LEADERSHIP IN HEALTHCARE QUALITY: STRENGTHENING COMPLIANCE CAPACITY FOR THE REGULATIONS RELATING TO STANDARDS FOR EMERGENCY MEDICAL SERVICES

by

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DECLARATION

I, Lloyd Denzil Christopher, hereby declare that the work on which this dissertation/thesis is based is my original work (except where acknowledgements indicate otherwise) and that neither the whole work nor any part of it has been, is being, or is to be submitted for examination towards any qualification at this or any other university.

Furthermore, it represents my own opinions and not necessarily that of the Cape Peninsula University of Technology.

LD Christopher 12/12/2023

Signed Date

ABSTRACT

In South Africa, Emergency Medical Service (EMS) eligibility and compliance with Office for Health Standards Compliance quality standards for EMS is not well understood. How EMS managers' knowledge, attitude, and professional practice can be transformed so that EMS organisations may develop capacity to comply with the quality standards for EMS is unknown. The study was conducted on South African public EMS organisations in its provinces. Although the provincial EMS organisations have commonality in terms of structure (e.g., medical qualification, rank, uniform, vehicles), there are significant variations between the provinces (constituting heterogeneity) that necessitated the national study.

Through the lens of critical theory, a mixed methods explanatory sequential design was used to describe the knowledge, attitude, and practices of EMS managers in relation to the quality standards for EMS. Phase 1 consisted of a quantitative survey (n=352). Phase 2 included the non-participant observation (N-PO) of national workshops (n=7 provinces) for EMS managers. The survey data were analysed using R Core Team®. The survey findings informed the development of a semi-structured interview guide. Interviews (n=11) were conducted with key EMS informants, to thematic saturation. The N-PO and interview data was analysed using ATLAS.ti 23® to develop themes and sub-themes to deepen the understanding of factors that influence quality improvement in EMS.

The survey knowledge, attitudes, and practices survey of EMS managers found that few (17%; n = 60) of public EMS managers were trained to manage quality. There were differences between the provinces with scores lower in the rural provinces. Key factors that hinder quality included lack the resources (61%; n = 213) to implement quality improvement projects; most (60%; n = 212) employees not following policies and standards; only 32% (n = 131) of managers said they get strong support from senior management, and few 24% (n = 83) said their staff are motivated to improve quality.

What emerged was that there are underlying complex historical influences that have shaped public EMS in South Africa. There are human resource challenges in relation

to the manager's experience, education and training, unfilled vacant posts, and the unprofessional work ethic of employees. The managers felt disempowered with EMS fragmented under the district health system, EMS is marginalised within the health department and the political and labour union influences negatively impact on the EMS quality.

The Capacity-Competency-Compass (C^3) framework is a novel finding of the study and was found to align to each of the themes that emerged from the findings. A bespoke development of leadership competencies for EMS managers is suggested for EMS to meet the envisaged quality standards. These novel findings are of potential value to EMS and other public service policy makers, managers, clinicians and academics in South Africa and other emerging EMS health systems.

KEYWORDS: Emergency Medical Services, Quality Improvement, Knowledge, Attitude and Practice survey, Quality standards

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DEDICATION

I dedicate this study to my wife Lynnell, my son Daniel, and daughter Shonell, thank you for allowing me this opportunity and for the many sacrifices that you have made. To my mom, Caroline and my late dad, Desmond Christopher, your values continue to be my source of strength. I give thanks to almighty God for granting me the strength, wisdom, and perseverance to accomplish this work.

Colossians 3:17. *“And whatever you do, in word or deed, do everything in the name of the Lord Jesus, giving thanks to God the Father through him.”*

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GLOSSARY OF TERMS

Emergency care personnel: Is any health care provider registered with the professional board for emergency care at the Health Professions Council of South Africa.

Emergency care: Means the evaluation, treatment, and care of an ill or injured person in a situation in which such emergency evaluation treatment and care is required, and the continuation of treatment and care during transportation of such person to or between health establishments.

Emergency Medical Service (EMS): Means an organisation that is dedicated, staffed, and equipped to provide prehospital emergency medical care (NECET 2017:1).

Emergency Medical Service Manager: Any person registered with the Professional Board for Emergency Care who is employed as either a Shift Leader, Station Manager, Sub-District Manager, District Manager, Provincial Manager or Director of Emergency Medical Services.

Healthcare leadership competencies: The skills, knowledge and abilities required by healthcare management to make meaningful health system change, integrating caring actions dedicated to user, community, and building caring teams that work in healthy workplaces.

Healthcare leadership: The behaviour of a leader in healthcare when directing, influencing, and managing the activities of other healthcare workers towards

	driving innovation, shaping systems, achieving outcomes, and attaining a shared goal (van Diggele, Burgess, Roberts & Mellis, 2020).
Healthcare management:	All the activities and tasks undertaken by one or more healthcare managers for the purpose of planning, using resources and controlling the activities of people within the healthcare organisation to achieve an objective or complete an activity that could not be achieved by the others acting independently.
Quality Domain in healthcare	An aspect of healthcare service delivery where quality or safety can be at risk.
Quality improvement (QI):	The systematic data driven processes designed to bring about improvement in the provision of healthcare services (Hughes Ronda, 2008).
Quality in healthcare	It is a complex concept that can be measured against standards. It refers to the degree to which health services meets the needs and expectations of individuals and communities (Whittaker, Shaw, Spieker & Linegar, 2011).
Quality Standards in healthcare	Statements that define the level of requirement, excellence, attainment or performance of key functions, activities, processes, and structures so that organisations can provide quality services. Standards should be achievable and designed to promote continuous improvement (Pillay, 2019:2; (Whittaker, Shaw, Spieker & Linegar, 2011).

ABBREVIATIONS AND ACRONYMS

AEA	Ambulance Emergency Assistant
ANOVA	Analysis of variance
ANT	Ambulans Noord Technologie (Paramedic)
AT	Activity Theory
BAA	Basic Ambulance Assistant
CAD	Computer Aided Dispatch
CCA	Critical Care Assistant
CPD	Continuing Professional Development
CPG	Clinical Practice Guideline
CPR	Cardiopulmonary Resuscitation
CPUT	Cape Peninsula University of Technology
CT	Critical Theory
DMAIC	Define, Measure, Analyse, Improve, and Control
DOH	Department of Health
DPSA	Department of Public Service Administration
ECA	Emergency Care Assistant
ECC	Emergency Communication Centre
ECCSA	Emergency Care Society of South Africa
ECP	Emergency Care Practitioner
ECT	Emergency Care Technician
EMC	Emergency Medical Care
EMS	Emergency Medical Service
GDP	Gross Domestic Product
HOD	Head of Department
HPCSA	Health Professions Council of South Africa
HR	Human Resources
HRH	Human Resources for Health
HRO	High Reliability Organisation
IFT	Inter Facility Transfer
IOM	Institute of Medicine
KAP	Knowledge, Attitude and Practice
KZN	KwaZulu-Natal

LMICs	Low- and Middle-Income Countries
N-PO	Non-Participant Observation
NCHL	National Center for Healthcare Leadership
NCS	National Core Standards
NDOH	National Department of Health
NECET	National Emergency Care Education and Training
NHA	National Health Act
NHI	National Health Insurance
NHQIP	National Health Quality Improvement Plan
NQF	National Qualifications Framework
NSDA	National Service Delivery Agreement
OECO	Occupational Emergency Care Orderly
OHCA	Out of Hospital Cardiac Arrest
OHSC	Office of Health Standards Compliance
OSD	Occupational Specific Dispensation
PBEC	Professional Board for Emergency Care
PDSA	Plan-Do-Study-Act
PPT	Planned Patient Transport
QA	Quality Assurance
QI	Quality Improvement
SA	South Africa
SAHPRA	South African Health Regulatory Authority
SAHRC	South African Human Rights Commission
SDGs	Sustainable Development Goals
STEEEP	Safe, Timely, Effective, Efficient, Equitable, and Patient-centred
TEWS	Triage Early Warning Score
TQM	Total Quality Management
UHC	Universal Health Coverage
UMICs	Upper Middle-Income Countries
UN	United Nations
WC	Western Cape
WHO	World Health Organisation

CHAPTER ONE
INTRODUCTION AND MOTIVATION

1.1 INTRODUCTION

This chapter introduces the background and motivation for this study. The purpose, aim, objectives and related questions are presented. An overview of the research design, data collection methods are included. The assumptions, limitations, significance, and positionality of the researcher is expressed. The chapter concludes with the expected outcomes and a description of the structure of the rest of the thesis.

This thesis aims to explicate the: what, who and how of South African Emergency Medical Service (EMS) managers' knowledge, attitude, and practices of quality improvement, through the lens of critical theory. It is important to note that the context for this submission is post the Covid-19 pandemic, 29 years post-apartheid, and soon after the release of the 2022 judicial enquiry into State capture[1]; from which health system resourcing also fell victim, compounding existing health challenges. There is widespread acknowledgement that the South African health system is in crisis and that the healthcare quality in South Africa (SA) has been compromised (Maphumulo, 2018). Reports such as the South Africa National Lancet Commission and the 2019 Presidential Health Compact, provide an expert analysis of the extent of the crisis and the interventions required for system rehabilitation and redress (Republic of South Africa, 2019b; National Department of Health, 2019). The EMS in SA will be discussed in the next paragraph to give context to where the research problem is located.

Emergency care is a provincial competency. The EMSs, as jurisdictional[2] custodians of emergency care are also microcosms of the national and provincial health system[3] and as such, may reflect broader system deficiencies and quality challenges.

[1] State capture refers to the South African Judicial Commission of Inquiry into allegations of state capture, corruption and fraud in the Public Sector, including Organs of State (Republic of South Africa, 2022c).

[2] Emergency Services' jurisdictions extend provincially. Each province funds and governs its own emergency service to respond to emergency care needs within its provincial jurisdiction.

[3] The National health system can be seen as the macrocosm (relative to Global Health).

Newspaper headlines are telling as a form of contextual[4] and experiential[5] evidence (and is what informs public confidence): *"Ambulance services grind to a halt as Eastern Cape districts as paramedics down tools"* (Lefafa, 2022); and *"Healthcare in Mpumalanga hamstrung by ambulance shortages and other problems"* are not uncommon (Sizani, 2022). The poor quality of the EMS was highlighted in the South African Human Rights Commission (SAHRC)[6] investigation that reported on the experiences of the ambulance services in the Eastern Cape province (South African Human Rights Council, 2015). The frequency of these negative public commentary suggests poor prevailing quality of EMS in many regions of SA.

In response to the obligation to redress poor-quality healthcare, the SA government proposed a National Health Quality Improvement Plan (NHQIP) for SA. The plan includes the development of regulatory standards by the Office for Health Standards Compliance (OHSC) which is an independent body established in terms of the National Health Amendment Act of 2013. The first regulated standards for EMS were promulgated in terms of Government Gazette Vol 2819 of 2 December 2022 and will come into effect 12 months after the date of promulgation. Notwithstanding this imminent implementation deadline, the capacity of EMS organisations to comply with these regulations is unknown. The next paragraph expands on.

In considering the knowledge gap to be addressed in this study, Howard et al. (2020) reported that poor knowledge of organisational-specific quality systems existed amongst EMS managers and that there is a general need to design a standardised quality system for EMS in SA. A review of the literature (Chapter 2) suggests that there is a gap in the knowledge and the proximal aim of this research is to address how and

[4] Contextual evidence provides guidance based on information, insights and understandings from a variety of local sources (e.g., community history) that are likely to influence a programme or policy under consideration (Hankey, 2011).

[5] Experiential evidence refers to collective experience, expertise and tacit knowledge systematically gathered from multiple stakeholders who have lived or practised in a particular community (Centre for Disease Control, 2009).

[6] The SAHRC is a constitutional institution charged with protecting the human rights entrenched in the constitution.

what should be considered in a quality improvement framework that targets EMS managers as quality champions. A framework is required so that EMS organisations and managers may have the information at their disposal to implement quality improvement and develop the capacity to address the ongoing quality concerns of the EMS nationally. The aim would be that the above findings give expression to the Sustainable Development Goals[7]: Goal 3: Good Health and Wellbeing, Goal 10: Reduced Inequalities and Goal 16: Peace, Justice and Strong Institutions. The above serves as motivation for this research project. The next section discusses the background of the research problem.

1.2 BACKGROUND OF THE PROBLEM

This section discusses the global concerns on the quality of healthcare, the SA legislation related to quality in healthcare and the concerns regarding poor healthcare in SA. The discussion funnels to EMS and EMS management and leadership.

1.2.1 Healthcare quality is a global concern

The World Health Organisation (WHO) has made the strengthening of health systems a key priority. The WHO reports that despite the advances in medical interventions, gaps in health outcomes continue to widen as health systems fail to deliver healthcare to those in greatest need (World Health Organisation, 2007). Health systems are for people, and people should receive good quality healthcare with the country's resource capacity (Donkin et al., 2018). What then, is the impact of poor quality on morbidity and mortality[8]?

It is well documented that poor quality healthcare systems impact on the life expectancy of the population. In low- and middle-income countries (LMICs) and in

[7] United Nations Sustainable Development Goals (SDGs). Goals adopted by all member states in 2015 to transform our world (www.sdgs.un.org/goas).

[8] Mortality and morbidity data serve as fundamental indicators of health system performance.

Upper-Middle-Income-Countries (UMICs) such as SA[9], a large proportion of the population are vulnerable and evidence suggests that in developed countries, access to high quality healthcare leads to improved health outcomes (GBD 2015 Healthcare Access and Quality Collaborators, 2017).

In developed countries, such as Singapore, Germany, USA, and France, the focus of quality is more concerned with cost, waste, effectiveness, and efficiency than access, and safety. In developing countries, such as SA, the quality issues are related to inequity, unavailable resources and lack of skilled personnel (Reerink, 1989). SA is classified as an UMICs, and yet faces numerous challenges which impact negatively on quality of healthcare delivery not unlike many LMICs. In SA there are inadequate health resources to meet the needs of the population and the country's health system is reported to be performing below par when its performance is compared to similar UMIC's (Whittaker et al., 2011; Stacey et al., 2021). An overview of the healthcare in SA relative to quality of care is presented next.

1.2.2 Healthcare quality in contemporary South Africa

The South African Lancet Commission conducted a national analysis on quality of care in SA. The commission reported challenges with healthcare quality, gaps in ethical leadership, maladministration, and mismanagement as key contributing factors. The report recommended that addressing health management training may help health services and facilities develop quality improvement measures to address healthcare quality (Department of Health South Africa, 2019). These quality challenges affect the safe, effective, efficient implementation of healthcare services including emergency medical services (Howard et al.,2020; Stacey et al., 2021).

Although the SA government's policy framework for improving healthcare quality appears robust, there are numerous challenges faced by the SA health system.

[9] The United Nations classifies countries as High-Income, Upper-Middle-Income, Lower-Middle-Income and Low-Income using World Economic and Prospects (WESP) data to determine the per capita gross national income.

Provision of high-quality healthcare in SA is impacted primarily by the unequal divide between public and private healthcare, the quadruple burden of disease, the impact of the COVID-19 pandemic, socio-economic inequality and corruption that further worsens the availability of scarce resources. Other contributing factors are the racial, spatial and urban-rural inequalities, high unemployment, crime, poor management, and a lack of ethical leadership and accountability (National Department of Health, 2019). Improving the quality of healthcare is central to the proposed healthcare reforms in SA (Armstrong et al., 2015).

There is divide between public and private healthcare in SA. The Deputy Director-General in the National Department of Health was reported in the Sunday Times[10] to have said that SA has a dual health system divided along socioeconomic lines, one private and the other public, and neither of which are doing well. Although SA has the 35th largest economy in the world and spends 8,5% of its GDP on healthcare, it performs poorly in terms of healthcare outcomes (Farber, 2022). What makes healthcare in SA unique is that less than 20% of the population enjoys access to private healthcare that may arguably be comparable to that of many first world countries, whilst the remaining 80% of the population must contend with a poorly performing public healthcare system (Passchier, 2017).

The policy response to poor-quality healthcare deserves mention. At face value, the commitment of policymakers to improving healthcare quality does appear to be sincere. However, policy makers are not those implementing the policy. Reports such as the NHQIP (Department of Health, 2021) and the National Guideline to Manage Complaints, Compliments and Suggestions by the Department of Health (Department of Health, 2021c), indicate a commitment to provide the best quality care to patients. This is done by meeting their expectations, needs and improving service delivery (Department of Health South Africa, 2007; Department of Health, 2021). To achieve this goal, the 2002 DOH policy on quality identifies three focus areas:

- To improve person-centred health service,

[10] One of South Africa's premier independent newspapers.

- To improve technical quality, and
- Caring for the carers (Western Cape Government Health, 2014).

Notwithstanding, this quality commitment in policy, its impact has been largely ineffective. Policy expectations are further thwarted when gross deficiencies and other decisions result in preventable loss of life or health consequences and costs. An intention for quality by policymakers, alone, does not seem to consistently translate into healthcare quality for healthcare users.

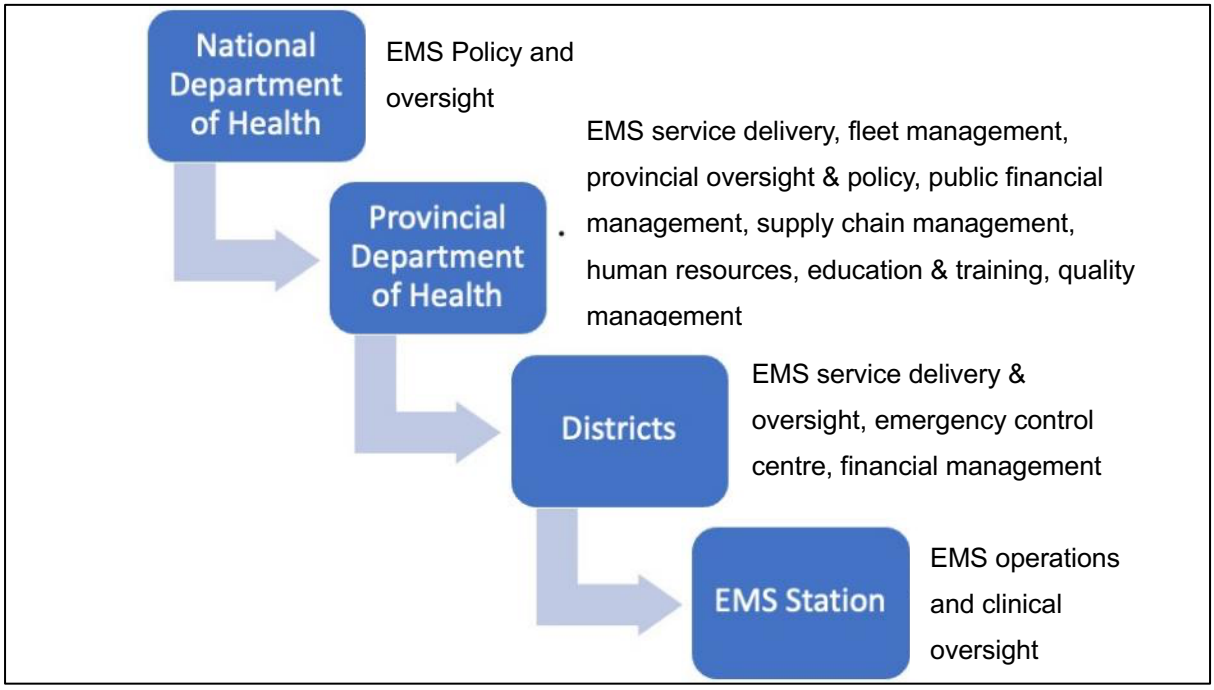
In relation to health policy impact, there have been a wide range of quality improvement programmes directed at health in SA, such as the re-engineering of Primary Healthcare, Strengthening District Health Systems (National Department of Health, 2019). Although the overall population health in terms of life expectancy has improved post 1994, it can be argued that health quality improvement policies have had limited success (Coovadia et al., 2009). As an example, Stacey et al. (2021) studied the Ideal Clinics Realisation and Maintenance Program which was a recent large-scale quality improvement policy in SA. The study was unable to find that this policy resulted in any change in the quality care indicators.

Key challenges such as the poor coordination and fragmentation of health services amongst the provinces, competing priorities within the health sector, as well as the socio-demographic, economic and cultural determinants of health continue to plague healthcare (Begg et al., 2018). The protracted implementation of universal health coverage through the National Health Insurance (NHI) is seen as an essential foundation upon which the health system must be based. The limited success of NHI implementation is appearing to erode rather than build confidence and trust in the public health services (Naidoo, 2012; Farber, 2022). The next section provides a brief overview of the quality in EMS as it is deemed to be an important pillar for effective, efficient and reliable healthcare.

1.2.3 An overview of quality in Emergency Medical Services in South Africa

This section describes the quality of EMS as an integral component of the healthcare system in SA. Schedule 5, Part A of the Constitution of South Africa (Act 108 of 1996) stipulates that the provision of ambulance services is the competence of the provincial government and as such each of the nine provinces therefore has EMS as a directorate within the provincial Department of Health (Republic of South Africa, 1996). The National Health Act of 2003 (Act 61 of 2003) provides the legislative framework for the provision of healthcare services. In Figure 1.1 the public sector EMS roles and responsibilities at a national, provincial, district and station level are summarised. This is a generic framework that may differ between provinces.

Figure 1.1 EMS roles and responsibilities: national, provincial, district and station



Source: Researcher's own compilation

It is important to gauge the quality of EMS as this component of the health system is a key entry point for patients needing urgent care (Sander, 2002; Howard et al., 2020). Given the nuanced nature of the pre-hospital environment, the assessment of quality in emergency medical services is complex (O'Connor et al., 2021). Howard et al. (2019) suggest that any quality improvement programme must therefore consider the nuance of the pre-hospital environment in developing countries.

The need for a quality EMS as part of the health system is discussed. An effective emergency medical system should have as its primary purpose to provide emergency care to all who need it regardless of circumstances that may render the patient vulnerable (Kobusingye et al., 2005). Member states at the Seventy-second World Health Assembly agreed that a functional emergency care system saves lives, increases the impact, reduces costs and is essential for universal health coverage (World Health Organisation, 2019). However even with the best resources delivering effective and safe emergency care is a challenge as the pre-hospital environment is uncontrolled and unpredictable. There is no direct oversight or supervision and access to patient history and information is often limited (Brice et al., 2001). Although no study has specifically investigated the consequences of pre-hospital medical errors, Campbell et al. (2007), report that emergency care is prone to clinical error given the unpredictable nature of the pre-hospital environment and that those cognitive errors do compromise patient safety and the provision of effective emergency care. Croskerry (2005) suggests that quality improvement measures can reduce diagnostic error in clinical practice. The next paragraph unpacks some of the concerns around the qualifications of EMS personnel.

The nature of the prehospital environment is such that direct pre-hospital clinical oversight of basic life support is difficult to implement. Advanced life support practitioners (Emergency Care Technicians, Paramedics and Emergency Care Practitioners) make up less than 5% of the EMS workforce and they are predominantly employed in the urban cities across SA (Tiwari et al., 2021). The National Emergency Care Education and Training (NECET) policy describes how the increased clinical demands emanating from the increased Health Professions Council of South Africa (HPCSA) scope of practice for emergency care personnel warranted changes to the education policy. The change was also driven by the need for greater accountability for the emergency care being rendered, coupled with the need to provide skilled multidimensional care in multiple, often unfamiliar environments (Department of Health of South Africa, 2017).

Stassen et al. (2015) reported that the emergency care environment in SA is prone to medical errors because the environment is dynamic and uncontrolled, and in addition

EMS personnel are generally overworked. Staff shortages due to vacant posts being frozen in the public sector leads to health workers having to work overtime (Department of Health South Africa, 2020). Health workers that are overworked are more likely to make mistakes. In EMS the extent of EMS patient errors is difficult to quantify due to under-reporting as a result of fear and lack of standardised reports for capturing adverse events. Stassen et al. (2015) reported that 54,8% of the respondents in a survey reported that they had seen others make errors yet only 28,7% admitted that they themselves had made errors that affected patients.

The demand on public EMS in SA is such that the existing resources are inadequate to meet the demand. This increases the workload with fewer ambulances having to respond to an increasing number of calls. Based on the national operational standard of one ambulance per 10 000 population, the EMS in KwaZulu-Natal province in 2019 had one ambulance per 61 820 population (Tiwari et al., 2021). The private EMS has identified the gap and there has been a growth of small private EMS companies that have emerged (KwaZulu-Natal Department of Health, 2019). Vincent-Lambert & Jackson (2016) reported that in the private EMS sector profit generation takes precedence over the provision of care.

Until recently, EMS has largely been missed in the discussion and legislation on quality in healthcare. In February 2021, the Minister of Health published for comment Regulations Relating Standards for Emergency Medical Service which has as its purpose to promote and protect the health and safety of patients and healthcare personnel. This regulation was promulgated in December 2022 and requires all public and private EMSs in South Africa to be compliant (Department of Health, 2021). Such compliance is predicated on a shared vision for accountable, equitable and quality care and the prerequisite inputs and processes to generate the desired outcomes.

Kobusingye et al. (2005) suggest that in LMICs the EMS is viewed as the transportation wing of the healthcare system and there is little focus on the quality of pre-hospital care delivered to patients. The quality of care provided by EMS varies greatly, and there are few established metrics for measuring prehospital care quality. Quality is measured using surrogate indicators such as success rates for treatment of

cardiac arrest (Stein et al., 2015). Research undertaken by Howard et al. (2019) report that some private EMS companies in SA are following the trends of EMS as in developed countries by setting quality indicators by which to measure the effectiveness of their service.

In SA the common nationally defined performance indicator used to measure quality in the public sector is the response times of EMS to emergencies and non-emergencies in urban and rural settings (Stein, 2009). The Regulations Relating Standards for Emergency Medical Services build on the 2017 EMS licensing regulation requirements. The standards for EMS and the quality measurement tool is used by the OHSC and Department of Health (South Africa, 2022) to evaluate compliance against the quality domains. The purpose of these regulations is to create a minimum acceptable level of quality that all EMS organisations in SA must attain. The EMS manager is required to ensure that systems, functions, and processes are in place to meet these standards.

1.2.4 EMS management and leadership in SA

Health system inefficiency is probable in the context of a lack of leadership, ineffective management, or poor policy implementation. Despite SA having well-established health science education institutions graduating skilled health professionals, Rispel (2016), in the South African Health Review 2016, reported that there is ineffective and sub-optimal management leadership at various levels of the public health system. Howard et al. (2020) noted that there have been improvements in emergency care education and training following the introduction of the NECET policy that resulted in the discontinuation of vocational education. In SA EMS managers are appointed based on their emergency care qualifications[11], and experience[12] and therefore often lack any management and quality improvement education and training (Naidoo et al., 2014; Sobuwa & Christopher, 2019).

[11] The minimum required qualification to be appointed to an EMS manager position is the Ambulance Emergency Assistant (AEA) which was a 16-week (8 weeks theory and 8 weeks practical) intermediate life support (ILS) short course. This qualification is no longer produced as it fell outside the National Qualifications Framework

[12] A minimum of 2 years of experience is required.

There are concerns on EMS management training in SA. Although SA has made positive strides to improve the education and training and expand the clinical scope of practice of EMS personnel, little is known with regards to the education and training of EMS managers on quality (Howard et al., 2020). Other unanswered questions include: what education and training on quality improvement is done? Who is trained and by whom? Where and when is training done? How is the quality improvement monitored post-training, and what indicators of quality are used by emergency medical services in SA? The following section describes the problem statement of this study.

1.3 PROBLEM STATEMENT

Studies report that the implementation of policies to improve the quality of healthcare in SA has been inadequate with the healthcare needs of the poor not adequately met (Coovadia et al., 2009; Gray & Vawda, 2016). Underdeveloped pre-hospital emergency care systems in Africa, including SA, contribute to a disproportionate burden of preventable deaths before arrival at hospital (Mould-Millman et al., 2017). The development of pre-hospital quality systems and associated quality indicators has become critical (Howard et al., 2019). The development concern was to widen access to EMS for the South African population. However, widening access to an EMS that is unaccountable and of questionable quality may have the impact of widening inequity and inequality of EMS service delivery. Rispel (2016) posits that access to healthcare facilities does not improve health outcomes if the quality of care remains poor. To prevent such counter-productive consequences of poor quality, the Department of Health, Emergency Medical Service Regulations, 2017 make provision for the licensing of both public and private EMS. The Regulations Relating to Standards for Emergency Medical Services (2022) makes provision for the OHSC to protect and promote the health and safety of users of health services by ensuring that EMS meet quality standards as prescribed by the Minister of Health (South Africa, 2022).

Improving the quality of healthcare delivered by EMS is complicated by factors such as the number and type of services, the geographic dispersion, and the unpredictability of the emergency environment. While in developed countries the indicators to measure pre-hospital care quality are well established, this is not the case in SA

(Pap et al., 2018; Howard et al., 2019). With the implementation of quality standards for EMS, it is unknown as to what extent public and private EMS can meet these standards, what quality management and quality improvement systems are in place and what quality management training the appointed quality champions have received to improve the quality and comply with the standards for EMS.

1.4 PURPOSE OF THE STUDY

The purpose of this study was to critique the SA public EMS managers' knowledge, attitude, and practices so as to construct a quality improvement framework that strengthens the managers' response to the Regulations Relating to Standards for EMS. The Department of Health: National Health Quality Improvement Plan (2020) confirmed the findings of the South African Lancet Commission on Quality Health Systems (2019) that mismanagement contributed to the poor-quality healthcare and suggested that health management training will help develop quality improvement measures aimed at addressing healthcare quality (National Department of Health, 2019).

In SA, the EMS managers are appointed based on their medical qualifications and often lack any management training and experience. Similarly, the purpose of this study is supported by research undertaken by Howard et al. (2020), which reported the poor knowledge of organisational standardised quality systems and concluded that there was a need for a standardised quality system for EMS in SA. The aim, objectives, research questions and research propositions of the study will follow.

1.5 AIM OF THIS RESEARCH

In the interest of administrative and social justice, the study aimed to evaluate capacity and compliance with the regulations relating to standards for EMS. This study intended to recontextualise the quality improvement discourse through the construction of a quality improvement framework that strengthens the public service EMS manager's response to the standards for EMS. Such an evaluation is a prerequisite for redress of capacity limitations.

1.6 OBJECTIVES OF THIS RESEARCH

The research objectives considered the knowledge gaps identified in the literature review and narrowed the focus to guide the research process to achieve the aim. It is within the research inquiry to identify and explore the benefits and impediments to implementing sustainable quality improvement systems in the public EMS and to develop a novel framework for quality improvement in EMS. The objectives were:

1. To facilitate a quality self-audit including the critical appraisal of the knowledge, attitude and practice of EMS managers who are the power brokers in relation to EMS quality improvement.
2. To observe and document the EMS managers perspectives on the application of the quality standards for EMS and reasons for non-compliance.
3. To develop a framework that explicates how change in EMS policy and praxis may lead to quality improvement in public EMS organisations, in the interest of patient safety and organisational sustainability.

1.7 RESEARCH QUESTIONS

The above context has provided insight into the purpose for conducting this investigation and based on the abridged literature surveyed the following questions or gaps in the literature became evident which necessitated this research. The primary research question was:

“How can the EMS managers knowledge, attitude, and practice (KAP) concerning quality improvement (QI) be transformed so that emergency medical service (EMS) organisations may comply with the regulations relating to standards for EMS?”

The secondary questions in relation to the research topic and objectives were:

1. What is the knowledge, attitudes and practices of EMS managers who are quality champions, in the public EMS organisations in relation to quality improvement?

2. How do EMS managers perceive, interpret, and understand the regulations relating to standards for EMS?
3. What are the factors that motivate and foster quality improvement amongst EMS managers within EMS organisations?
4. What are the benefits, and impediments and opportunity costs to implementing quality improvement in EMS?

1.8 RESEARCH PROPOSITIONS

A proposition is a declarative statement that suggests an association between concepts based on prior research, reasonable assumptions, and existing correlative evidence. Propositions are valuable in complex systems, and Reuter-Oppermann, van den Berg & Vile (2017) found that EMS are complex systems where variation make experimental tests difficult. The researcher elected to use *a priori* propositions rather than hypotheses as the quantitative component of this study is of an exploratory nature, and there are no previous models that can be used, therefore, a pragmatic approach was adopted.

The following *a priori* propositions were formulated:

1.8.1 Proposition 1

Quality systems assess and maintain standards of quality and patient safety in EMS in SA are perceived to be underdeveloped and poor due, in part, to ineffective leadership.

1.8.2 Proposition 2

EMS are nuanced and complex organisations that require bespoke quality improvement systems to develop, maintain, and evaluate quality and patient safety.

1.8.3 Proposition 3

Developing a quality improvement framework will contribute to improving the knowledge, attitude, and practices of EMS managers thereby improving compliance capacity with the quality standards for EMS.

1.9 RESEARCH DESIGN AND METHODS

1.9.1 Research philosophy

Any research undertaking must make assumptions about what knowledge claims are being made, what strategies of inquiry will be used and the choice of methodologies for data collection and analysis. These knowledge claims are about what ontological lens do we use to view knowledge, how we know it, i.e. What is our epistemology?, what are the values embedded in it (axiology), how it is written and what methodology we use to study it (Guba & Lincoln, 1994). The narrative of the considerations of selecting the most appropriate research approach for this study is discussed in Chapter Four.

Critical Theory was the philosophical paradigm that underpinned this study. The Positivist, Interpretivist, Critical and Pragmatic philosophical paradigms were considered[13]. Critical Theory was decided upon as this study critiqued the action and motivation of what was currently being done in relation to quality improvement in EMS, and why? The philosophical paradigms will be discussed fully in Chapter Four.

1.9.2 Mixed methods

EMS are complex and diverse organisations and phenomena of quality in health are multifaceted (McManamny et al., 2014). To enhance the research findings a sequential explanatory mixed methods research design was deemed appropriate to meet the aims and objectives of this study. Kajamaa et al. (2020) report that when the methods are mixed, the weaknesses of the one paradigm can be supported by the strengths of the other, and therefore the design can be advantageous in answering complex research questions by providing a more nuanced understanding of the phenomena.

1.9.3 Data collection

This study was enabled through collaboration with The National Department of Health: Directorate EMS and Disaster Medicine who scheduled face-to-face workshops in all nine provinces (countrywide) to engage and share information on the Regulations Relating to Standards for EMS with the existing provincial EMS managers. After

[13] …in part for the author's own development.

obtaining ethical clearance and site approval to conduct the study in all nine provinces, the researcher accessed the participants attending the EMS workshops conducted by the Directorate EMS and Disaster Medicine (Appendices B & C). At the start of each workshop, the researcher was introduced to the workshop participants. After a briefing by the researcher on the purpose of the study, participants were informed of their rights as voluntary participants and requested to complete the consent form (Appendix D).

During Phase 1 the quantitative survey data was collected. The survey was designed and implemented to measure the Knowledge, Attitude and Practices (KAP) of the EMS managers in relation to quality management standards for EMS intended to contribute to the quality and safety of healthcare services (Office Health Standards Compliance, 2022). KAP surveys gather declarative statements based on the knowledge or conceptions and opinions or attitudes of a population about a specific topic. The survey included items about the respondent's practices in relation to quality management standards for EMS and identified the factors that promote and inhibit quality improvement in SA.

A survey tool was selected as the tool is versatile, cost effective and efficient in terms of time and resources. The strength of a survey is that the information found is generalisable not just to the sample but to the entire population (Polit & Hungler, 1999). To ensure construct and content validity, a panel of experts examined the appropriateness and comprehensiveness of the survey to measure the KAP. A pilot study was conducted to test the face validity of the survey instrument. The survey was then administered by the researcher to the consenting participants at the end of the workshop.

In Phase 2 (a) the researcher undertook non-participant observations during the EMS workshop question and answer sessions. The non-participant observational data was collected at workshops held in seven of the nine provinces. The observations were captured by the researcher using MS Word® (Version 16.76), aided, when necessary, by the voice to text transcription feature in MS Word®. The researcher captured the key observations, participant questions and comments. The researcher did not assign

the findings and supporting quotes to individual workshop participants but to the workshop in general.

The survey and non-participant observational data was used to identify any observable relationships that were further explored during Phase 2 (b) which was interviews with key informants. The key informants included senior managers from public EMS organisations. The purpose of the interviews was to explore in more depth the findings of the survey and the non-participant workshop observations. The findings from the quantitative survey data were analysed using R® statistical software[14] (R Core Team®, 2023). The non-participant observations and interviews were coded using ATLAS.ti® (Version 23.2.0). Both the quantitative and qualitative findings were mixed and used to develop quality improvement framework for EMS managers in SA.

Table 1.1: Alignment of the objectives, questions, methods, and analysis

Study Objectives	Research Questions	Methods	Analysis
Facilitate a quality self-audit of EMS managers	What is the knowledge, attitudes and practices of EMS managers that are quality champions, in the public EMS organisations in relation to quality improvement?	Survey Questionnaire	Statistical Analysis using R® statistical software (Version 2023).
	What are the factors that motivate and foster quality improvement amongst EMS managers within EMS organisations?		
Document the key stakeholder perspectives	How do EMS managers perceive, interpret, and understand the OHSC quality standards for EMS?	Non-Participant Observation of EMS Workshops.	Qualitative Analysis using ATLAS.ti® (Version 23.2.0)

[14] R Core Team (2023). R: A language and environment for statistical computing. R Foundation for Statistical Computing, Vienna, Austria. URL https://www.R-project.org/.

Develop framework for change	What are the benefit and impediments to implementing quality improvement in EMS	Participative interviews	Qualitative Analysis using ATLAS.ti® (Version 23.2.0)

Source: Researcher's own compilation

1.10 ASSUMPTIONS

It is assumed that participants have an interest in promoting quality in healthcare. It is also assumed that quality improvement frameworks, if designed appropriately, evidence-informed, and theoretically laden, have value for development of a quality mindset among stakeholders. It is assumed that the participants would have answered truthfully and accurately to the survey and interview questions based on their experience.

1.11 LIMITATIONS AND/OR DELIMITATIONS

There is acknowledgement of potential bias and influence over the interview participants with the researcher having been in the profession for many years and having held the position of Chairperson of the Professional Board for Emergency Care, albeit over a decade ago. This influence is not deemed to be undue. Time and resource constraints were a limitation as the EMS Standards regulations will come into effect in December 2023. The use of Likert scale can potentially be a limiting factor as survey participants may avoid selecting the extremes thus masking the intensity of the real KAPs.

The delimitations are:

a) To include the dissident participants in the interview sample that are opposed to the introduction of EMS standards for improving the quality of pre-hospital emergency care.
b) The study included EMS managers who hold the rank of shift leader or higher, registered with the Professional Board for Emergency Care at HPCSA and employed in a public EMS organisation in any province in SA. Managers from private EMS companies were not included in the study.

1.12 SIGNIFICANCE OF THE STUDY

Health services is a fundamental human right that is articulated in Section 27 of the Constitution of the Republic of South Africa which states that everyone should have access to health service, and no one may be refused emergency medical treatment. South Africa is committed to Universal Health Coverage which is also the target of United Nations Sustainable Development Goal-3 (Republic of South Africa, 2019b).

The Presidential Health Compact 2019 noted that the quality of the public health system remains inadequate and that there is inequitable access to healthcare. The 2019 Presidential Health summit report listed several focus areas for health improvement. This study focuses on two areas, namely: improving the health system in terms of quality, safety, and quantity; and strengthening governance and leadership to ensure accountability. Where employees lack management knowledge, skills, and competencies, engaging with the other sectors to improve access, coverage and quality of health services is required.

The Department of Health in collaboration with the OHSC developed and published regulations related to standards for EMS (Appendix H). The regulations followed the processes of consultation with stakeholder and public comment before publication. Whereas previously, public, and private EMS organisations were only required meet the 2017 EMS licensing inspection requirements (Appendix G), the regulations relating to standards for EMS will require EMS organisations to meet the quality standards. The gap in the knowledge requires to investigate how prepared the public EMS managers are to meet these quality standards, and what factors, if any, impact, on quality improvement interventions by the managers who are the quality champions tasked with improving the EMS organisation’s compliance with these quality standards?

This study is nuanced in so far as the quality standards for EMS in SA did not exist previously and therefore research related to these quality standards has never been undertaken. This study has relevance for health system development with a particular focus on EMS structure, processes, and outcomes not only for SA but also other

LMICs and UMICs with similar EMS organisations, such as those in the Southern Africa region. The outputs of this study should provide enabling recommendations that may influence future South African EMS policy, practice, education, and management. Any quality improvements may have the benefit of enabling equitable access, effectiveness, safety, patient centeredness, and efficiency of healthcare delivery. The study aims to create new knowledge and set a research agenda for future studies related to quality in EMS.

1.13 POSITIONALITY OF THE RESEARCHER

The researcher[15] has had various leadership positions in EMS since 1987 and is therefore an insider. These positions have shaped the researcher's experience and perspectives in the leadership roles as:

- Head of Training, KwaZulu-Natal College of Emergency Care
- Principal of the Lebone College of Emergency Care in Gauteng
- HOD of Department of Emergency Medical Sciences at the Cape Peninsula University of Technology
- Past Chairperson of the Professional Board for Emergency Care
- Present elected member of the Professional Board for Emergency Care

An insider is regarded as someone who has a lived familiarity with the group being researched. There is a presumption that an insider has easier access and therefore the data is less time consuming. Although not all the participants invited to be interviewed, accepted the invitation, the researcher was given access to the nation-wide workshops and almost all the workshop participants[16] completed the survey. Shah (2004, p. 556) argues that "A social insider is better positioned as a researcher because of his/her knowledge of the relevant patterns of social interaction required for gaining access and making meaning".

[15] The researcher's voice in mixed methods research is a hybrid that shifts from the first-person personal pronoun (to promote subjectivity) common in qualitative tradition to the more objectively distanced third person in quantitative writing thus leading to an individualistic dimension that brings emic and etic perspectives together (Zhou & Hall, 2018).

[16] The researcher did a head count at each workshop and compared the count against the number of surveys completed.

1.14 EXPECTED OUTCOMES

The researcher had the expectation that the knowledge, attitude, and practices of the knowledge, attitude, and practices of the public EMS managers regarding quality improvement may be deficient as there are no bespoke higher education EMS management qualifications in SA. There was also a reasonable expectation that there would be resistance to implementing standards for EMS from the managers as the regulations added responsibilities to the job of the manager, without added personal benefits[17]. There are several emergency care qualifications and therefore the expectation was that there would be significant differences in the knowledge, attitude, and practices of EMS managers with non-formal and formal qualifications.

1.15 SUMMARY OF THE RESEARCH

Chapter One presented the background of the problem related to the provision of quality health service by EMS. The definition of terms provides the meaning for these terms as interpreted in this study. The background for the study provides a synopsis of literature leading to the gap in the knowledge. The purpose of the study is to determine what is known and what is unknown in relation to quality management in EMS and in so doing develop a training programme to address the gap. The research questions determine the knowledge, attitude, and practices of EMS managers in relation to improving quality to comply with the EMS standards regulations and how bespoke quality improvement training can influence quality improvement in EMS. The significance of the study is derived from documenting the status quo of quality management in EMS and addressing the gap in knowledge and practice to improve quality management in EMS. The chapter concludes with the assumptions, limitations, and delimitations of the study.

Chapter Two provides a critical review of the literature in relation to healthcare quality and patient safety in general and as it relates to emergency medical services. The contextual nature of healthcare quality, and its complexity is discussed in relation to

[17] In some high-income countries with an egalitarian focus, increasing work demands with disproportionate remuneration is tantamount to wage theft, a corporate offence.

its definitions and dimensions. The healthcare system in South Africa is unpacked in relation to the legislative framework, policies, and challenges of implementation. The review concludes with a critique of the evidence on EMS and pre-hospital quality improvement, which is scant for pre-hospital care in South Africa.

Chapter Three discusses the theoretical framework that guides and grounds the research, and informs the principles, concepts and tenets of a theoretical construct thereby enhancing the rigour of the research findings. The conceptual framework provides the structure and presents the main concepts of the research problem.

Chapter Four presents the research design and the rationale as to why critical theory is used as the theoretical frame for the study is explained. Sequential explanatory mixed methods were used to allow for deeper understanding of the phenomena. It includes information regarding the study population, data collection and data analysis. The sampling, validity, reliability, and ethical considerations are presented.

Chapter Five describes the quantitative survey data collected in the first phase of the study. The data are presented in various tables and graphs.

Chapter Six presents the qualitative data collected during the second phase of the study. The interview data is coded and categorised into themes and presented with the aid of schematic diagrams.

Chapter Seven is the discussion chapter and presents the integration of the literature, quantitative and qualitative data. A framework for quality improvement training of EMS leadership is presented.

Chapter Eight is the concluding chapter of the thesis. The conclusions in relation to the aim, objectives and research question are presented. Finally, recommendations for further research concludes the chapter.

CHAPTER TWO
LITERATURE REVIEW

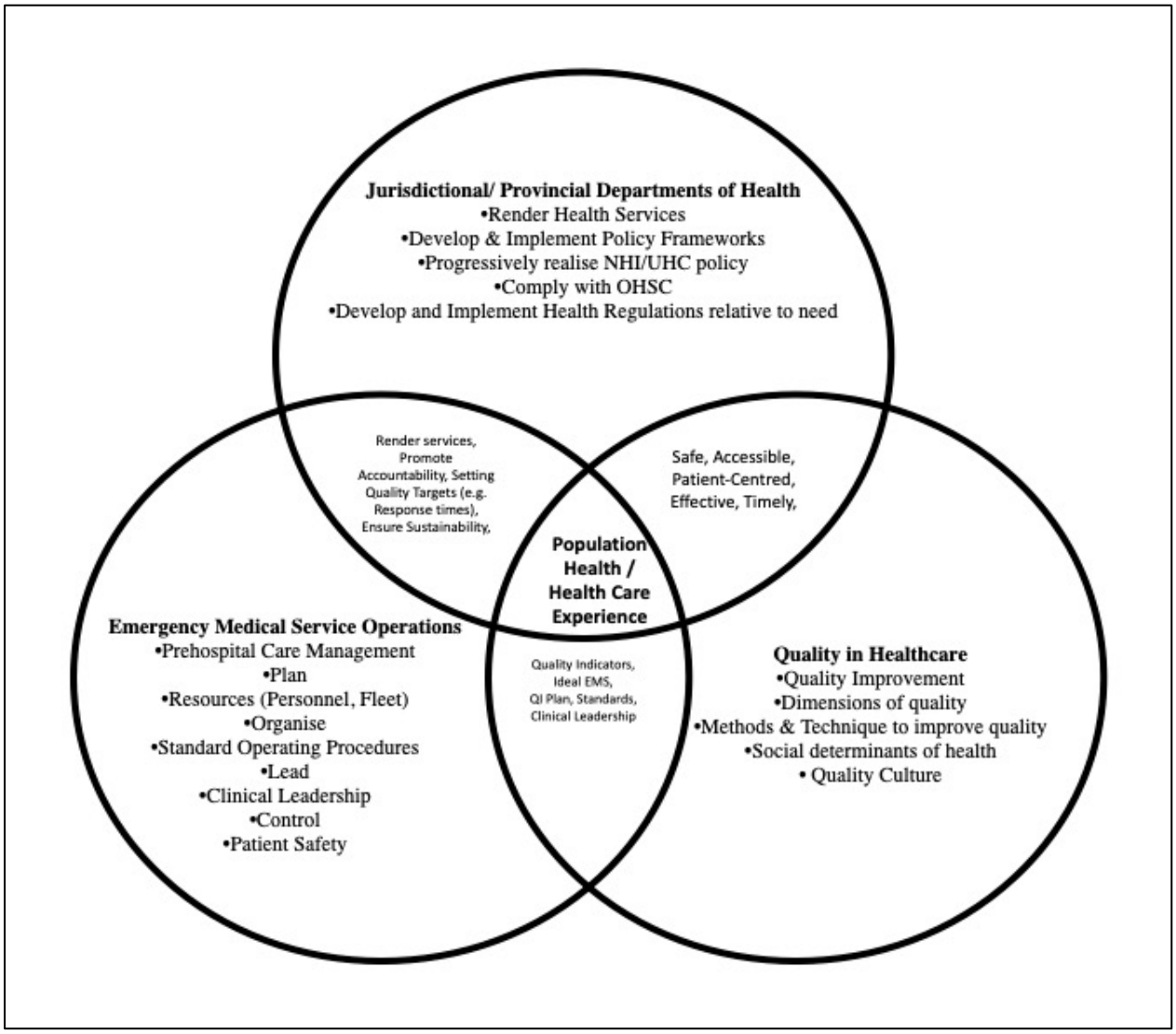
2.1 INTRODUCTION

Chapter One introduced the research and described the background, motivation, purpose, research aim, objectives, and related questions. The previous chapter briefly included an overview of the research design, data collection methods, the assumptions, limitations, significance, and positionality of the researcher.

This chapter is a critical narrative analysis of the literature on quality in healthcare in South Africa focusing on the quality improvement (QI) of EMS. The chapter begins by describing the jurisdictional EMS organisations, its brief history, and the legislative mandate under which EMS systems function. The focus then shifts quality in healthcare in SA and the initiatives to improve quality that led to the Regulations Relating to Standards for EMS. The regulations are discussed citing the relevant literature. The chapter concludes with an overview of the literature on quality improvement tools and necessary knowledge and skills required by EMS managers.

In terms of policy, scale and budget, EMS is an essential component of the healthcare services. The intersections between the three key focus areas of this chapter namely EMS, quality and the department of health is illustrated in the nested-Venn diagram in Figure 2.1. This conceptual diagram was used to structure this chapter. The context for QI is that low quality is associated with medical error and medical error is globally recognised as a leading cause of death and disability (Burstin, 2002; Weingart et al., 2000; Cegolon & Mastrangelo, 2012; Makary & Daniel, 2016; Lange et al. 2012).

Figure 2.1: Intersection between EMS, Healthcare and Health jurisdictions



NHI – National Health Insurance; UHC – Universal Health Coverage; OHSC – Office for Health Standards Compliance; QI – Quality Improvement; EMS – Emergency Medical Service.

Source: Researcher's original conception

The accumulation of professional knowledge is important for the development of the profession. The literature review aims at contributing to a clearer understanding of the nature and meaning of the study being undertaken and in so doing puts the research into perspective and creates a foundation and situates the study into the larger pool of knowledge. This literature review frames the research and identifies some gaps in the knowledge that this study intends to fill. An iterative review of the literature continued throughout the study and (in the discussion) helped identify how current findings are consistent/inconsistent with and contributory to existing knowledge.

2.2 SEARCH STRATEGY

A critical review of the literature is a creative exercise that calls for judgement and insight of the researcher. The literature review aimed to summarise, critically analyse, compare, and synthesise prior research. The literature search of the Cape Peninsula University of Technology (CPUT) subscribed databases in November 2021 until August 2023: a) MEDLINE database, which was accessed using the National Centre for Biotechnology Information (NCBI) PubMed advanced search web interface, b) Google Scholar, d) EBSCOHost, e) SCOPUS, and f) AFRICAN JOURNALS. Relevant websites included: World Health Organisation (WHO) and the Institute for Healthcare Improvement. The search included a search of the grey literature[18]. Snowballing literature search and hand searching was used to track references and citations in journal articles and books. The search string below describes the words used in the search:

TITLE (“Emergency Medical Service” OR Ambulance OR Prehospital OR Pre-hospital OR Paramedic OR “Emergency Medicine”) AND ABSTRACT (“South Africa”) AND ABSTRACT (Quality OR Management OR “Quality Management” OR “Quality Improvement”).

The articles were screened focusing on the titles and relevance to the search criteria. Priority was given to studies eligible for inclusion that were published after 2010 and were relevant to one or more of the research outcomes. For pragmatic reasons, only English, full-text publications were included.

Although there has been a substantial increase in prehospital research published in SA since 2010, very few articles were found on EMS quality management in SA (Dippenaar & Marr, 2021) these did not meet all the inclusion criteria of this study, therefore a broader review of the literature was undertaken. Similarly, Wankhade & Mackway-Jones (2015) reported that globally pre-hospital and EMS public policy and management research lags behind other health disciplines. EMS systems vary across the world and the way these EMS services in SA are unique.

[18] Grey literature included reports, newsletters, and government documents.

An effective literature review is essential to advance the knowledge on the topic of interest and the three main types of reviews of narrative reviews, descriptive reviews, and scoping reviews (Paré et al., 2015). A narrative review approach was used in this literature review as literature and evidence used was that which could be accessed. The weaknesses of the narrative analysis is that it is subjective and make replication near impossible (Paré et al., 2015). To counter the weakness the approach for this literature review included defining the literature search choices in the search string, citing literature from diverse sources to ensure a balance of views, evaluating some of the methods used in the individual studies to avoid poor quality research (Byrne, 2016). The next section of this chapter will describe the EMS system in SA in detail, as this is the context within which the EMS manager functions.

2.3 INTRODUCTION TO EMERGENCY MEDICAL SERVICES (EMS)

Health services, which includes EMS, is a fundamental human right that is articulated in Section 27 of the Constitution of the Republic of South Africa (Republic of South Africa, 1996). South Africa is also committed to Universal Health Coverage which is a target of United Nations Sustainable Development Goal-3, implying that everyone in SA must have access to safe, timely, effective, efficient and patient-centred healthcare services (Republic of South Africa, 2019b).

The EMS is an essential component of the health system in SA and many other developed and developing countries. EMS primary role is to respond timely to emergencies, evaluate the patient and provide prehospital emergency care that is safe, and stabilise and transport patients to the nearest appropriate health facility (Mould-Millman et al., 2017).

The EMS system encompasses more than providing ambulances to transport patients to hospital. EMS is a complex interdependent network of systems that includes: first responder volunteers; ambulance services; planned patient transport; medical rescue services; aeromedical services; information communication systems; disaster management; education and training; major incident and disaster management, special event management and management and administration (Department of

Health South Africa, 2012b). These systems must be coordinated to create a continuum of care that starts with a bystander calling the emergency services for help and ends when the stabilised patient is handed over to the appropriate receiving hospital (Benn & MacFarlane, 2003).

Kobusingye et al. (2006:1261) state that “The goal of EMS is to provide emergency medical care to all who need it.” High-quality emergency medical care provided by EMS is seen as a contributor to preventing and reducing death and disability. In SA approximately 40% of all deaths occur outside of hospital and similarly one can assume that most life threatening medical and trauma emergencies occur in the pre-hospital environment (Stein, 2009). Emergency medical care reduces mortality by overcoming factors such as delaying seeking care, gaining access to a health facility, and provision of immediate care. EMS therefore must be an integral component of the health system (Reynolds et al., 2014; Kobusingye et al., 2005; Tiwari et al., 2021). The importance of providing quality EMS systems is discussed in the paragraphs that follow.

In countries that have an EMS system, the EMS are required to deal with a wide range of illnesses, including injuries, obstetrics, noncommunicable disorders, and communicable infections. Emergencies such as myocardial infarction, acute bleeding, or injuries present to the EMS in their acute stages where time can be a critical factor in outcome for the patient (Nielsen et al., 2012). It is estimated that 500 000 maternity deaths occur annually, mostly in LMICs where emergency care is deficient. Similarly, Kobusingye et al. (2005) report that 80% of deaths due to injury were in LMICs and that deaths due to violence often impact the young and productive population. Hsia et al. (2010) found that paramedics can help lower mortality in trauma by 9%.

In SA, the mortality rate from violence and transport-related issues is amongst the highest in the world. The delay in victims of injury and trauma getting to hospital contributes to this high mortality rate. Public health experts have called for the EMS improvement in SA to ensure victims have the best opportunity to survive (Suresh et al., 2022). SA is not unique in the challenges it faces. The next paragraph discusses the EMS challenges faced by Ukraine prior to 2020.

The WHO report entitled: Emergency Medical Services in Ukraine, Current Capacities and Opportunities for Future Development (World Health Organization Regional Office for Europe, 2020) revealed that EMS in SA and Ukraine faced similar challenges of dissatisfaction due to irrelevant legislation, poor working conditions, lack of safety, low prospects of future improvements and low salaries as comparable country-level case studies. Ukraine's EMS concerns relate to low quality of ambulance crews, human factors, and the absence of infrastructure (Ministry of Health of Ukraine, 2018).

Effective emergency care to the community can be provided with the appropriate personnel, equipment, coordination, and management which in turn will reduce risk of disability and death (Kobusingye et al., 2005). Although Osterwalder (2004) argues that more research is required to show benefit of the effectiveness and efficiency of EMS, the World Health Assembly recognises the need for trauma and emergency care service and passed a resolution in 2007 requesting the WHO to provide assistance to countries to design quality improvement programmes needed for essential trauma and emergency care (Broccoli et al., 2018).

Understanding the EMS is central to answering the aim and objectives of this study as it provides the broad context of the ecosystem in which the EMS manager functions and undertakes quality improvement endeavours. Every organisation that exists today has a history that shaped its present purpose, structure, and function. The next section will delve into the recent history of EMS in SA.

2.4 HISTORY OF EMS IN SOUTH AFRICA

The historical roots of the present-day EMS have influenced and shaped the organisational culture of the EMS organisations. The key objective of this study is to appraise the knowledge, attitude, and practices of the personnel within those organisations. A review of the history contextualises the everyday EMS attitude and practices in relation to quality improvement and is consistent with historical realism.

The present-day EMS as a component of the health service in SA has a recent history in comparison with the rest of the health sector. The ambulance services were

originally established to provide a means to transport patients from the community to a hospital or between health establishments (Tiwari et al., 2021). Prior to the amendment of Section 16 of the Health Act of 1977, the provision of the ambulance services in SA was the responsibility of the fire department in the various municipal councils and volunteer organisations such as the SA Red Cross and St John. In terms of section 25(2)(m) of the Constitution, the responsibility of the provision of emergency medical services falls to the provincial department of health (Sobuwa & Christopher, 2019).

From the onset, ambulance services rendered patient care initially in the form of first aid to reduce the risk of death and relieve pain and suffering. Over time the scope of pre-hospital care has expanded to better serve the community by providing clinical interventions at the scene and enroute to hospital. However, the development of quality systems to assess and maintain quality of care and patient safety has been slow to develop (Howard et al., 2020). The history of EMS education and training will be discussed in the paragraphs that follow.

The training and qualifications of the EMS personnel has its origins in advanced first aid. As medical science and technology advanced, medical devices became portable. The pre-hospital benefits of these advances in technology required additional skills and training. The training expanded and developed into basic, intermediate, and advanced life support short courses that were registrable with the Health Professions Council of South Africa (HPCSA) (Vincent-Lambert, 2015). Formal training began with the offering of the 3-year Diploma in the 1980’s (Sobuwa & Christopher, 2019).

The Department of Health released the National Emergency Care Education and Training (NECET) policy in 2017 that resulted in the cessation of emergency care short courses and the emergency care qualifications aligned to the National Qualifications Framework (NQF) (Department of Health of South Africa, 2017). These qualifications include the higher certificate, diploma, and bachelor’s degree in emergency medical care. The HPCSA accredits the higher education institutions offering the qualifications, registers emergency care personnel and determines the clinical scope of practice for each registration category. Not everyone has been accepting of the changes as

Sobuwa & Christopher (2019) noted many comments on social media have been critical of the changes, mainly citing the critical shortage of advanced life support in SA. The qualification structure has implications for the qualification of EMS managers that will be discussed later in this chapter.

Although SA has made progress in improving education and training and broadening the clinical scope of practice for prehospital ECPs, Howard, Cameron, Wallis, Castrén & Lindström (2020) noted that little is known about the education and training of ECPs on quality, such as what education and training on quality improvement is done, who instructs whom and how? What time and where is training conducted? What quality indicators are employed by SA emergency medical services and how is quality improvement assessed after training?

Today EMS is provided by a mix of public and private EMS that deliver pre-hospital emergency care across the country. In the public sector, EMS is provided by each of the provinces and although there has been increasing standardisation, the provinces differ in how EMS is provided (Benn & MacFarlane, 2003). Since the late 1990's there has been a growth of private EMS providers that caters for patients with medical insurance and recipients of the road accident and workman's compensation fund. SA has a few large private EMS companies and hundreds of small private EMS companies. The larger private EMS are subsidiaries of private health groups and therefore tend to have better qualified staff and quality systems and resources. The private EMS operators were unregulated prior to 2017 and there were serious quality concerns about the services they rendered (Department of Health South Africa, 2012b). Vincent-Lambert & Jackson (2016) found that some private EMS in SA were engaged in unethical practices such as over-billing, cramming multiple patients of road traffic accidents into ambulances and performing unnecessary medical interventions.

In addition to the companies providing ambulance services, there are private and non-governmental organisations that provide rotor-wing and fixed wing aeromedical services. These services are utilised in most provinces to complement the EMS by providing rapid access to critically ill and injured patients in remote locations. Aeromedical services are also utilised to support community outreach projects and for

interfacility transfer of patients needing intensive care. The quality and safety standards that are applied to the aviation industry has influenced the quality standards applied to aeromedical services (Muhlbauer et al., 2016).

In 2012 the Minister appointed an independent review committee for EMS that envisaged that under the National Health Insurance, the EMS will be transformed to be at the centre of the healthcare system by providing quality emergency care services when emergencies occur (Department of Health South Africa, 2012b). Part of the transformation will require the existing shortcoming of the EMS in SA to be addressed.

The EMS Regulations released in 2017 regulate all private and public EMS and the 2022 Regulations Standards for Emergency Medical Services are aimed at improving the quality of both private and public emergency medical services in South Africa. The next section will focus on the EMS legislation that regulates the provision and quality of EMS in South Africa. These regulations are linked to the third objective of this study which is to document the EMS managers perspectives in the application of these regulations.

2.5 HEALTH AND EMS RELATED LEGISLATION AND POLICIES IN SOUTH AFRICA

In the South African Constitution, Section 27 in the Bill of Rights obliges the government to ensure that access to healthcare services is available to all citizens. To realise this constitutional obligation, various pieces of legislation and policies have been put in place. These include: the National Health Act, 2003 (Act 61 of 2003 as amended), Patient Rights Charter, Mental Healthcare Act 17 of 2002, the National Development Plan and the National Core Standards (National Department of Health, 2019).

Section 27 (3) of the Constitution states that no one may be refused emergency medical treatment and Section 5 of the National Health Act (NHA) confirms that no one may be refused emergency medical treatment and that the head of the provincial department must provide and coordinate EMS. Section 90(1) of NHA also empowers the Minister to make regulations regarding EMS and emergency medical treatment

and establishes the National Health Council to advise the Minister on health policy and management of the healthcare system including EMS (Van Huyssteen, 2016).

Chenwi (2013) argues that despite the rights afforded to citizens in the legislation and policies of government, the rights are often subject to the availability of scarce resources and the progressive realisation of the rights. The result has been the focus on access rather than improvements. Notably, progressive realisation implies that there must be progress towards achieving the rights and the government cannot be seen to be doing nothing especially for vulnerable and disadvantaged people. The EMS regulations in SA will be discussed next.

In 2017, the Minister published the Emergency Medical Service regulations that made provision for the licensing of EMS and all emergency vehicles (Appendix G). These regulations are the first step towards regulating both public and private EMS organisations. The regulations allow for the licensing and accreditation of EMS services thereby governing the quality services rendered by EMS organisations. The regulations cover all aspects of EMS including staff, equipment, vehicles, stations, inspections, and liability insurance. An inspection of an EMS includes an inspection of the organisation and management of that EMS, accommodation, care, treatment of patients, registers, clinical records and any other records of patients, staff and vehicles (Department of Health South Africa, 2017). With the licensing regulations implemented, the NDOH then focused on the standards for EMS that will be discussed next.

In December 2022, the Minister published Regulations Relating to the Standards for Emergency Medical Services, which included the seven domains of the NCS and the sub-domains as they relate to EMS (Appendix H). The regulations will take effect in December 2023, meaning that both public and private EMS have twelve months to meet these quality standards (Department of Health South Africa, 2021d). These are the first such regulations for EMS in SA. The paragraph that follows discusses the purpose of the regulations.

The 2017 Emergency Medical Services regulations and the 2022 Regulations Relating to the Standards for Emergency Medical Services are fundamental to the quality of EMS in SA. These regulations are intended to contribute to improving the health outcomes and strengthening the overall effectiveness of the SA health system. The aim of this study is to develop a quality improvement framework for EMS that will prepare EMS managers to comply with these regulations thereby improving the quality of EMS provision. The next section of this chapter will discuss quality concerns of the department of health that promoted the publication of these regulations.

2.6 QUALITY IN HEALTHCARE IN SOUTH AFRICA

In 2010, the Negotiated Service Delivery Agreement (NSDA) was signed by the Minister of Health with the commitment to improve the health status of the entire population and contribute to the vision of "A Long and Healthy Life for All South Africans". Improving quality of care is a fundamental step towards strengthening the health system. There is very little mention of EMS in the NSDA other than the requirement for an ambulance to respond within an hour to a clinic to transfer a maternity patient. This led to ambulances being withdrawn from operational service in some provinces and stationed at clinics waiting to transfer maternity patients to hospital (Schoon, 2013; Lembani et al., 2018). Importantly the NSDA undertook to establish standards for Emergency Medical Services that were gazetted in 2022 (South African Government, 2013).

The National Policy on Quality in Healthcare was published in 2001 (revised in 2007) with the aim to increase patient participation and dignity, decrease illness, injury, and disability through prevention and promotion, use evidence-based actions and decision-making to ensure appropriate use of healthcare services, and decrease healthcare errors (National Department of Health, 2007). Given that inspections of provincial establishments in all provinces deemed the level of service supply to be poor, the usefulness of these policies is in doubt (National Department of Health, 2019). Understanding the reasons why policy implementation fails is important to answer the third objective of this study which is to identify and explore the benefits and impediments to implementing sustainable quality improvements. The next paragraph will continue to discuss the factors that contribute to poor quality healthcare in SA.

Passchier (2017) reported that despite the well-intended goals of the health programmes in SA, the health system is still predicated on colonial, apartheid-era maldistribution. Producing high-quality healthcare continues to be difficult despite advances such as the increased life expectancy and declining mortality rates in the South African population after 1994. The quadruple burden of diseases; the more recent Covid-19 pandemic; poverty and unemployment; inequalities between urban and rural, and between private and public health services; and poor management and governance of the health system contribute to the poor quality of healthcare in SA (National Department of Health, 2019).

Quality of care is key principle of health policy and the goal to improve healthcare quality is universally accepted. Healthcare delivery in today's world is complex as it is characterised by having to know more, manage more, and having more people involved (Institute of Medicine, 2001). Poor-quality healthcare impacts millions of lives, and the World Health Organisation (WHO) recognises that between 5.7 and 8.4 million deaths and 1.4 -1.6 trillion US dollars is lost in productivity because of poor health quality in low- and middle-income countries (LMICs). As a result the United Nations Sustainable Development Goal 3.8[19] emphasises quality as a key element to universal health coverage (World Health Organisation, 2020b).

The Healthcare Access and Quality Index ranked SA 127th in 2016 with an index of 49.7 which translates to poor access and quality contributing to potentially 200 000 preventable deaths. This ranking is consistent with the growing number of malpractice and medical litigation claims in the public sector that amounted to R1.2 billion in 2016/17 (GBD 2015 Healthcare Access and Quality Collaborators, 2017). It is estimated that 60% of maternal deaths and 25% of neonatal deaths in SA are preventable. There are also deficiencies in the quality of care for disease such as hypertension, diabetes, and mental illnesses (Dhai, 2015).

[19] SDG Target 3.8 | Achieve universal health coverage, including financial risk protection, access to quality essential health-care services and access to safe, effective, quality, and affordable essential medicines and vaccines for all (The WHO Global Health Observatory is Accessible from: https://www.who.int/data/gho/data/themes/world-health-statistics)

A clear theoretical definition of healthcare quality is an essential foundational component before a discussion is to be had on quality improvement of healthcare services in SA (Allen-Duck et al., 2017). The next section will discuss the multiple perspectives from which quality can be defined.

2.7 DEFINITIONS OF HEALTHCARE QUALITY

In the published literature (World Health Organisation, 2006; Allen-Duck et al., 2017; Rantala et al., 2019) there are multiple perspectives from which quality can be defined and therefore one finds disaggregated definitions of healthcare quality. Busse et al. (2019) also argues that while it may not be necessary to define healthcare quality before attempting to improve it, a definition may be necessary before attempting to measure quality. A key part of the primary research question of this study asks how can a framework for quality improvement transform the knowledge, attitude, and practice of EMS managers? Having a clear definition and understanding the context of quality in healthcare is an essential basis from which the quality improvement framework can be established.

The concept of what is quality has been debated for millennia. Using the example of a knife, Aristotle wrote that quality is not an act, it is a habit and if a distinctive quality of the knife was to cut, therefore a good knife would cut well (Swanwick, 2014). The Chinese philosopher Zhuangzi in the 4th century BCE is recorded as saying that a good butcher changes his knife once a year because he slices flesh, while a mediocre butcher who hacks at bone has to change his knife every month (Swanwick, 2014). It therefore can be argued that quality is therefore a transaction, that is something that is fit for purpose, rather than a property and inappropriate use of quality mechanisms will not necessarily capture quality. The third objective of this study is to develop a framework that explicates how change in EMS policy and praxis may lead to quality improvement. It will be argued later in this chapter that the quality measures and indicators adopted by EMS have not resulted in an improvement in the quality of EMS systems. The next paragraphs will discuss Donabedian's definition for quality in healthcare.

Avedis Donabedian is acknowledged as a pioneer of healthcare quality systems with his model that focused on three elements of service delivery: structure, process and outcomes being cited most often in the healthcare quality literature (Kajonius & Kazemi, 2016). For Donabedian, the criteria for quality are essentially value judgments that reflect the values and goals of the healthcare system and the society of which it is part. According to Donabedian, the concept of quality of care has a dual meaning, one technical in nature including the structure, process and outcome, and the other concerns the experience of quality by the healthcare user.

"Care which is expected to maximise an inclusive measure of patient welfare, after one has taken account of the balance of expected gains and losses that attend the process of care in all its parts" (Avedis Donabedian, 1988).

Donabedian's definition includes the goal to maximise patient welfare which is aligned with the approach that considers patient-centredness. His definition is also realistic in terms of the expectations of healthcare gains and losses[20] (Busse et al., 2019). These gains and losses of the individual's health have been conceptualised as health capital that will be discussed in the next paragraph.

Health capital theory emerged in the twenty-first century with the individual taking greater responsibility and participating more in their own health. Good health is viewed as a commodity, as a form of human capital that can be invested in through medical care. This has led to the field of health economics which focuses on the functioning of the healthcare system and healthcare policies (Schneider-Kamp, 2021). The third

[20] "Health capital: toward a conceptual framework for understanding the construction of individual health" by Anna Schneider-Kamp (Social Theory & Health volume 19, pages 205–219 (2021), https://link.springer.com/article/10.1057/s41285-020-00145-x) has relevance in the conception of Health as 'capital'. This concept has relevance for both a monetised health system such as that of the USA or an egalitarian system such as Denmark. South Africa has published its intent to implement Universal Healthcare, on the basis that of growing health and economic inequity and multiple health burdens facing the health system. (Fusheini and Eyles. Achieving universal health coverage in South Africa through a district health system approach: conflicting ideologies of healthcare provision. BMC Health Services Research (2016) 16:558 DOI 10.1186/s12913-016-1797-4)

objective of this study is to identify the benefits and impediments to implementing quality improvement. Television, the internet, social media, and technology has made the public more aware of their health and health rights and therefore the demand for quality care has increased.

It can be argued that quality is fundamentally a process of transformation. Michael Walzer a contemporary political theorist argues that insiders[21] are the most effective reformers as they have unique insights of the institutions they critique. Walzer's analyses of social critics such as Foucault and George Orwell also have relevance to the inherent power health workers have in order to lead healthcare reform (Freundlieb et al., 2022). In the Walzerain tradition[22], the first objective of this study sought to appraise the attitudes of EMS managers in relation to quality improvement, the discussion above has relevance to the importance of values of healthcare workers that would influence their attitude. The next paragraph will start the discussion on the Institute of Medicine's definition of quality.

The Institute of Medicine (IOM) produced two influential reports on the quality of the United States (US) health system. For the IOM, the definition of healthcare quality is:

[21] This notion of inclusive participation extends to lay public health workers too: "This study found that the lay health knowledge of an individual UK LPHW is determined primarily by his or her position within, or in relation to, the community within which he or she works. Insider LPHWs possess an embodied knowledge and incomer LPHWs possess an experiential knowledge which, although different from one another, are essentially interpersonal in nature. Lay health knowledge can take different forms, and different LPHWs can provide different forms of lay health knowledge. Public health structures and services in the UK should make better use of all forms of LPHW knowledge and should seek from LPHWs training on how to engage the most 'hard-to-reach' or 'difficult-to-engage' groups. Services recruiting LPHWs should decide whether they are seeking embodied insider LPHW knowledge, experiential incomer LPHW knowledge or a mixture of both."
Yoeli H and Cattan M. 2017. Insiders and incomers: how lay public health workers' knowledge might improve public health practice. Health and Social Care in the Community. (Accessed from https://doi.org/10.1111/hsc.12446 on 23/10/22)

[22] Michael Walzer is a political theorist that is a proponent of communitarianism, a belief that the individual's social identity and personality are shaped by the community relationships. (Accessed from https://www.britannica.com/biography/Michael-Walzer)

"The degree to which health services for individuals and populations increase the likelihood of desired health outcomes and are consistent with current professional knowledge" (Institute of Medicine, 2001).

The focus of the IOM definition is on "desired health outcomes" which they explain encompasses patient satisfaction and well-being. The reference to "health services" speaks to the multidisciplinary approach to healthcare as opposed to focusing just on medical care. The definition also refers to "individuals and population" rather than "patients" and therefore also includes health promotion and prevention. Lastly "current professional knowledge" reinforces the notion of evidence-informed decision making where healthcare workers are assessed against the current knowledge and best practice (Busse et al., 2019). Howard et al. (2020) quoted an EMS manager as having said that EMS was an expensive taxi service, therefore assuming that there is little value EMS adds to the health system. This is contradicted by the IOM definition that implies good health outcomes require a holistic approach. This definition speaks to the secondary research question of this study regarding the benefit and impediments to implementing quality improvement in EMS. The next paragraph will be a discussion of the Lancet Global Health Commission definition on quality.

The Lancet Global Health Commission defines quality as:

> *"A high-quality health system is one the optimises healthcare in a given context by consistently delivering care that improves or maintains health outcomes, by being valued and trusted by all people, and by responding to changing population needs"* (Kruk et al., 2018).

In determining a definition of quality, the South African Lancet National Commission[23] considered that perceptions of quality would differ for each stakeholder depending on their perspective. Healthcare providers focused on treatment protocols, infection

[23] In 2017, the Lancet Global Health journal convened a commission on quality of health systems in LMIC's. The South African Lancet National Commission comprised leaders from academia, medicine, education and health system management and produced the 2019 consensus report "Confronting the right to ethical and accountable quality healthcare in South Africa".

prevention and patient outcomes. The priority for patients was the cleanliness of the facility, waiting time and the behaviour of healthcare workers. The healthcare managers focus was on the health system performance, finances, and population outcomes. The consensus definition reads as follows:

> *"A high-quality health system is able to achieve equitable health outcomes and a long and healthy life for all. It prioritises health promotion and protection as well as the prevention, treatment and rehabilitation of conditions that constitute South Africa's disease burden. It is accountable through effective leadership and governance and is people-centred in its approach by facilitating patient, provider, and community participation in health attainment. A high- quality health system is responsive to patient needs and provides comprehensive, timely and safe care, which ultimately results in quality outcomes. It adapts to the changing health needs by collecting, analysing and disseminating information and equitably allocating and distributing resources"* (National Department of Health, 2019:3).

Lancet Global Health Commission definition speaks in part to the third objective of this study that is to implement sustainable quality improvement systems. The Covid-19 pandemic reminded us how quickly things could change as overnight trauma injuries and deaths were replaced with Covid-19 fatalities (Chersich et al., 2020). It therefore can be argued that sustainable quality systems are required to overcome these unexpected changes. The next paragraph discusses the definition of quality adopted by the Department of Health in SA.

The Department of Health uses the following definition of quality improvement (QI):

> *"QI is achieving the best possible results within available resources. To this end, QI includes any activities or processes that are designed to improve the acceptability, efficiency, and effectiveness of service delivery and contribute to better health outcomes as an ongoing and continuous process"* (National Department of Health, 2012:5).

The recognition of health outcomes as an ongoing and continuous process acknowledges quality improvement as a cycle. This aligns with the secondary questions of this study that asks how EMS managers perceive, interpret, and understand quality standards. The Department of Health definition calls for the quality management process to be adaptive to the context to ensure acceptability, efficiency, and effectiveness of service delivery.

The next section of this chapter will focus on quality dimensions and frameworks.

2.8 HEALTHCARE QUALITY FRAMEWORKS

A quality improvement framework is a sequential process used to conduct QI projects. The framework allows for coherence, shared understanding, and language. QI frameworks are useful in healthcare organisations because they are complex, factors that affect services, activities, events, and outcomes (Hamilton et al., 2020). Our understanding of health systems has been improved using frameworks. The majority of frameworks list quality as a health system aim, but they differ in how they define and explain how it contributes to the broader goals of the health system. (Busse et al., 2019).

Quality has different meanings depending on the perspective from which it is viewed. The Donabedian Framework, the World Health Organisation systems framework, and the Institute of Medicine (IOM) are the most widely utilised and adapted frameworks in contemporary healthcare quality improvement. These will be discussed in the paragraphs that follow.

The three categories of the Donabedian model with the six quality dimensions of the Institute of Medicine are used by EMS organisations in developed countries to monitor quality performance and implement strategic quality improvement planning (El Sayed, 2012). The Donabedian framework is widely used to categorise and measure quality indicators, and this will be discussed next.

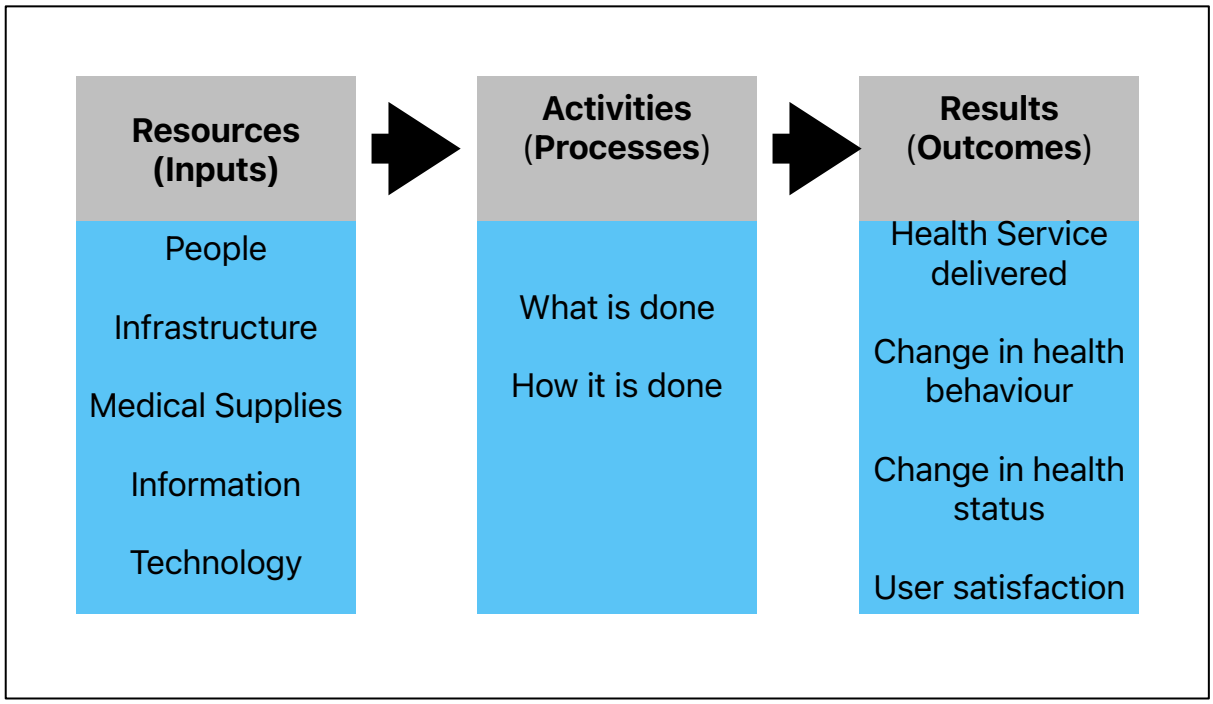
Avedis Donabedian (1998) quality framework focused on three elements of service delivery: structure, process and outcomes as illustrated in Figure 2.2. Donabedian

(1988) realised that it was important to view the settings in which the process occurs, in other words the structure that supports and directs the provision of care. These resources such as human resources, intellectual resources, facilities, equipment, medicines, etc. are needed. The assumption is that good quality care will take place if the structures are in place (Donabedian, 2003).

According to Donabedian (2003), an alternative approach to assess quality is to focus on the process itself. The process implies the healthcare itself and a method of its delivery. The assumption is identified if the medical care provided was appropriate, and the diagnostic and therapeutic care was rendered the best given the available knowledge and resources. Process is more difficult to assess than outcome. However, this should not be seen as the one or the other, but rather a process where there is a series of outcomes or end points in respect to values, standards, and validation.

Often patient outcome is used as an indicator of quality, such as for out-of-hospital cardiac arrest (OHCA). The outcome is the effects of the healthcare and the subsequent health status of the patient (Nehme et al., 2021). Notably there are many other factors, such as age, socioeconomic status, and environment, other than medical care that may influence patient outcomes. Subjective healthcare service outcomes such as patient satisfaction can be difficult to measure.

Figure 2.2: Donabedian's Structure, Process and Outcomes



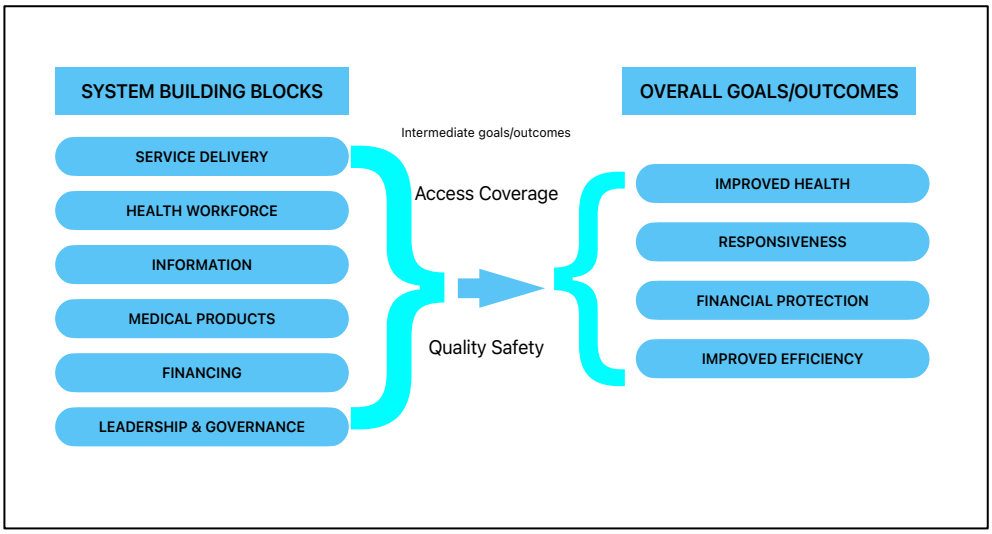
Source: Adapted from Donabedian (1980)

The secondary question of this asks how EMS managers perceive, interpret, and understand the OHSC quality standards for EMS. The inputs and processes in the Donabedian framework (Figure 2.2) align to these standards and help to contextualise their interpretation and understanding. Donabedian also distinguished between four different levels at which quality could be assessed. These are the individual practitioner, the care facility, the care received by the patient and the care received by the community (Donabedian, 1988). Different levels have also been used to describe where quality policies are developed and in so doing change the definition of quality: 'Macro' referring to the health system, 'Meso' referring to the organisation and 'Micro' being the clinical[24] (Busse et al., 2019). Understanding these levels help to contextualise and give meaning to the interpretation and understanding of the OHSC standards.

[24] Bronfenbrenner (1992) socio-ecological theory provides a useful framework for understanding the multilevel micro, meso and macro systems and subsystems how they intersect.

Patients and the communities may view quality as services that are delivered courteously and on time. The important dimensions would focus on accessibility, effectiveness, interpersonal relations, continuity, and amenities. For the healthcare worker and health service manager, technical competence or skills, safety and effectiveness are important (Brown et al., 1989). The next paragraph will discuss the WHO's health systems framework. Gaps in quality are often the result of poorly designed systems that generate waste and create inefficiencies that impact on health outcomes. The WHO 'building blocks' framework includes service delivery, health workers, information systems, medical devices, finance, leadership, and governance. Quality, safety, access, and coverage are seen as intermediate goals that contribute to the overall goals of improved health, responsiveness, financial protection, and efficiency. This helps to understand the system and its components to identify weakness on its systems (World Health Organisation, 2006). The OHSC domains and sub-domains for quality align with the WHO system building blocks and add additional dimension of the health workforce and financing. These additional blocks would need to be explored and considered in developing the framework which is the third objective of this study. The next section of this chapter discusses the domains of healthcare quality. Understanding the domains of quality provides the context for the EMS standards. This aligns to the secondary question of this study which is how EMS managers perceive, interpret, and understand the OHSC standards for EMS.

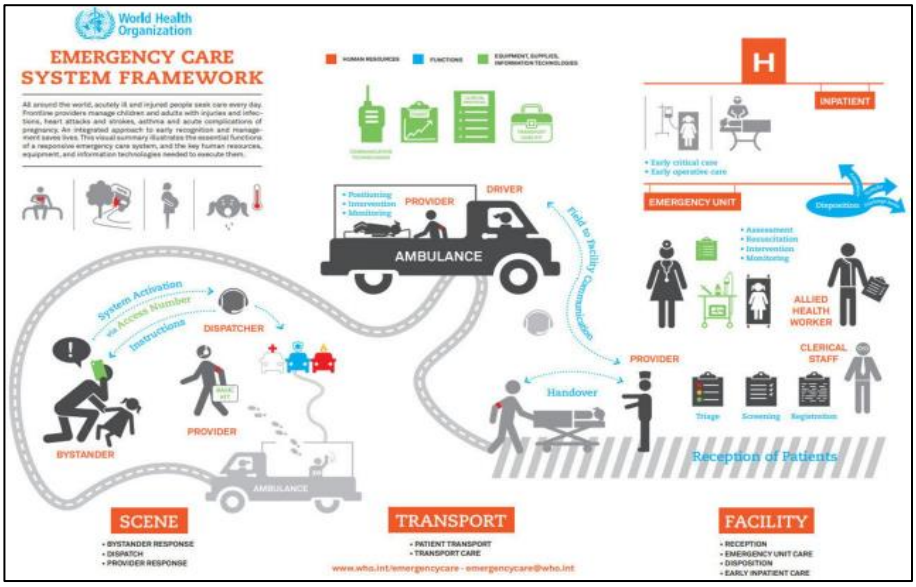
Figure 2.3: WHO Quality Framework



Source: WHO (2006)

The WHO developed an emergency care system framework that incorporates the essential chain of events from the place of the emergency incident, through to the inpatient care at the receiving hospital (Hansen et al., 2020). Figure 2.4 illustrates the key links and how any weakness in the chain of events will impact the morbidity and mortality of the patient.

Figure 2.4: WHO Emergency Care System Framework



Source: Hansen, Boyle, Holroyd, Phillips, Benger, Chartier, Lecky, Vaillancourt, Cameron, Waligora, Kurland & Truesdale (2020:438)

2.9 DOMAINS OF HEALTHCARE QUALITY

Healthcare quality by its nature is subjective and intangible. The 2001 Institute of Medicine (IOM) report titled: “Crossing the Quality Chasm”, named the domains or dimensions of quality that now lays the foundation for healthcare reform in the USA. Although there is no universal agreement of the domains of quality in the literature, the WHO recognises the six core domains of quality healthcare services as being: safety, timeliness effectiveness, efficiency, equity, and patient-centred (STEEEP) which appear to be most inclusive (World Health Organisation, 2020). Berwick (2017) argues that each domain has a vital role in the overall quality of care. By understanding each domain and appreciating its relative importance, EMS managers can improve the quality of the EMS system. These domains overlap with the domains and the sub-domains of the OHSC standards that will be discussed later in this chapter. This

discussion aligns to the secondary question of this study which is how EMS managers perceive, interpret, and understand the OHSC standards for EMS.

Table 2.1: IOM Dimensions of quality

Dimensions of Quality	
Effective	Providing evidence-informed healthcare services to those who need them
Safe	Avoiding harm to the people for whom the care is intended
People-centred	Providing care that responds to individuals
Timely	Reducing waiting times and sometimes harmful delays for both those who receive and those who give care
Equitable	Providing the same quality of care regardless of age, sex, gender, race, ethnicity, geographic location, socio-economic status, linguistic or political affiliation
Efficient	Maximise the benefit of available resources and avoiding waste

Source: Beattie, Shepherd & Howieson (2013)

2.10 MANAGING PATIENT SAFETY IN PREHOSPITAL EMERGENCY CARE

Patient safety aligns in part with the third objective of this study which is to develop a framework that explicates how change in EMS policy and praxis may lead to quality improvement in public EMS organisations in the interest of patient safety and organisational sustainability. It also is associated with the first proposition which states: Quality systems assess and maintains standards of quality and patient safety in EMS in SA and are perceived to be underdeveloped and poor due in part to ineffective leadership. Patient safety implies that patients are not being harmed when care is provided suggesting that there is little to no risk from accidental injury (Cosby & Croskerry, 2004). There is always some degree of inherent risk when medical procedures are performed, or medicines administered. In some cases, the potential risks outweigh the potential benefits. Safety is promoted by health professionals when paying attention to systems that reduce hazards and risks from the care itself. Factors to consider include the standard of care should not diminish during the night and over

weekends, vital patient information such as allergies should not be lost, inaccessible or forgotten during the handover (Reason, 2008).

The pre-hospital emergency services and in-hospital emergency department is a high-risk area for medical errors due to patients presenting with high acuity illnesses or injuries. Health professionals need to act quickly under conditions of uncertainty, and this is when mistakes happen (Magid et al., 2002). Clinical protocols and guidelines help to reduce clinical error in pre-hospital emergency care (McCaul et al., 2018).

Clinical decision is key to patient safety as the healthcare provider is committing to one course of treatment in preference to another. Clinical decision making is a complex process and in medicine these choices are often irreversible, as an incorrect drug injected cannot be withdrawn. Clinical Risk is a sub-domain of the regulations standards for EMS, and this aligns to the objective that seeks to understand the perspectives of the application of the EMS standards and implications for non-compliance.

When the deductive framework is applied to a clinical setting, the diagnosis is used to predict the absence or presence of signs and symptoms, which practitioners then use to confirm or reject the diagnosis. In the inductive framework, the signs and symptoms are assessed, and this leads to a diagnosis. It is common for health workers to use intuition to make clinical decisions (Croskerry, 2003). Benner et al. (2008) found that experts were able to focus directly on the problem and use intuition whilst novices relied on detailed analysis to inform their action. Kahneman (2011) describes heuristics as a mental “short-cut” to make quick and easy decisions.

Norman (2009) reported that most of the clinical errors are attributed to cognitive bias. There are many factors that can influence clinical decisions such as: the practitioner can be too optimistic, rely too heavily on one piece of information, base a decision only on the available information or poor information or be unable to look beyond experience and therefore reject the unfamiliar option. Often in a high pressure environment convenient options are chosen (Croskerry, 2005). The next paragraph discusses quality in high-risk organisations.

High risk industries such as nuclear power plants have few accidents, yet healthcare organisations are slow in adopting the lessons learned from such high-risk industries. High-risk industries collect data on errors and analyse their cause, minimise reliance on human memory and standardise routine aspects of care (Burstin, 2002). Magid et al. (2002) suggest that technology and system redesign can help reduce accidents in the hospital emergency department.

There is limited literature on safety in EMS in South Africa. In one South African study emergency care personnel indicated that they did not have a protocol for managing medical error in the workplace and that they did not receive training on patient safety. They reported other contributing factors including work related fatigue and/or stress, insufficient clinical knowledge and experience, and an unsafe work environment (Rowland & Adefuye, 2022). Prevention of adverse events is complex given the nature of the prehospital environment (Jensen et al., 2009). Effectives as a domain will be discussed in the next section.

2.11 MANAGING EFFECTIVENESS OF PRE-HOSPITAL EMERGENCY CARE

The WHO describes effectiveness as providing evidence-based care to those who need them (World Health Organisation, 2006). Berwick (2002) describes it as matching science to care by ensuring that scientific evidence-based practice informs clinical decisions so that the health intervention produces a better outcome than the alternative, noting that the alternative may include doing nothing. Evidence-based practice is defined by (Sackett et al., 1996:71) as “the integration of best research evidence with clinical expertise and patient values”. The level of evidence is ranked with a bias towards randomised control trials that are ranked the highest.

The Crossing the Quality Chasm report (2001) notes that for many aspects of healthcare there is little or no evidence of effectiveness or ineffectiveness of health interventions and therefore it is impossible to base all care on scientific evidence. In the absence of evidence informed decision making where systems continuously monitor the results of care and use alternate sources of information, is preferred (Straus, 2009). The regulations Standards for EMS requires EMS management to

facilitate the provision of effective emergency care. This aligns with the objective of this study which is to document the perspectives of the EMS managers on the EMS standards and implications for non-compliance.

Effectiveness implies therefore avoiding the underuse of effective care and the overuse of ineffective care that is more likely to have side effects (Institute of Medicine, 2001). The RAND corporation in the USA tracked 7000 patients over two years in the USA and found that of those surveyed only 55% received the medical care that would have helped them (McGlynn et al., 2003). The next paragraph will discuss the challenges of the pre-hospital environment where the likelihood of error can be high.

Effectiveness of the emergency medical services can be difficult to determine as the prehospital environment is uncontrolled and risk adjustment is necessary to allow for comparison between circumstances that may be different (Maio et al., 1999). Traffic and road conditions will influence ambulance response times. When viewed from a system perspective where effective response times can be attained by deploying resources at strategically placed locations during peak traffic periods (Kobusingye et al., 2005). The EMS manager must facilitate the provision of effective emergency care. Effectiveness aligns with the objective of this study which is to document the perspectives of the EMS managers on the EMS standards and implications for non-compliance. The next section will consider the domain of patient-centredness in the provision of pre-hospital emergency care. This section aligns with the secondary question of this study: What are the benefits, impediments, and opportunity costs to implementing quality improvement in EMS?

2.12 CONSIDERING OF PATIENT CENTEREDNESS IN PREHOSPITAL EMERGENCY CARE

Healthcare quality expert Berwick said: *“Person-centredness is not just one of the dimensions of healthcare quality, it is the doorway to all qualities”* (Berwick, 2009:561). Patient-centeredness encompasses the patient’s experience in relation to the compassion, empathy, responsiveness, and values of the healthcare system. This aim requires people to be in control of their own care and that they should make decisions about what affects them. In the modern era people are better informed about their

health thanks to the internet. The demand is to participate in decision-making and to be heard. The phrase: “Nothing about me without me”[25] puts the patient at the centre of the healthcare system in relation to improving the design, delivery and organisation of health services (Zelmer, 2019:6). Patient centredness requires EMS management to ensure that the patient as the healthcare user is the primary focus when emergency care services are rendered. This aligns with the objective of this study which is to document the perspectives of the EMS managers on the EMS standards and implications for non-compliance. The next section speaks to the timely provision of emergency care.

2.13 MANAGING TIMELINESS OF PREHOSPITAL EMERGENCY CARE

Timeliness implies avoiding needless delays while waiting to receive medical care but more importantly, the timely delivery of appropriate care can reduce mortality and morbidity (Institute of Medicine, 2001). In addition to the emotional distress associated with delays in receiving care, many health emergencies such as the treatment for stroke and myocardial infarction are time dependent (Fleming et al., 2006). In the example of myocardial infarction there is strong evidence to support early reperfusion therapy in patients with S-T elevation myocardial infarction. Based on this evidence standards for time to cardiovascular reperfusion therapy and treatment for cerebrovascular accidents have become a quality indicator.

[25] "Nothing about us without us" is a slogan used to communicate the idea that no policy should be decided by any representative without the full and direct participation of members of the group(s) affected by that policy. In its modern form, this often involves national, ethnic, disability-based, or other groups that are often marginalised from political, social, and economic opportunities…The term in its English form came into use in disability activism during the 1990s. James Charlton relates that he first heard the term used in talks by South African disability activists Michael Masutha and William Rowland, who had in turn heard the phrase used by an unnamed East European activist at an earlier international disability rights conference. In 1998, Charlton used the saying as the title for a book on disability rights. Disability rights activist David Werner used the same title for another book, also published in 1998. In 2004, the United Nations used the phrase as the theme of International Day of Persons with Disabilities and it is also associated with the Convention on the Rights of Persons with Disabilities. Use of this slogan has expanded beyond the disability rights community to other interest groups and movements.” https://en.wikipedia.org/wiki/Nothing_about_us_without_us

The concept of the Golden Hour or the Lancet Commission on Global Surgery's 2-hour target has been accepted as an appropriate period for victims of trauma to receive definitive care. A study in South Africa found that 36% of deaths were avoidable if the obstacles to access to care were removed (Odland et al., 2022). Although the concept of the Golden Hour is well established there is no scientific evidence to support the concept (El Sayed, 2012).

This domain requires EMS management to ensure the provision of timely emergency care. Providing timely emergency care aligns with the objective of this study which is to document the perspectives of the EMS managers on the EMS standards and implications for non-compliance. This is linked to the second proposition which is: EMS are nuanced and complex organisations that require bespoke quality improvement systems to develop, maintain and evaluate quality and patient safety. The next section addresses the efficient provision of emergency care.

2.14 MANAGING EFFICIENCY IN PREHOSPITAL EMERGENCY CARE

Efficiency is about avoiding wastage of medical supplies, equipment, money and energy (Magid et al., 2002). Examples may include duplication of procedures and administering medication that does not help. In an inefficient system, resources are not used to get the best value (Burstin, 2002). It also relates to unnecessary bureaucracy in the healthcare system that adds to the administrative burden whilst not necessarily improving the quality of care.

Efficiency reduces waste and ensures that scarce resources are put to best use by the EMS management. Efficiency as a domain ensures that the use of scarce resources aligns with the objective of this study which is to document the perspectives of the EMS managers on the EMS standards and implications for non-compliance. Equity in the provision of emergency care follows.

2.15 MANAGING EQUITY IN PRE-HOSPITAL EMERGENCY CARE

Equity in healthcare is about closing the gap between justice and healthcare. Equitable care does not vary in quality because of gender, ethnicity, geographic location, or socio-economic status. SA is amongst the most unequal societies where the top 1%

owns 70,9% of the wealth, while 60% owns 7% of the country's wealth (de Villiers, 2021). Race and poverty is associated with health inequity, with 95% of the poor in SA being African and 75% of the poor living in rural areas (McIntyre et al., 1998; Coovadia et al., 2009).

The health inequity is seen in the differences between the disease and mortality rates amongst the racial groups in SA. Coovadia et al. (2009) reported that the life expectancy of white women was 50% longer than it was for black women and infant mortality was 7 per 1000 in the white population compared to 67 per 1000 in the black population. Health inequity is also determined by the geographical location of the population in SA. There are inequities between and within provinces. As an example, under 5 mortality rates range from 46 per 1000 in the Western Cape province to 116 per 1000 in KwaZulu-Natal province. Similarly there are differences in the prevalence of diseases between rural and urban and between formal and informal settlements in the urban cities (Coovadia et al., 2009; Chopra et al., 2009; de Villiers, 2021). The secondary research questions speak to the benefit and impediments to implementing quality improvement in EMS. In the SA healthcare context, addressing health inequity is key to any quality improvement plan.

SA has a two-tiered health system with 17 out of 100 in the population having access to private medical insurance. Health spending consumes 8,5% of the GDP[26] of which 4,2% is spent on private healthcare that serves 16% of the population. The public health sector serves 84% of the population and received ZAR 259 billion in the 2022/23 financial year (Statistics South Africa, 2021). The National Health Insurance (NHI) Bill which aims to address in inequity and provide universal health coverage (UHC), which is enshrined in the Sustainable Development Goals (SDGs), is undergoing review at the National Assembly of parliament[27] (Department of Health South Africa, 2010). The next few paragraphs will focus on the factors that contribute

[26] The Gross Domestic Product (GDP) of South Africa was estimated at 435 billion US Dollars in 2022 making it the 2nd largest economy in Africa.

[27] The NHI and the implications for EMS will be discussed separately later in this chapter.

to inequity such as socio-economic and political factors and poor management and leadership.

Political, social, and economic issues are ongoing concerns for South Africa as a developing nation. Coovadia et al. (2009) identify the main causes of the issues in the health system as weak leadership, management, and policy execution. Notwithstanding South Africa having well-established health science education institutions graduating skilled health professionals, Rispel (2016), in the South African Health Review 2016, reported that there is ineffective and sub-optimal management leadership at various levels of the public health system.

Other factors that have been identified as impacting on the quality of service include: inadequate oversight and monitoring; fraud and corruption; staff shortages, mal-distribution, unprofessional behaviour and poor performance and motivation; poor data quality and health information systems; and fragmented quality care initiatives (National Department of Health, 2019). Baker (2010) argues that the apartheid-era structures are to blame for the health system issues.

Since 1994 there have been leadership crises with the healthcare system plagued by two problems: the loss of institutional memory caused by the affirmative action programme and the hiring of inexperienced managers to critical posts (Coovadia et al., 2009). Maphumulo (2018) reports that most managers are promoted to their positions based on how long they have worked for the organisation rather than their abilities. Weak management leads to weak implementation that will be discussed in the next paragraph.

The National Policy on Quality in Healthcare was established in 2001 (revised in 2007) with the aim to increase patient participation and dignity, decrease illness, injury, and disability through prevention and promotion, use evidence-based actions and decision-making to ensure appropriate use of healthcare services, and decrease healthcare errors (National Department of Health, 2007). Given that inspections of provincial establishments in all provinces deemed the level of service supply to be poor, the usefulness of these policies is in doubt (National Department of Health,

2019). Compliments and complaints are a good indicator of quality and will be discussed in the next paragraph.

Complaints can be used as a proxy for the quality of services received. The Patient's Rights Charter and the National Health Act, 2003 (Act 61 of 2003) states that everyone has the right to complain about the healthcare they receive. The national complaints report received 25 733 complaints in all provinces in 2019. The top three complaints lodged against the public health service for 2020/21 in all nine provinces related to patient care (33%), staff attitude (29%) and waiting times (21%). Nationally 95% of the complaints were resolved within 25 days indicating that many of the complaints could have been avoided (Department of Health South Africa, 2021c). Equity as a domain is an important consideration in SA considering the unequal society and the disparities between the private and public healthcare services. This domain aligns with the objective of this study which is to document the perspectives of the EMS managers on the EMS standards and implications for non-compliance.

The next section considers National Core Standards and the role of the Office for Health Standards Compliance. This section of the chapter will provide the background context for the Regulations Relating Standards for Emergency Medical Services that are fundamental to the quality improvement of the EMS system in SA. This section is linked to the second objective: To observe and document the EMS managers, who are quality champions, perspectives on the application of the standards for EMS and the reasons for non-compliance.

2.16 NATIONAL CORE STANDARDS (NCS) AND OFFICE HEALTH STANDARDS COMPLIANCE (OHSC)

The EMS Manager would be required to know the background and context leading up to the formulation of the Standards for EMS. This is aligned to the objective of this study which is to implement sustainable quality improvement systems in EMS. This section discusses the Department of Health policies related to quality starting with the Ten Point Plan to meet the Millennium Development Goals.

The Department of Health's Ten Point Plan and Negotiated Service Delivery Agreement signalled the commitment to improving the quality of health services. The National Health Council published the Ten Point Plan in 2010 to meet the Millennium Development Goals (MDGs). The Ten Point Plan also prioritises improved patient care and satisfaction, and accreditation of facilities for quality (Whittaker et al., 2011). Similarly, the Negotiated Service Delivery Agreement (NSDA) committed the SA government to improving quality in preparation for National Health Insurance (NHI) (Begg et al., 2018). To strengthen the health services to be ready for the NHI, the NSDA included the accreditation of facilities to ensure compliance with prescribed standards to obtain UHC (World Health Organisation, 2016).

The need to improve the quality of care in the health system in SA led to the development of the National Core Standards (NCS) in 2008 as the benchmark requirements for quality and safe care. The NCS was revised and piloted in 2010 in an inclusive process spearheaded by OHSC, the ministry of health and assisted by the WHO and other international agencies (Whittaker et al., 2011). The purpose of the NCS is discussed next. The NCS are intended to develop a common definition of quality of care, establish a benchmark to identify gaps and strengths in public health facilities, and provide a framework for certification of health establishments (Maphumulo, 2018). The NCS has three main goals namely: to develop a common definition of quality care and health standards[28]. Secondly, establish a benchmark for assessment of health establishments and in so doing, identify gaps and strengths. Thirdly, introduce standards for a national accreditation system. The structure of standards NCS comprises domains, sub-domains, standards, criteria, and measures. Table 2.2 provides the definition for each in the NCS structure.

[28] Whittaker, Shaw, Spieker & Linegar (2011) describe a standard as a statement that defines the functions, activities, processes, and structures to enable facilities to provide quality services, that is they help to improve quality. Quality standards can be used to set goals, develop quality improvement plans, identify gaps, benchmark compliance, set performance indicators, measure quality improvement, underpin policies, and empower providers to ask for specific support they need to improve performance and quality (National Institute for Health and Care Excellence, 2022).

Table 2.2: Structure of the standards

Structure of standards	Definition
Domain	Aspect of service delivery where quality or safety may be at risk
Sub-domain	Critical areas which when combined describe the scope of the domain
Standard	What is expected to be delivered in terms of quality of care, reflects the expected situation resulting from implementation of policy, procedure, or system.
Criteria	Elements which are measurable and achievable that set out the requirements to achieve compliance with the standard
Measures	Evidence for determining if the criteria has been met.

Source: Adapted from Quality Improvement Guide (Department of Health, 2012)

The NCS are structured into seven domains: [1] Patient Rights, [2] Patient Safety, Clinical Governance and Care, [3] Clinical Support Services, [4] Public Health, [5] Leadership and Corporate Governance, [6] Operational Management, and [7] Facilities and Infrastructure. The first three domains relate to the core function of the health system, while the remaining four domains focus on support systems (Department of Health South Africa, 2011b).

The National Health Amendment Act, 2013 (Act 12 of 2013) saw the establishment of the OHSC. One of the purposes of the OHSC was amongst others to facilitate the compliance and standards of the national health system and certify establishments as compliant. The NHI Bill requires certification of the OHSC as a precondition to provide services and contract with the NHI Fund. Whittaker et al. (2011) argue that the OHSC has a broad and difficult mandate and will require time to develop the skills and experience to implement its mandate. The 2019 Consensus Report of the South African Lancet National Commission and the 2019 Presidential Health Compact acknowledged the poor quality of healthcare services in South Africa. This then led to the government developing the National Health Quality Improvement Plan (NHQIP).

The plan includes all sectors with health, including EMS. The discussion on the NHQIP will follow.

The NHQIP was released in 2021 as a roadmap towards improving the quality in the health system and alleviating the concerns around the NHI (Department of Health of South Africa, 2021). The NQIP acknowledges the deficiencies and aims to evaluate the existing initiatives. The lack of accurate data was identified as a key obstacle to the evaluation of the quality of the health system. The NHQIP has as its purpose to address the challenges relating to quality-of-service delivery in public and private healthcare. The intention of the NHQIP is to support the move from a narrow focus on compliance to a mindset of continuous improvement to improve patient outcomes (Department of Health of South Africa, 2018). The NCS provides a regulatory framework against which service delivery at health establishments in SA can be evaluated. As output of the NCS, the regulated standards for Emergency Medical Services[29] were promulgated in terms of Government Gazette Vol 272 of 2 December 2022 No.47632 and will come into effect 12 months from promulgation (see Appendix H).

As mentioned in the introduction to this section, this section aligns to secondary questions of this study: How does the EMS manager perceive, interpret, and understand the background and context to the development of the standards for EMS. The EMS regulations cannot be seen in isolation but rather as part of the National Health Quality Improvement Plan. The next section will review and discuss the literature on the six domains contained in the Regulations for Standards for Emergency Medical Services.

2.17 UNPACKING THE SIX DOMAINS IN THE REGULATIONS RELATING STANDARDS FOR EMERGENCY MEDICAL SERVICES

[29] The Standards for EMS excludes the domain Public Health for reasons that will be explored during this study as this domain includes the sub-domain of Disaster Preparedness, Health Promotions and Environment control.

The six domains are linked to the NCS for Health Establishments and provide a framework for quality assurance (Moleko et al., 2013). These domains will establish a national benchmark against which each EMS organisation and station will be assessed and accredited by the OHSC. The assessment will identify gaps, guide healthcare managers on quality improvement and provide a framework for certification of EMS organisations. Each of the six domains and sub-domains in Table 2.4 will be discussed in relation to the research aim and objectives of this study in the sections below.

Table 2.3: EMS standards domains and dub-domains

Domains	Sub-Domains	
Healthcare User Rights	Dignity of healthcare user Information for healthcare users	Stakeholder satisfaction surveys Complaints management
Clinical Governance and Clinical Care	Healthcare user's records Clinical management of emergency care Dispatch of emergency vehicles Response management Clinical leadership and clinical risk	Interfacility transfers Planned user transport services User safety incidents Infection, prevention, and control of infections Waste Management
Clinical Support Services	Medicines and medical supplies Medical equipment management	
Leadership and Governance	Oversight and accountability	
Operational Management	General Management Human Resource Management Occupational Health and safety	Emergency and disaster preparedness Fleet management
Facilities and Infrastructure	Management of buildings and grounds Facility management services	Security services Linen services

Source: Republic of South Africa (2022)

2.17.1 Domain 1: Healthcare User Rights

In SA, patients have the right to receive information about their health status, treatment options, and other aspects of their healthcare. This right is enshrined in the SA

Constitution and the National Health Act, 2003 (Act 61 of 2003) and supported by health regulations such as those for EMS. The National Health Act of 2003 (Act 61 of 2003) sets out specific requirements for healthcare providers regarding informed consent and the provision of information to patients. This includes ensuring that patients understand their health status and the options available to them, and obtaining their consent before any treatment is provided. In addition, the Patients' Rights Charter, includes rights that patients are entitled to, including the right to receive information about their health status, the decision on treatment options, and the risks and benefits of any proposed treatment. The Patients' Rights Charter also outlines the responsibilities of healthcare providers in ensuring that patients are informed and involved in their healthcare decisions.

These domains, sub-domains standards lie at the centre of this study and are aligned to all four objectives and the secondary questions. The current knowledge, attitude and practices of the EMS standards when creating a benchmark to identify where there is low compliance and understanding of the domains and sub-domains. The next section discusses the rights as they appear in the regulations relating to Standards for Emergency Medical Services. The rights discussed below include patient dignity, information for healthcare users, stakeholder satisfaction surveys and complaints management.

2.17.1.1 Dignity of healthcare user

The Standards for Emergency Medical Services Chapter 1, section 4 (1) states that: “The EMS must have systems in place to ensure that users are treated with dignity and respect at all times” (South African National Department of Health, 2021:7). Patient dignity is an important aspect of healthcare in SA, particularly given the country's history of apartheid that led to racial inequality and discrimination. Post 1994 the democratic government placed great emphasis on promoting and protecting patient dignity in the various legislation including the Constitution, the Patient’s Rights Charter and the Health Act of 2003 (Department of Health of South Africa, 1999). Despite this legislation, Dhai & McQuoid-Mason (2011) found that patients in South African public hospitals reported feeling that their dignity was not respected. Factors

that contributed to this disrespect included poor communication with healthcare providers, lack of privacy, and poor quality of care.

The concept of dignity is central to the provision of high-quality emergency care. In the emergency setting the patient is vulnerable and during the encounter will engage with unfamiliar caregivers. A study by Abelsson & Lindwall (2015) found that human dignity can be preserved in the pre-hospital environment by respecting the will of the patient and not disrespecting and ignoring the patient. Chochinov et al. (2018) emphasised the importance of communication and shared decision-making in promoting patient dignity. They suggested that promoting patient dignity requires attention to the unique needs and circumstances of each patient, as well as a commitment to providing care that is respectful, compassionate, and empowering. To address these and other quality issues, the OHSC was established in 2013 to promote and monitor compliance with healthcare standards, including those related to patient dignity (Moleko et al., 2013). Despite the efforts of the OHSC and other non-governmental organisations, there is acknowledgement by the National Department of Health that more needs to be done (Republic of South Africa, 2019b).

The next sub-domain addresses policies and practices regarding patient/user's rights. The Standards for Emergency Medical Services Chapter 1, section 4 (2) state that: “The EMS must have organisational policies and practices regarding user's rights that are consistent with sections 10, and 27(1)(a) and (3) of the Constitution of the Republic of South Africa, 1996 and Chapter 2 of the Act” (South African National Department of Health, 2021:7).

EMS has a responsibility to ensure that the rights of patients are respected and maintained whilst care is being provided. The rights that are protected in the Constitution and the Health Act (Act 61 of 2003) includes providing patients with information about their rights, obtaining consent for treatment, and ensuring patient confidentiality. Section 16 of the Health Professions Act (HPA) of 1974 makes provision for the Professional Boards to establish registers for the different qualifications, regulate emergency care education and training, publish the clinical scope of practice for each category, and publish ethical rules to which all registered

practitioners must abide. The HPCSA established the Professional Board for Emergency Care in 1992 (Sobuwa & Christopher, 2019). Failure to comply with the HPCSA ethical rules may result in disciplinary action being taken against the registered practitioner with the sanctions including fines, suspension or being removed from practice (Republic of South Africa, 2009). Section 3 of the HPA gives the mandate to the HPCSA to:

> *"…ensure that persons registered in terms of this Act behave towards users of health services in a manner that respects their constitutional rights to human dignity, bodily and psychological integrity and equality, and that disciplinary action is taken against persons who fail to act accordingly"* (Republic of South Africa, 2015).

This sub-domain is associated with the objective of implementing a sustainable quality improvement plan. The next sub-domain addresses information about the health care services.

2.17.1.2 Information for healthcare users

The Standards for Emergency Medical Services Chapter One, 5 state that: The EMS must provide users with adequate information about the healthcare services provided, including information: -

(a) about the service made available to users, including the cost for services; and
(b) relating to the quality of services provided.

In SA, patients have the right to receive information about the cost and quality of healthcare services they receive, including the cost and quality of EMS. Exploiting patients for financial gain whilst they are vulnerable is unethical. A study by Vincent-Lambert & Jackson (2016) reported that a number of SA paramedics working in the private EMS sector reported unethical financial practices such as over-servicing, selective patient treatment, fraudulent billing and receiving undue incentives. These

practices are prohibited in terms of the ethical rules of the HPCSA. The HPCSA Guidelines on overservicing, perverse incentives and related matters states that:

> *"Healthcare practitioners shall not charge or receive fees for services not personally rendered by either a healthcare professional himself or herself or by an unregistered person in his or her employ, except for services rendered by another healthcare practitioner or person registered in terms of the Health Professions Act (Act No. 56 of 1974), that regulates the particular profession, with whom the healthcare practitioner is associated as a partner, shareholder or locum tenens"* (Health Professions Council of South Africa, 2008:6).

This sub-domain is associated with the objective implementing a sustainable quality improvement plan. The next sub-domain addresses information about enabling the stakeholders and users to communicate their experiences of care and user satisfaction.

2.17.1.3 Stakeholder satisfaction surveys

The Standards for Emergency Medical Services Chapter One, 5 states that:

(1) "The EMS must have the mechanisms and systems to enable the stakeholders and users to communicate their experiences of care."
(2) "The EMS station or ECC must implement systems and processes to assess, monitor and improve their stakeholder satisfaction with the services provided annually."

Healthcare user satisfaction surveys are an important tool for evaluating the quality of healthcare services and to identify areas for improvement. There are several reports by the South African Human Rights Commission (SAHRC) and investigative journalists that have investigated and reported on patient satisfaction with EMS in SA. In 2015 the SAHRC produced a report: Access to Emergency Medical Services in the Eastern Cape. In the report the SAHRC found that the shortcoming of the ambulance services in the Eastern Cape impacted harshly especially on patients in rural areas of

the province. As a result people hired private transport to move sick patients to hospital (South African Human Rights Council, 2015).

The Bhekisisa centre for health journalism claimed in 2018 that there were only 1971 ambulances operating among the nine regions. The number of ambulances should be at least 5700, according to the national department of health's ambulance to population ratio. Staffing issues were cited as a challenge that hindered the provision of services (Msomi, 2018). A Spotlight report found that the Mpumalanga Health Department had 55 of the 98 ambulances in working condition. Doctors in the provincial hospitals complained about waiting for several hours for an ambulance to transfer the patient to the next level of care (Lefafa, 2022). Due to the demand generated by the government's failure to provide this crucial service, the private ambulance industry has expanded.

This sub-domain is associated with objectively implementing a sustainable quality improvement plan. The next sub-domain addresses information about complaints and complaint management.

2.17.1.4 Complaints management

(2) The Standards for Emergency Medical Services Chapter One, 7 states that:

(1) “The EMS must have a system for monitoring, assessing and responding to complaints.”
(2) “The EMS must provide users with information about the process of lodging a complaint.”
(3) “The EMS must record and analyse complaints to improve quality of care provided to the users.
(4) “The EMS must have a system to provide feedback to the complainant.”

The Patient’s Rights Charter and the National Health Act, 2003 (Act 61 of 2003) as amended says that everyone has the right to complain about the health service they receive, and they have the right for their complaint to be investigated and to receive a full response on the investigation (South Africa. Department of Health, 1999). The

Department of Health has produced a guideline to assist managers in dealing with complaints, compliments, and suggestions. The guideline will be summarised in the next paragraph.

The National Guideline to Manage Complaints, Compliments and Suggestions in the Health Sector of South Africa recognises that complaints inform strategies to improve the quality of health services. The information gathered can be used to learn and bring about the desired change. Of the 25 733 complaints received in the 2020/21 reporting period, that top three categories were related to patient care (33%), staff attitude (29%) and waiting times (21%) (South Africa. Department of Health, 2021c). There are no studies published specifically on complaints in EMS in SA. The next few paragraphs will present the EMS experiences with regards to complaints management in developed countries.

In countries with well-developed EMS systems, complaints management is an integral part of quality and are a valuable tool to identify areas that need improvement. Brady (2017) undertook a literature review of complaints in the UK ambulance service and found that the complaints related to delay in service, attitude of staff and quality of service related to clinical errors. In the study, Brady (2017) noted that unlike in other service industries, the patient requiring emergency care did not have a choice of EMS service provider.

Healthcare user rights are an important facet of healthcare quality. The EMS manager is required to report on compliance of the EMS system in attaining these standards. These rights are linked to the study objective: the critical appraisal of the knowledge, attitude, and practice of EMS power brokers in relation to quality improvement. It also links to the secondary question: How do EMS managers perceive, interpret, and understand the standards for EMS.

The next section will discuss the important quality domain of clinical governance and clinical care that appears in chapter 2 of the regulations Standards for Emergency Medical Services.

2.17.2 Domain 2: Clinical governance and clinical care

Chapter 2 of the Standards for EMS focuses on clinical governance and clinical care. It could be argued that this is the most important quality domain, and it goes to the core functioning of the EMS system. The domain is linked to the third objectives of this study namely: To document the quality champions perspectives on the application of the Standards for EMS. It also is aligned to the secondary questions namely: What is the knowledge, attitude, and practice of EMS managers in relation to quality improvement? Secondly, how do EMS managers perceive, interpret, and understand the Standards for EMS?

In the regulations Standards for EMS, this domain includes: 1) Healthcare user records, 2) Clinical management of emergency care, 3) Dispatch of emergency vehicles, 4) Response management, 5) Clinical leadership and clinical risk, 6) Interfacility transfers, 7) Planned user transport services, 8) User safety incidents, 9) Infection, prevention, and control of infections, and 10) Waste management. These will be discussed below.

2.17.2.1 Healthcare records

The Standards for Emergency Medical Services Chapter 2, Section 8, Healthcare user records states that:

(1) “The station must ensure that accurate and comprehensive records of the healthcare services provided to users are created and maintained.
(2) The EMS must record accurate biographical information for users.
(3) The accurate and comprehensive records of clinical care provided to users must be documented by the EMS to facilitate continuity of care.
(4) The EMS must ensure that users’ health records are stored, accessible and can be retrieved when needed.”

Health records document patient information and essential records of the care provided. The HPCSA ethical guidelines on patient records defines a health record as any relevant record made by a healthcare practitioner that contains information about the health of an identifiable individual. Examples include handwritten notes, laboratory

reports, X-Ray films, ECG traces, and audio-visual recordings. The guideline details on the ownership of records, what information must be recorded, how long records must be retained, and how and who can access these records (Health Professions Council of South Africa, 2007).

The quality of medical records is essential for clinical governance, medicolegal and the continuum of care. Spicer & Sobuwa (2014) conducted a study in the Western Cape and reported that 97% of the pre-hospital patient report reviewed had missing vital information noting the adage 'If it is not documented, it was not done' implied that significant medicolegal risk to EMS that this finding presented. Although this study was confined to one region of the country and therefore not generalisable, the findings identify a significant quality weakness. This risk posed by poor record keeping will be discussed next.

Accurate medical documentation captured on healthcare user records or patient report forms are an essential part of patient safety. These records facilitate the continuation of care during the patient handover and are important for patient care. Loss of information can lead to inappropriate medical treatment, such as repeating a drug dose because there was no documentation of the initial dose. These medical errors ultimately influence patients' outcomes (McKenzie et al., 2022). Laudermilch et al. (2010) reported that the lack of EMS documentation recording basic patient physiology at the scene was found to be associated with a greater than twofold increase in the risk of mortality. The study recommended that this deviation in care could serve as an audit filter for performance improvement. The next paragraph will discuss how training has been used on nursing to improve patient record keeping.

Poor healthcare user record keeping can be addressed by training and system interventions. Thomas et al. (2007) reviewed a health district in Gauteng province, South Africa and found poor record-keeping amongst other factors that contributed to poor maternal health services. By implementing system interventions and programme specific training, patient records improved. The authors of the study recommended that the training of healthcare workers include health system development and avoid only promoting programme specific interventions. The EMS manager is required to

ensure that EMS personnel accurately document the care provided on a patient report form and that these health records are correctly captured, safely stored, and easily retrieved. The survey questions 32 and 33 in this study enquires about the practice.

This sub-domain is associated with objective implementing a sustainable quality improvement plan. The next sub-domain addresses communication centre and call management.

The Standards for Emergency Medical Services Chapter 2, Section 9, Clinical Management of Emergency Care states that:

(1) "The EMS must put in place an efficient call management system to facilitate access to communication systems to facilitate the provision of effective and appropriate emergency care.
(2) The EMS must ensure that contingency plans for communication system failure or malfunction are available and known to personnel and managers."

The emergency medical dispatch system is a key component of the EMS. The system can not only dispatch the right resources to the right place but also provide lifesaving telephonic emergency care advice and information to the caller. A key component of the emergency medical dispatch system is the emergency control centre (ECC) (Mould-Millman et al., 2015). An emergency medical service is activated by a call being made to the ECC by the patient, member of the family, the public or another healthcare practitioner or fire, traffic, police, or emergency services. The call takers usually follow a structured procedure to manage the call that includes a triage of the call to ensure that the correct resources are dispatched to the emergency (MacFarlane, 2003).

The ECC plays an important role in curtailing the inappropriate use of ambulances and improving the utilisation of this scarce resources in LMICs. Notwithstanding the limitation of seasonality, Newton et al. (2015) found a significant mismatch between dispatched resources and the actual patient need. In the 1385 reviewed calls to the ECC in KwaZulu-Natal they found that 'red-code' or 'priority 1'calls constituted 56% of the cases dispatched but accounted for less than 2% or 'red-code' priority on scene.

Although this study has several weaknesses such as the brief data collection period with data collected over one weekend, the implication is that scarce resources are dispatched to non-life-threatening emergencies therefore potentially delaying the response time to patients in dire need to emergency care.

The regulations require an efficient call management system. In today's technological age, Computer Aided Dispatch (CAD) is universally accepted as an essential component of EMS. This sub-domain is associated with objective implementing a sustainable quality improvement plan. The next section discusses CAD in the regulations.

2.17.2.2 Dispatch of emergency vehicles

The Standards for Emergency Medical Services Chapter 2, Section 10, Dispatch of emergency vehicles states that:

(1) "An efficient vehicle dispatch system must be in place to ensure user have rapid and safe access to services.
(2) For the purposes of sub-regulation (1), the EMS must -
    a. have a Computer Aided Dispatch (CAD) system that facilitates vehicle allocation, routing and tracking and where an Emergency Communication Centre (ECC) does not have a Computer Aided Dispatch (CAD) system, a paper-based system must facilitate vehicle allocation, direction, and tracking;
    b. have a standardised process for dispatching vehicles; and
    c. monitor response times for each stage of the call management and dispatch process."

The CAD systems utilised in the ECC contribute to the appropriate use of resources. Alshehri et al. (2020) point out that factors such as using a universal access number such as 112, having trained ECC personnel, using real time vehicle tracking and analytics and using criteria-based dispatch all contribute to the efficient and effective use of EMS in resource constrained settings. Although there has been a rapid development of EMS systems across Africa, having ECC's meet these criteria is

lacking despite the advances in telecommunications (Mould-Millman et al., 2015). The 9-1-1 emergency telephone number in the USA has been acknowledged as one of the more successful public health interventions. The system is designed to rapidly obtain critical information and dispatch the closest appropriate resources whilst providing life-saving advice such as telephonic CPR instructions (Sutter et al., 2015).

This section discusses the standards for EMS requirements to monitor response times for each stage of the call management and dispatch process. Access to emergency is guaranteed in section 27 of the Constitution. Timeliness of the care, especially for high acuity medical conditions, is an important dimension of quality (Stein et al., 2015). In South Africa, the provinces report annually against response times targets. The response time is defined as the time interval between which the call was received to the time the first EMS vehicle arrives on the scene of the incident. There are several factors that affect ambulance response times including: the number of ambulances, where the ambulances are located, the response system design, and management and supervision (Baloyi et al., 2017).

Up until 2019, the national response time targets are 90% of Priority 1 (P1) high acuity calls should be reached within 15 minutes in urban areas and within 40 minutes in rural areas. All other responses should be responded to within 60 minutes (Stein et al., 2015). The time was adjusted to 30 minutes[30] in urban areas and within 60 minutes in rural areas for the 2019/20 reporting period.

Response times are one of the most used benchmarks for judging the effectiveness and efficiency of EMS, especially in situations where the patient's condition is regarded to be life-threatening. Measuring the efficiency and effectiveness of an EMS system is a challenge given that there are few validated indicators of quality (Spaite et al., 1995; Benn & MacFarlane, 2003). Associated with the access is that it should be timely depending on the severity of the illness or injury (Stein et al., 2015). Howard et al.

[30] The response time targets were adjusted by the NHC to 30 minutes for P1 in urban areas and 60 minutes for rural in 2020 due to none of the provinces meeting these targets (Bham, A. “Personal Communication” 30 August 2022)

(2020) found that in contrast with the provincial EMS, where the primary focus of quality indicators was on response times and ambulance availability, the larger private services placed high emphasis on clinical quality assessment and improvement.

The time it takes to reach the patient has been identified as an important dimension of healthcare quality (Burstin, 2002; Benn & MacFarlane, 2003). The four-delay framework describes the barrier to accessing quality care. The delays happen firstly when taking the decision to seek help (i.e. call the ambulance), then reaching a healthcare facility (i.e. ambulance), receiving definitive care at the health facility and finally discharge from acute care to rehabilitation (Odland, et al., 2022).

The KwaZulu-Natal (KZN) 2020-2021 Annual Report, reported on the response times for Priority 1 (P1) calls for urban and rural areas under their strategic objectives, performance indicators and targets and achievements. Stein et al. (2015) reported that providing timely access to EMS is a challenge as none of the 3 provinces sampled over the period met the targets. Despite the adjustment of the response times, the KZN under 30-minute response time was achieved 50,9% for urban responses and 52,4% for rural responses. Finlayson (2017) reported that in one KZN health district over a period of seven days were there was a response to 1503 cases, the mean P1 response time in urban areas was 33 minutes and 95 minutes for rural areas.

The Western Cape reporting of response times for the same period was 65,7% for under 30-minute P1 response time for urban responses and 88,1% for under 60-minute for P1 rural responses. The Gauteng EMS spokesperson told the Daily Maverick newspaper reported in June 2022 that the Gauteng EMS P1 urban response time was under 30 minutes in 54% of calls and under 60 minutes for 83% of P1 calls in rural areas (Banda, 2022).

The EMS manager must ensure an efficient vehicle dispatch system to ensure users have rapid and safe access to services. The first objective of this study was to appraise the practices amongst EMS managers. This sub-domain is associated with the objective of implementing a sustainable quality improvement plan. The next sub-domain addresses information about the response to emergencies by EMS.

2.17.2.3 Response management

The Standards for Emergency Medical Services Chapter 2, Section 11, Response Management states that:

(1) Emergencies must be responded to in a coordinated and efficient manner by the EMS.
(2) For the purposes of sub-regulation (1), the EMS must -
    (a) ensure emergency vehicles are appropriately equipped and staffed; and
    (b) have systems to ensure that users are treated in accordance with current Health Professions Council of South Africa approved evidence-based guidelines to reduce variations in care and improve user outcomes.
(3) For the purposes of sub-regulation (2) (b)-
    (a) healthcare professionals must have and adhere to evidence-based clinical practice guidelines on stabilising user before and during transportation; and
    (b) comply with the standardised method of user handover to a receiving healthcare provider.

This sub-domain is associated with objectively implementing a sustainable quality improvement plan. The next sub-domain addresses information about EMS equipment.

2.17.2.4 Emergency vehicles are appropriately equipped

The Emergency Medical Service Regulations, 2017 define an ambulance as a motor vehicle that is appropriately equipped, designed, or adapted solely for the purpose of providing emergency care and conveyance of patients. The equipment specification for each ambulance is listed in the Appendices of the regulations (Appendix G). Stein et al. (2015) report that the lack of operational ambulances is the most common reason for public EMS not meeting the national response times targets. In 2015, it was reported that the cost of a fully equipped and staffed ambulance is R3.6 million, noting

that each ambulance required 8 staff to provide a 24-hour service utilising a four-shift system.

The Bhekisisa Centre for Health Journalism investigation reported that the National Department of Health said that there should be 5700 ambulances available based on the department of health aim for a ratio of one for every 10 000[31]. In 2018, just a third of the required ambulances were operational (Msomi, 2018). During the 2015 hearing, the SAHRC recommended that the Eastern Cape Department of Health increase the number of vehicles to 416 and activate live tracking of the fleet (South African Human Rights Council, 2015). The table below shows the distribution per province in 2018, noting that in 3 provinces less than 50% of the fleet was operational (Msomi, 2018).

Table 2.4: Number of ambulances per province in 2018

Province	Number of Ambulance	% of Operational Ambulances	Actual Operational Ambulances
Limpopo	373	62%	231
Mpumalanga	153	43%	66
KwaZulu-Natal	573	87%	499
Eastern Cape	447	67%	299
Free State	191	72%	138
Western Cape	264	96%	253
Northern Cape	189	49%	93
Gauteng	726	45%	327
TOTAL	**2916**	**65%**	**1905**

Source: Msomi (2018)

[31] The ratio of one ambulance for every 10 000 people is not supported by any evidence. The figure was based on a consultant's report in the early 2000 (personal communication with Mr. I Naidoo, 6 February 2023)

The demand on public EMS in South Africa is such that the existing resources are wholly inadequate to meet the demand with the workload of the EMS in KwaZulu-Natal (KZN). The KZN report reasons cited for poor response times included a lack of vehicles due to high accident rates, vehicle maintenance and an aging fleet noting that the province did not meet the national target for ambulance to population ratio is 1:10 000 (KwaZulu-Natal Department of Health, 2020). A key responsibility of an EMS manager would be to manage the fleet to ensure that the maximum number of vehicles are operational at any given time. This sub-domain is associated with objective implementing a sustainable quality improvement plan. The next sub-domain addresses information about EMS staffing.

2.17.2.5 Ensure emergency vehicles are appropriately staffed

Emergency vehicles include ambulance staff with a minimum of two crew and primary response vehicles that are usually crewed by an advanced life support qualified paramedic. The minimum equipment requirements of an ambulance is specified in the Appendix A of the Emergency Medical Service Regulations, 2017 (Republic of South Africa, 2017). The Profession Board for Emergency Care has registers for the following categories of emergency care personnel:

- Basic Ambulance Assistant (BAA)[32]
- Ambulance Emergency Assistant (AEA)[33]
- Critical Care Assistant (CCA)[34]

[32] The BAA was trained on a 4-week short course to render basic life support and assist those with higher qualifications. The NECET policy led to Regulation GN 49 that was published in 2017 resulted in training in this course ending with the closure of the HPCSA BAA register in February 2018 (Sobuwa & Christopher, 2019).

[33] The AEA was trained on a 16-week short course to render intermediate life support practice. The NECET policy led to Regulation GN 49 that was published in 2017 resulted in training in this course ending with the closure of the HPCSA AEA register in January 2020 (Sobuwa & Christopher, 2019).

[34] The CCA was trained on an 8-month short course to render advanced life support. The NECET policy led to Regulation GN 49 that was published in 2017 resulted in training in this course ending with the closure of the HPCSA CCA register in February 2018 (Sobuwa & Christopher, 2019).

- Operational Emergency Care Orderly (OECO)[35]
- Paramedic (ANT)[36]
- Emergency Care Assistant (ECA)[37]
- Emergency Care Technician (ECT)[38]
- Emergency Care Practitioner (ECP)[39]

The NECET policy has seen a change in the numbers in each of the HPCSA registers as reflected in Table 5. Tiwari et al. (2021) estimated that 23% of BAAs and AEAs registered with the HPCSA are employed in the public sector and 69% of ECT's, ANT's and ECP's are working in the public sector. The majority reside in Gauteng Province, followed by KwaZulu-Natal and Western Cape with the lowest number in the Northern Cape. Tiwari et al. (2021) recommend that the emergency medical services in South Africa undergo transformation to ensure the right skills mix to meet the needs of the NHI.

Table 2.5: HPCSA registration numbers per category 2017-2022

HPCSA Register	2017	2018	2019	2020	2021	2022
Ambulance Emergency Assistant (ANA)`	9657	10084	10719	11672	11358	11017
Paramedic (ANT)	1547	1519	1485	1532	1537	1611
Basic Ambulance Assistant (BAA)	53500	50801	43206	35797	29666	26318
Emergency Care Assistant (ECA)	0	1	0	0	2	43

[35] The OECO is a qualification offered by the South African Military Health Service with an intermediate life support scope of practice (Vincent-Lambert, 2015).

[36] Completion of the Diploma in Emergency Medical Care leads to registration on this register (Sobuwa & Christopher, 2019).

[37] Completion of the Higher Certificate in Emergency Medical Care leads to registration on this register (Sobuwa & Christopher, 2019).

[38] Completion of the two-year Higher Certificate in Emergency Medical Care lead to registration on this register. This course has been replaced by the Diploma Emergency Medical Care (Sobuwa & Christopher, 2019).

[39] Completion of the Degree in Emergency Medical Care leads to registration on this register (Sobuwa & Christopher, 2019).

Emergency Care Practitioner (ECP)	554	633	737	822	858	976
Emergency Care Technician (ECT)	1117	1126	1124	1101	1080	1056
`Operational Emergency Care Orderly (OECO)	510	487	462	446	393	366
TOTALS	66885	64651	57733	51370	44894	41387

Source: Mafetsa, R. "personal communication" held on 18 May 2022

This sub-domain is associated with objective implementing a sustainable quality improvement plan. The next sub-domain addresses information about clinical practice guidelines.

2.17.2.6 Emergency care personnel adhering to clinical practice guidelines

The pre-hospital environment is uncontrolled and unpredictable, there is no direct supervision and limited patient history and information (Brice et al., 2001). Although no study has specifically investigated the consequences of pre-hospital medical errors, Campbell et al. (2007), report that emergency care is prone to clinical error given the unpredictable nature of the pre-hospital environment and those cognitive errors do compromise patient safety. Ashokcoomar & Naidoo (2016) found that in SA, EMS personnel must deal with adverse weather conditions, noise, mechanical vibration, unstable equipment, restricted lighting, limited workspace, and limited support services, all of which may contribute to clinical error.

In the prehospital setting, emergency care personnel must make critical decisions at critical moments. To assist with the clinical decision making process and reduce clinical error, the HPCSA produced Clinical Practice Guidelines (CPG) for prehospital emergency care in South Africa in 2018 (Health Professions Council of South Africa, 2018). Amongst the factors that contribute to medical error are human factors, complacency, distractions, high workload, poor team work, overconfidence, poor professional communication, non-adherence to protocols and a poor safety culture (Lange et al., 2012). Quality improvement measures implemented by healthcare managers can reduce diagnostic error in clinical practice (Croskerry, 2005).

EMS in South Africa started out as a doctor-driven emergency service and has developed to one in which the emergency care professional is an autonomous independent practitioner registered with the HPCSA. The responsibility for clinical decision making is largely determined by the paramedics themselves. Although the national health regulations require each EMS organisation to have a medical doctor to provide medical direction and clinical governance, in practice this clinical governance and oversight is effective in a few EMS organisations (Vincent-Lambert, 2015).

Clinical governance is defined as a structure that holds healthcare organisations accountable for consistently enhancing service quality and preserving standards of care (Basu, 2019). In South Africa, reference to clinical governance can be found in several health regulations such as Regulation 67 of 2018: Norms and Standards Applicable to Different Categories of Health Establishments, which has as its purpose to seek to advance and safeguard the health and safety of patients, healthcare workers, and the public (South African Government, 2018).

CPGs provide evidence-based guidance to healthcare workers on how to ensure best patient care. McCaul et al. (2018) argue that given the higher burden of disease in LMICs, the use of CPGs are more important in these settings. Data from LIMCs show that adherence to clinical practice guidelines was below 50% in several instances (World Health Organisation, 2018). Although the manager may hold a lower medical qualification, the EMS manager is responsible for ensuring that staff under his control adhere to the HPCSA clinical practice guidelines. As per the regulations, the manager would require implementing systems to ensure adherence. This aligns with the third objective of the study that seeks to identify the benefit and impediment to implementing quality improvements in EMS.

This sub-domain is associated with the objective of implementing a sustainable quality improvement plan. The next sub-domain addresses information patient handover.

2.17.2.7 Implementing a standardised method for patient handover

The Standards for EMS requires a standardised method for user handover. An appropriate patient handover is essential to ensure continuity of care from the pre-

hospital to the receiving hospital. A poor handover increases the risk if medical error, delayed treatment, and waste of resources. There are a range of mnemonics used to recall the information that needs to be conveyed but Makkink et al. (2019) found a range of variables did not signify the importance of the variables in a survey of EMS personnel in SA.

The EMS manager is required to implement a standardised system for patient handover. There are discrepancies between the practices in various provinces with for example the Triage Early Warning Score (TEWS) being adopted in the Western Cape but seemingly not in Gauteng (Makkink et al., 2019). This standard aligns to the objective of this study related to EMS practice which is a question in the survey (Appendix A). This sub-domain is associated with the objective of implementing a sustainable quality improvement plan. The next sub-domain addresses information clinical leadership and governance which is linked to the secondary question: What are the benefits, and impediments and opportunity costs to implementing quality improvement in EMS.

2.17.3 The Standards for Emergency Medical Services Chapter 2, Section 12

Clinical leadership, and clinical risk states that:

(1) Systems to support the provision of quality healthcare services and prevent user safety incidents must be implemented by the EMS.
(2) For the purposes of sub-regulation (1), the EMS station must -
    a) participate in local and regional clinical governance activities; and
    b) have systems in place to ensure that users requiring resuscitation receive an immediate response by emergency care personnel trained in resuscitation.

2.17.3.1 Participating in clinical governance activities

The HPCSA requires all practitioners to engage in Continuing Professional Development (CPD) activities. In emergency care there is a constant updating of new knowledge, and it is therefore incumbent on the practitioner to constantly keep up to date with the current best practices. The CPD system has since its adoption in 2007

faced numerous challenges such as low compliance, it is difficult to measure, maintain and support the system (de Villiers, 2008). The standards for EMS direct the EMS manager to engage the staff under his control in CPD or other similar local and regional clinical governance activities. This again aligns to the objectives of the knowledge, attitude, and practices of the EMS manager in relation to clinical governance.

2.17.3.2 Systems to provide immediate resuscitation

Many EMS systems have programmes to improve the quality and performance of resuscitation from Out-Of-Hospital-Cardiac-Arrest (OHCA). Sayed (2012) found that internationally OHCA survival is a common outcome to measure the quality of an EMS system. The success of OHCA and Cardio-Pulmonary-Resuscitation (CPR) is dependent on several factors such as the time interval to CPR being started, the time to first defibrillation, advanced care, and transportation to hospital. Any interruption in the cycle will lead to poor outcomes (Nehme et al., 2021).

Although survival from OHCA is viewed as an indication of the quality of the EMS system, Stassen et al. (2021) reported that in underdeveloped and under-resourced EMS systems survival is low. In the Cape Town study 929 patients with OHCA received an EMS response in Cape Town, resuscitation was attempted in 7,4% (n=68) of cases and return of spontaneous circulation occurred in 1,3% (n=13), and 97,8% (n=909) were declared dead on scene (Stassen et al., 2021). A study that reviewed data from Johannesburg found that the median response time to OHCA was nine minutes and that return of spontaneous circulation occurred in 18% (n=36) of the 563 confirmed cases of cardiac arrest (Stein, 2009).

Notably, the study by Stassen et al. (2021) compared response time and OHCA outcomes results from the private and public EMS. The average response time for the private EMS was 10 minutes when compared to 20m39s of the public EMS. This resulted in 11 (4,3%) of the 258 OHCA patients having return of spontaneous circulation compared to 2 (0,3%) of the 671 patients seen by public EMS. Notably the private sector is 10 times better funded and resourced and therefore the expected outcomes would be better. The ethical dilemma facing the public EMS is to consider the value proposition of funding expensive resources for EMS to better manage

OHCA, noting that the OHCA outcomes in terms of long-term survival are generally poor.

The standards for EMS direct the EMS manager to implement a system to manage OHCA. The contrast between the outcomes of the two SA studies and the difference in outcomes between public and private EMS serve to highlight the opportunity to improve OHCA outcomes. This aligns to the objectives of the knowledge, attitude, and practices of the EMS manager in relation to clinical governance. This sub-domain is associated with objective of implementing a sustainable quality improvement plan. The next sub-domain addresses information user/patient safety incidents.

2.17.3.3 User Safety Incidents

(2) “For the purposes of sub-regulation (1), the EMS must -

(a) implement a system for recording, investigating, and managing user safety incidents to minimise the risk of harm and the risk of recurrence; and

(b) have systems in place to report user safety incidents to the responsible authority.”

The pre-hospital environment is stressful and uncontrolled and therefore prone to human error (Rowland & Adefuye, 2022). The World Health Organisation (WHO) describes a patient safety incident as one in which there was an unintentional event or circumstance that could have or did result in patient harm (Larizgoitia et al., 2013). The global incidence of adverse events is high, ranking amongst the top 10 causes of death and disability. In South Africa, the number of reported cases in 2019/20 was 21 777 with the main categories relating to behaviour (27%), clinical processes/procedures (27%) and patient accidents (12%) (Department of Health South Africa, 2022).

A survey of emergency care personnel in South Africa identified the causes of prehospital error as relating to poor communication, poor judgement, poor knowledge and skill, and fatigue. Other contributing factors included inadequate resources such as equipment and environmental factors. Amongst other recommendations, the

authors recommended developing a protocol for managing medical error, implementing education, training and leadership skills amongst EMS staff to help prevent medical errors (Rowland & Adefuye, 2022). EMS managers are required to ensure safe, quality care and therefore should be familiar with the processes in the National Guideline for Patient Safety Incident Reporting and Learning in the Health Sector of South Africa. This sub-domain related to the knowledge and practices of the EMS manager in the first objective of this study.

2.17.3.4 Infection, prevention, and control of infections

This section includes the discussion related to infection, prevention, and control of infections, and waste management as they appear in the Regulations for Standards for Emergency Medical Services. Infection, prevention, and control are associated with patient safety. The recent Covid-19 pandemic highlighted the threat posed by microorganisms. The World Health Assembly recognises that infection prevention and control as well as waste management is the cornerstone for healthcare-associated infections. In response, the Department of Health has produced a strategic framework to prevent, reduce and control healthcare-associated infections (South African National Department of Health, 2020).

A study conducted by Naguran (2008) in KwaZulu-Natal found ambulances to be contaminated with 13 species of microorganisms of which ten were potentially pathogenic. The EMS staff surveyed in the study were unaware of infection control policies and procedures stating that personal protective equipment was often unavailable. Appendix B of the Emergency Medical Services Regulations, 2017 specify the requirements for the management of waste materials and cleaning of ambulances and equipment (Department of Health South Africa, 2017). The EMS manager is required to adhere to the National Infection, Prevention and Control Strategic Framework and ensure that the staff are trained in infection prevention and control. This aligns to the first objective of this study related to knowledge and practices of EMS managers.

2.17.4 Domain 3: Clinical support services

Section 18, Clinical Support Services relates to 1) Medicines and medical supplies, and 2) medical equipment management.

In SA, the advanced life support paramedics are permitted to store and administer medicines up to schedule 7. The use of the medicines is authorised by the South African Health Products Regulatory Authority (SAHPRA), whilst the storage, use and disposal are regulated by the requirements in terms of the Medicines and Related Substances Act, 1965 (Act 101 of 1965). There is limited research available on the pre-hospital management practices on medication control and safety. Although the incidence of medication errors is unknown, studies by Christopher (2007) and McCaul et al. (2018) have found that there is non-adherence to the HPCSA protocols and clinical guidelines that govern the pre-hospital use of medicines. Non-adherence to protocols and guidelines compromise patient safety.

The EMS manager is required to ensure that the ambulance station and staff adhere to the Medicines and Related Substances Act, 1965 (Act 101 of 1965). This aligns to the knowledge, attitude, and practices of the EMS manager in relation to quality improvement as stated in the first objective of this study. This links with the second proposition: EMS are nuanced and complex organisations that require bespoke quality improvement systems to develop, maintain and evaluate quality and patient safety.

2.17.5 Domain 4: Leadership and governance

(1) The provincial department must oversee and support the EMS.

(2) For the purposes of sub-regulation (1) -

(a) The EMS are licensed as per the requirements of the Emergency Medical Services Regulations, published in the Government Gazette of 1 December 2017 and any other applicable legislation; and

(b) A functional governance structure oversees service delivery to ensure quality services are provided.

Effective leadership has been identified as an essential component in health quality systems (Peters et al., 2019). Nielsen et al. (2012) conducted a survey in 13 LMICs in Africa, Asia and Latin America using a WHO needs assessment form. The survey

found that lack of leadership within the system was a significant finding. Leggio (2013) found that leadership styles across EMS in the United States varied significantly and suggested that EMS managers move from management to leadership to accomplish goals with and through people. Further Leggio (2013) reported that EMS should manage things such as budgets and fleet but need to lead people.

Naidoo et al. (2014) surveyed EMS staff in KwaZulu-Natal province where respondents indicated that the Advanced Life Support[40] qualification is the ideal medical qualification for EMS managers. Those surveyed also affirmed the need for EMS managers to have managerial qualifications. These findings that managers lack expertise is supported by a similar study in the province (Finlayson, 2017). The independent review committee for EMS in South Africa reported that often EMS personnel were appointed to managerial positions with no management skills and experience. The lack of management training, the Occupation Specific Dispensation (OSD) requirements and the low salaries paid to public EMS employees contributed to the problem (Department of Health South Africa, 2012b).

A study into the EMS response times in KwaZulu-Natal conducted by Finlayson, (2017) found poor supervision of staff and that managers did not take disciplinary action against EMS personnel for driving recklessly and causing accidents. Leadership and governance are a core responsibility of the EMS manager and links to the objective: To identify the benefits and impediments to implementing quality improvement systems in EMS. The next section of this chapter will discuss Chapter 5 of the Standards for EMS, Operational Management.

2.17.6 Domain 5: Operational management

(1) Management of the EMS must ensure the provision of safe, effective, and efficient user care.

(2) For the purposes of sub-regulation (1), the EMS must -

[40] The Advanced Life Support (ALS) is based on a 3-teir scope of practice being that of Basic, Intermediate and Advanced Life Support. Persons with the CCA, Diploma and ECP qualification registered with HPCSA would be deemed ALS. The AEA, ECT and ECA is regarded as Intermediate Life Support (ILS), whereas the BAA is regarded as Basic Life Support (BLS).

(a) ensure the service is managed by an appropriately qualified individual, who is responsible for ensuring the provision of quality services; and

(b) ensure that financial management and supply chain management processes facilitate business continuity and efficient service delivery.

The Lancet Global Health Commission report endorsed four universal actions to improve the quality of healthcare. The first was " …*health system leaders need to govern for quality by adopting a shared vision of quality care, a clear quality strategy, strong regulation, and continuous learning"* (Kruk et al., 2018: e1197). The second was to redesign the health service to maximise health outcomes, thirdly to transform the health workforce and lastly to empower the people to hold the health system accountable (Kruk et al., 2018). The EMS Regulations, 2017 (GN 1320) requires every emergency medical service operating in South Africa to be licenced and appoint an Emergency Medical Service Manager who must hold at least an AEA qualification[41]. The responsibilities of the EMS Manager specifically related to quality are listed as:

(a) ensure that the Emergency Medical Service is operated in a way that provides quality care and does not compromise the safety of the public, patient, or personnel;

(b) ensure compliance with norms and standards determined by the Office of Health Standards Compliance;

(c) ensure that all indicators for Emergency Medical Services as per the National Indicator Data Set are submitted as stipulated by the Auditor General of South Africa; and

Additionally, Section 27 of the regulations require:

(1) The Emergency Medical Service Manager must ensure that an individual patient care record is kept for every patient treated or conveyed by the service.

[41] The AEA course was discontinued in 2020.

(2) The Emergency Medical Service Manager must ensure that the following information is captured monthly, is properly secured and is readily available to inspect at the request of an inspecting officer or the Head of Department:

(a) Response time performance appropriately categorised into the response categories for urban and rural areas.

Although in the public service, AEA medical qualification and two years' experience is the minimum requirement to be appointed as an EMS Manager, the AEA course did not include any management outcomes. The HPCSA AEA curriculum, which was last updated in 1999, had a total of 210 hours of classroom theory, of which 5 hours were allocated to the section on Professional Practice and Ethics. The rest of the curriculum time was allocated to emergency care clinical education and training (Health Professions Council of South Africa, 1999). The operation role and function of the EMS manager links to the first objective which is to appraise the knowledge, attitude, and practices of the EMS manager in relation to quality improvement. The next section will summarise the domains and sub-domains in the context of frameworks for quality.

2.17.7 Domain 6: Facilities and infrastructure

The facility management services must be functional and enable safe and uninterrupted delivery of EMS.

(1) Security systems must be in place to protect users, personnel and property from security threats and risks.

(2) Clean linen is provided as required for the type of services delivered.

This domain links with the objective to change EMS policy and praxis in the interest of patient safety and organisational sustainability. The chronic underinvestment in health facilities and maintenance was identified in the draft national infrastructure plan 2050. Infrastructure is the responsibility of the Department of Public Works and infrastructure. The OHSC conducted an audit that found no maintenance plans for health facilities with many facilities non-compliant with safety regulations and waste management practices (Republic of South Africa, 2022a). There is no research or

reports available on the status of EMS stations, however this domain links to the objective to change policy and praxis to lead to quality improvement in EMS.

2.18 OVERVIEW OF REGULATIONS RELATING TO STANDARDS FOR EMS

South African policy frameworks in the form of the norms and standards regulations published in February 2018 included sub-regulations that included the domains: user rights; clinical governance and clinical care; clinical support services; facilities and infrastructure; governance and human resources; and general provisions (Basu, 2019). Importantly, Basu (2019) noted that despite these regulations, no training programme is available to train the clinical managers to acquire the knowledge and skills to implement and manage these components.

Initiatives to include quality evaluation in EMS have incorporated the frameworks and principles of quality management systems used in the business sector, just like other healthcare contexts (El Sayed, 2012). EMS organisations around the USA employ a variety of different quality improvement techniques. After the Joint Commission on Accreditation of Healthcare Organisations (JCAHO) adopted the CQI concept in 1992, the quality management paradigm in EMS shifted from pure quality assurance programmes towards quality improvement (Mainz, 2003). The National Highway Traffic Safety Administration (NHTSA) developed a quality framework called Emergency Medical Service Outcomes Project (EMSOP) to identify “tracer” conditions that would benefit from EMS and guide quality measures (Maio et al., 2002). Whereas previously, quality improvement in the USA were focused on the provider, it is now patient-centred (Suriyawongpaisal et al., 2012).

Rahman et al. (2015) reported on the key quality of performance of EMS systems across Asia, noting that the non-uniformity of performance measurements made comparison between countries difficult. Howard et al. (2020) reported that in SA the quality systems are in their infancy and that the general opinion among EMS personnel is that the country’s EMS quality systems are poor. The main concerns relate to the system transparency, dependability, and contextual relevance. Poor communication, inadequate leadership and quality systems used as a punishment have worsened this perception (Howard et al., 2019).

This summary aligns to the objective to develop a framework that explicates how change on EMS policy and praxis may lead to quality improvement in EMS. The next section will discuss the barriers to quality in healthcare.

2.19 BARRIERS TO QUALITY HEALTHCARE

The second objective of this study is to identify and explore the benefits and impediments to implementing sustainable quality. This section of the chapter will discuss the barriers to quality improvement in healthcare.

Berwick et al. (1992) identified four obstacles: time, territory, tradition, and trust that are responsible for perceived quality failures. 1) Time: Quality improvement takes time and requires health professionals to learn the method, work in teams, gather and analyse data. 2) Territory refers to each health profession needing to realise the interdependency with others. 3) Traditions of overt and subvert behaviour can hinder change. 4) Trust is the commitment of the leadership within the organisation and must be reflected in the time, behaviour, budget, and the way they deal with each other.

The barriers to change have been identified at the level of the patient, the health professional, and the organisation. The context of the individual, team and organisational beliefs and values also play a role in implementing quality improvement. In emergency care there is a strong emphasis on “doing” as to provide immediate lifesaving care. This limits the opportunities for interaction and collaboration amongst the healthcare team and leads to error producing conditions (Muntlin et al., 2010).

Croskerry et al. (2002:1108) describe the emergency department as a clinical environment with “diagnostic uncertainty, high decision density and cognitive load, time and resource limitations, interruptions, frequent transitions of patient care and poor feedback.” The barriers in Table 4 relates to those attributed to health professionals as identified by Croskerry et al. (2002).

Table 2.6*:* Physician barriers to quality

BARRIERS TO QUALITY	
Relinquishing of control, autonomy, power, and clinical freedom	Intrinsic resistance to change
Quality improvement (QI) not seen as a clinical function	Shift of leadership from doctor to team, organisation system
New accountability- doctors saw accountability only to themselves and their professional body; now it has nonclinical origins	Disagreement with criteria being used for quality; seen to be developed by those without clinical training and insight into patient care
Development of new QI initiatives requires an investment of doctor time and is seen as encroachment on clinical time	Time spent on QI is see as an added burden to other administrative duties
QI is seen as an opportunity for blame and possible litigation	Absence of doctor role models in the new paradigm
Suspicions that QI programmes are designed to cut costs rather than improve care	

Source: Croskerry et al. (2002)

Poor quality healthcare accounts for 60% of preventable deaths and supersedes insufficient access and non-utilisation of services as a barrier to reducing mortality in LMICs. As utilisation of health resources increases, the poor quality of the healthcare decreases as the health system is unable to meet the demand. This leads to a lack of trust and confidence in the systems as less than 25% of people in LMICs believe their health systems work well (Kruk et al., 2018). The lack of trust and confidence leads to decreased health seeking behaviour and non-adherence to evidence-based interventions such as was seen with the uptake of the Covid-19 vaccines (Chan et al., 2020). The next section discusses the quality improvement tools and techniques used in quality improvement. These tools align to the interventions to motivate and foster a quality discourse among EMS managers.

2.20 QUALITY IMPROVEMENT METHODS, TOOLS & TECHNIQUES

Integral to the success of the NCS Standards for Emergency Medical Services is the identification of the gaps or problems, analysis of the problem to identify the root causes and possible remedial action. Realising that the NCS is a new initiative, Moleko et al. (2013) identified the need to firstly raise awareness and disseminate knowledge and introduce formal training activities.

The use of quality improvement (QI) methods is considered important for achieving QI yet there is scant information in the literature on what QI methods are best suited for use in EMS. Phung et al. (2016) found that there was a significant correlation between length of service of paramedics, team leaders and operational managers and their familiarity and use of QI methods. Wiggins & Marshall (2018) note that healthcare managers are faced with a vast array of approaches to organisational improvement[42]. They suggest that a multi-paradigm enquiry may offer a more comprehensive view of complex organisational phenomena.

This section will describe the efforts to improve healthcare quality by borrowing ideas on modern leadership methods from studies done in industrial organisations. The quality improvement methodology discussed is Plan-Do-Study-Act, which is being applied to healthcare organisations. This will be followed by a discussion on quality control tools and how quality is applied to High Reliability Organisations (HROs) such as nuclear power stations and these lessons can be applied in health systems. The next section will describe the Plan-Do-Study-Act method.

2.20.1 Plan-Do-Study-Act (PDSA) method in quality improvement

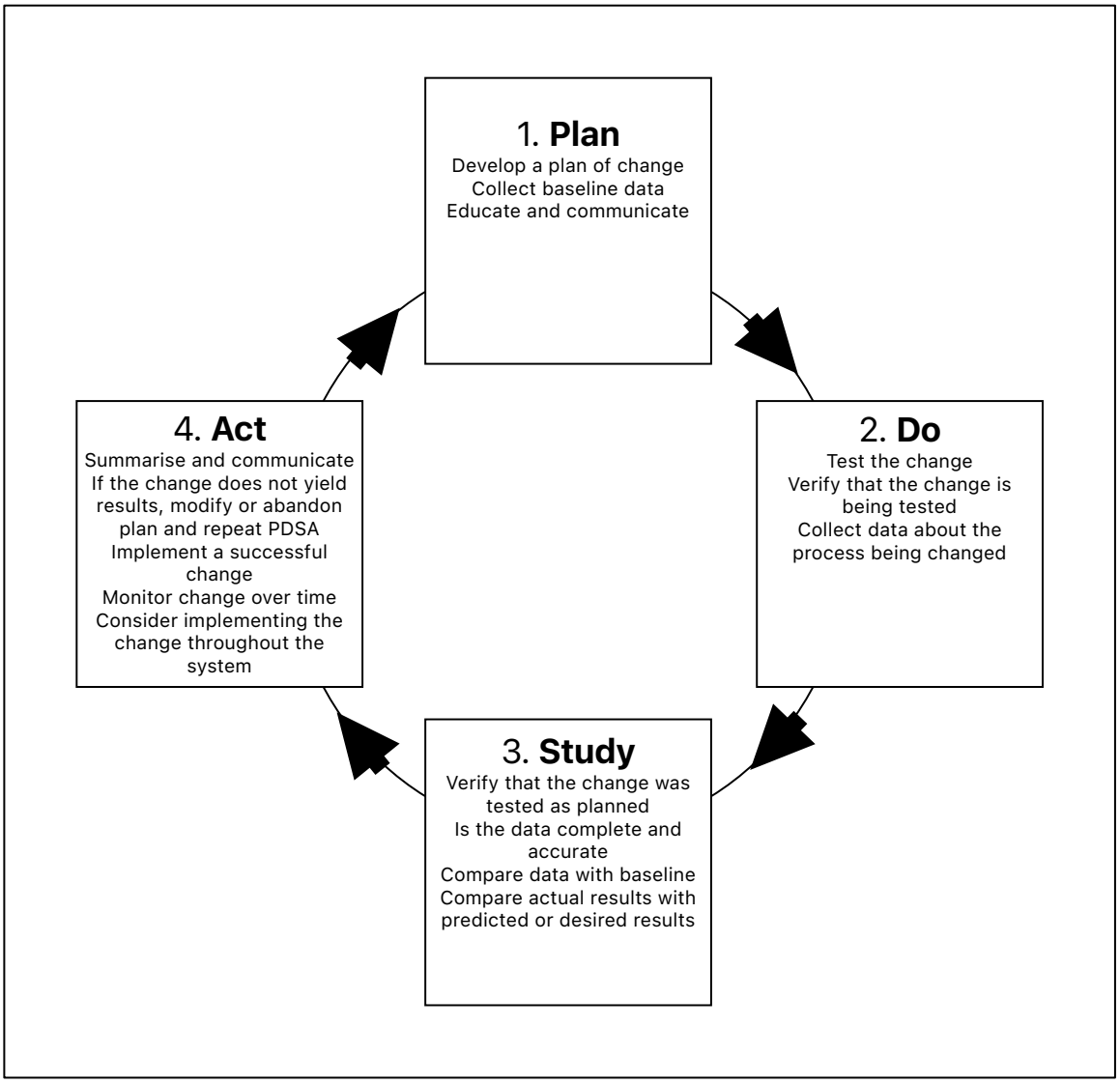
Quality improvement (QI) describes a set of concepts, methods and skills that include QI methods such as Plan-Do-Study-Act (PDSA) or Plan-Do-Check-Act (PDCA) cycles. The PDSA cycle, otherwise referred to as Shewhart's Cycle, reflects the iterative

[42] There are many QI tools of which the most common are described and briefly discussed.

scientific method and was made popular by Edwards Deming and Walter Shewart. PDSA is reported as the most common approach to continuous improvement in healthcare, including EMS organisations in the USA (Graham et al., 2006).

The PDSA together with the Root Cause Analysis can be used for individual problem solving, rapid and systematic team problem solving, and process improvement. The example of PDSA for learning and improvement is illustrated in Figure 2.5 (Massoud et al., 2001). The results from the first cycle inform the next iterative improvement cycle leading to continuous improvement. The cycle includes the use of other quality tools such as Check Sheets and Pareto Analysis that is summarised in Table 2.8. It is the recommended improvement methodology within the ISO 9001 standard. The PDSA cycle developed by the Institute of Healthcare Improvement is chosen by several EMS groups in the USA as a model for improvement (Lincoln et al., 2021). Similarly, PDSA cycles, process mapping and statistical process control have been successfully applied in the United Kingdom National Health Service (NHS) (Phung et al., 2016).

Figure 2.5: PDSA Cycle



Source: Massoud, et al. (2001)

The implementation of the PDSA cycle for quality improvement changes require the following questions: “What is our goal?”, “How will we measure that the change is an improvement?”, “What changes can we make that will result in improvement?” In answering these questions, it is important to consider that there are historic and ongoing barriers that may contribute to poor quality (Amati et al., 2018). The PDSA cycle links to the research objective to develop intervention to motivate and foster quality and the objective to develop a framework that explicates how change in praxis may lead to QI. In the next section the common quality improvement tools will be discussed.

2.20.2 Quality improvement toolkit

The seven basic quality tools was proposed by Kaoru Ishikawa to assist managers identify and analyse improvement in quality (Neyestani, 2017). This links to the objectives to develop intervention to motivate and foster quality and the objective to develop a framework that explicates how change in praxis may lead to QI. The EMS managers knowledge of these quality tools is tested in the survey questions.

Table 2.7: Seven basic tools of quality control

QUALITY TOOLS	DESCRIPTION
Flow Charts	Flow charts describe what is actually happening when compared to what should be happening in the process.
Check Sheets	Used to collect, organise, and analyse data
Pareto Charts	Allows for the analysis of data in search for the 80/20 principle. According to Joseph Juran (Juran, 1993) it helps separate the vital few from the trivial many
Cause and Effect Diagrams	Fishbone diagram that can include the "8-M's": maintenance, measurement materials, man, mother nature, management, methods, and machines.
Histograms	Bar chart that graphs the frequency of occurrences to identify patterns or variation
Scatter Diagrams	Help to identify relationships between variables, noting that there can be correlation without causation.
Control Charts	It is a tool that ensures that the process is in control

Source: Neyestani(2017)

Table 2.8 above briefly describing these tools are practical examples that relate to the research objective to identify interventions to motivate and foster a quality discourse among EMS managers. The next section on high reliability organisations aligns to the second proposition: EMS are nuanced and complex organisations that require bespoke QI systems to develop, maintain and evaluate quality and patient safety.

2.20.3 EMS as a high reliability organisation

High reliability organisations (HROs) are organisations that achieve quality, safety, and efficiency goals. HROs are fast-evolving work environments that are complex where thousands of processes must work to prevent chaos and lives being lost. An example is the air traffic control systems or nuclear power stations where the million accidents that could happen did not happen. The extraordinary successes of these industries outside healthcare has led researchers to study their characteristics and ask how healthcare can become highly reliable? (Chassin & Loeb, 2013).

Charles Perrow (cited in Van Stralen & Mercer, 2013) studied the Three Mile nuclear power plant accident and concluded that complex systems where there is close interaction between humans and technology are prone to accidents but they can be expected to happen. This then implies that reliability is transient and constantly needs to be re-established. By the nature of its daily operations, EMS function in a dynamic environment often without the staff and resources immediately available to stabilise the emergency incident (Van Stralen & Mercer, 2013).

Weick & Sutcliffe (2015) acknowledge that organisations cannot plan for the unexpected and some environments such as the hospital emergency departments deal with disruptive events on a regular basis. In response, they identified five principles of HRO. The first three principles: 1. Preoccupation with failure, 2. Reluctance to simplify; 3. Sensitivity to operations, emphasising anticipating problems. The last two principles: 4. Commitment to resilience; and 5. Deference to expertise, emphasise containing problems after they occur. EMS systems are becoming increasingly complex to the extent that failures are not only expected but they can be predicted (Centre for Patient Safety, 2021). These system failures can lead to preventable death or disability. HRO's do not accept that failures will happen, and EMS can use quality systems and tools to the reduce the risk of failure in EMS systems. HRO solutions for EMS align to the research objective to implement sustainable quality improvement systems for EMS.

2.20.4 Appreciative Inquiry an alternate approach to quality improvement in EMS

Appreciative Inquiry offers an alternative to approaching quality improvement. It relies on positive psychology and social constructionism that suggests that social reality is an agreed construction of members of a society and is based on the theory that adults work and learn best when they construct something collectively. This is a new and powerful way to create new ideas and change organisations by focusing on the positive ideas that foster growth (Walker, 2014). The approach suggests that by finding ways for people within the organisation to share positive ideas and past examples of effective leadership, will naturally lead people to apply and design an improved organisation (Galer et al., 2008).

Appreciative inquiry offers an alternative approach. It aligns to the research objective to implement sustainable quality improvement systems for EMS. There are many challenges faced by EMS and solutions to some of those challenges may lie in alternate approaches. The next section will discuss the use of the Change Laboratory as an alternate method to solving complex organisational quality improvement problems.

2.20.5 The “Change Laboratory” approach to improving quality in EMS

Garraway & Christopher (2020) suggest that the Change Laboratory as an alternative to dealing with complex, intractable problems with organisations. Whereas it is common for organisations to use experts to initiate solutions which are implemented by the rest of the staff, in the Change Laboratory, the staff generate the solutions. Virkkunen & Newnham (2013) have noted that the Change Laboratory is suited to learning in the workplace as it integrates the change in organisational practices and individuals learning. The approach has been successfully used in hospitals in Finland.

The Change Laboratory again offers an alternative approach that has been successfully used in hospitals. It aligns to the research objective to implement sustainable quality improvement systems for EMS. The next section will summarise the alternate methods used to solving complex organisational quality improvement problems. Lessons learnt from HRO’s can be applied to complex organisations and

be used to solve complex problems. Wiggins & Marshall (2018) advocate for multi-level pluralism response to complex organisational change in healthcare. Whereas typical quality tools such as Lean Six Sigma differ ontologically from appreciative inquiry, adopting multi-level pluralism may allow healthcare managers to work with different change approaches within the health sector.

2.21 SUMMARY OF THIS CHAPTER

The WHO acknowledges that universal health access with unsafe and poor quality health services will lead to poor health outcomes (World Health Organisation, 2018). The WHO acknowledges that poor quality healthcare accounts for a high percentage of preventable deaths and causes a lack of trust and confidence in the health system (World Health Organisation, 2006). South Africa, as a member state, is in need of quality improvement of its health system (and EMS in particular).

The definition of quality in healthcare is necessary for it to be measured. The provision of healthcare is multidimensional and depending on which lens the individual is using to view the provision of health, will influence their perspective. Healthcare personnel view things differently from patients, and the personnel and patients will have a different perspective to that of the healthcare manager. Agreeing on the domains of quality is important as it helps all stakeholders to focus on a particular aspect or dimension of quality, identify indicators or standards, measure it, and look for ways to improve it. Different frameworks have been used to guide development of quality indicators and compare results.

The methods used to improve healthcare quality have been adapted from the manufacturing industry where competition, productivity, improving efficiency, reducing waste, and increasing profit is the motive. Healthcare organisations are complex by nature and therefore change within these organisations are difficult to implement. There is a quantitative bias towards the adaptation and use of statistical tools in quality improvement that are used in industry and adapted by healthcare systems. Wiggins & Marshall (2018) suggest a multi-level pluralism approach and considering alternative methods such as Appreciative Inquiry to implement change in complex systems. The development of a framework for quality improvement for EMS managers must

therefore consider tools that are reliant on high quality data but also qualitative methods such as Appreciative Inquiry and the use of the Change Laboratory as described by Virkkunen & Newnham (2013).

The historic vestiges of apartheid continue to impact the South African health system (Passchier, 2017). The inequalities between private and public, rural, and urban as well as the burden of disease, poverty and employment are all factors that contribute to South Africa's health challenges. Although legislation and policies are in place, Coovadia et al. (2009) have identified weak leadership, poor management and policy execution as obstacles to change. Setting standards and improving quality are key to the successful implementation of the NHI. The National Health Quality Improvement Plan requires healthcare managers to be trained on quality improvement (Department of Health of South Africa, 2021). EMS is an integral component of the health system and Howard et al. (2020) identified the need for training of EMS managers in quality improvement.

The EMS Regulations released in 2017 that regulates all private and public EMS, and the 2022 Regulations Standards for Emergency Medical Services are aimed at improving the quality of emergency medical services in South Africa. Knowing how to improve quality requires knowledge of quality improvement techniques and methods. The EMS manager in the public service is required to comply with the EMS regulations and little is known about their knowledge, attitudes, and practices. Studies in other health sectors and in EMS systems in developed countries suggest that they are a lot further down the road but there is still no universal solution that can be adopted to suit the SA context. The EMS regulatory policy framework is in place, however the implementation and monitoring of compliance with the regulations require development. This study aims to contribute to the body of knowledge by critiquing the SA public EMS managers' knowledge, attitude, and practices so as to construct a framework that strengthens the managers' response to the Regulations Relating to Standards for EMS.

CHAPTER THREE
THEORETICAL AND CONCEPTUAL FRAMEWORKS

3.1 INTRODUCTION

Chapter Two discussed the literature review. This chapter presents theoretical models that emerged from the body of knowledge and that were considered in building a conceptual framework for this research. Few studies have addressed quality in EMS in developing countries, including South Africa. The aim of this research was to potentiate eligibility and compliance with the regulations relating to standards for EMS and in so doing contextualise the quality improvement discourse through the construction of a quality improvement framework that strengthens the public service EMS manager's response to the standards for EMS.

This theoretical framework guided the research and grounded it in the principles, concepts and tenets of a theoretical construct thereby enhancing the rigour of the research findings. It provided the structure to the research approach, analytical tools in a way that they become meaningful and generalisable. It provided direction to the research based on the principles, constructs, tenets and concepts of an existing theory or theories that are related and reflect the hypothesis of a study (Adom et al., 2018). The theoretical approaches that will be drawn upon to help to explain some of the phenomenon will include the quality theorists in healthcare, the improvement of science theories and models and the adult learning theories. The quality theories start with Florence Nightingale. The industrial models for continuous quality improvement as developed by Deming and Juran were applied as it has implications for the quality improvement in healthcare. The learning theories include Andragogy; Social Cognitive Theory as espoused by Bandura which acknowledges that we learn from and in interaction with others and our environment; and Situated Learning which views development as occurring via transformation through communities of practice. Edgar Schein's model of transformative change will be used to help make sense of individual and organisational change. Theorists on quality in healthcare will be discussed in the next section.

3.2 THEORISTS ON QUALITY IN HEALTHCARE

The early work done by the healthcare quality theorists are still applicable today as many of the challenges identified in the past continued to plague healthcare systems today. Dlugacz (2017) acknowledges the theoretical contributions to what quality in healthcare means and how it can be improved made by Florence Nightingale, Ernest Codman, William Shewhart, William Deming, Avedis Donabedian, Joseph Juran and Phillip Crosby. I will focus on Florence Nightingale, William Shewhart, William Deming, Joseph Juran and finally Avedis Donabedian. The contributions of these theorists will form the basis for the development of the conceptual framework for this research. The next section will start with the early theorist, Florence Nightingale.

3.2.1 Florence Nightingale's Environmental theory

Florence Nightingale is widely known and acknowledged as the founder of modern nursing. She is less well known for the advocacy work that she did in area healthcare reform as well as her role in educating lay people on health-related issues. Florence was a social reformer and feminist who promoted women's rights in a patriarchal society where at the time in England, women of status and wealth were not expected to work, and nurses were not regarded as professionals. It is through her advocacy that nursing started to emerge as a profession (Frello & Carraro, 2013).

Florence Nightingale used her mathematical and analytical skills to graphically represent a decrease in mortality due to improvements in sanitation. Using the pie chart and histogram she was able to draw associations between infection and mortality. By focusing not only on the number of dead but also the cause of death she demonstrated the value of outcomes measurements and by using statistics, in 1873 she reported that mortality of soldiers in India had dropped from 69 to 18 per 1000 (Dlugacz, 2017). She recognised that for outcome measurements to be meaningful required accurate data and accurately defined outcome measures. Selanders (2010) credits her for recognizing that systems, structures, and processes were at the core of problems and not individuals.

Florence Nightingale is not without criticism as Selanders (2010) concludes that she focused more on hospital administration than on patient care and also suggested that

she opposed the regularisation of the nursing profession as she felt there was not an educational level equal to the divine calling of God to be a nurse. Despite the criticism most researchers agree that she influenced nursing and healthcare practices that lead to it being recognised as a profession.

The critique of the health system by Florence Nightingale led to her questioning of the role of the doctor as the sole custodian of healthcare. She influenced the recognition of women as professionals in the workplace and in her novel Cassandra, Florence describes the futility of being a woman during the Victorian period in England. Importantly, she demonstrated the value of using statistics to determine outcome measures. The End Result System theory will be discussed in the next section.

3.2.2 Ernest Codman's End Result System theory

Like Florence Nightingale, Ernest Codman was regarded as a reformer who promoted evidence-based medicine and a focus on outcomes management or what he termed end results of patient care. He introduced evaluation processes that are still in use today such as morbidity and mortality meetings, standardised hospital practices and systematic approaches to tracking patient outcomes. He held the belief that physicians should be accountable and that there should be a follow up on every patient long enough to determine if the treatment worked and if not, why? He favoured working from evidence-based standards rather than individual experience (Dlugacz, 2017).

Codman is credited as introducing accountability and transparency in healthcare. His work on quality assessment led to the formation of the Joint Commission on Accreditation of Healthcare Organisations (JCAHO). JCAHO has influenced quality and safety standards around the world (Whittaker et al., 2011). Shewhart's Value Generation theory is discussed in the next section.

3.2.3 William Shewhart's Value Generation theory

William Shewhart was an American physicist known for developing statistical methods to assess and improve quality. Together with Shewhart, Edward Deming and Joseph Juran are considered as the founders of modern quality improvement in industry. He

emphasised the importance of standardisation by reducing variation and continuously monitoring the process.

Shewhart acknowledged the need for creativity, he emphasised the need for data and statistics in management decisions. This led to the development of the Shewhart's improvement cycle of Plan-Do-Study-Act (PDSA). He is credited for influencing the work of Edward Deming and Joseph Juran (Dlugacz, 2017). The next section discusses the System of Profound Knowledge theory.

3.2.4 Edward Deming's System of Profound Knowledge theory

Deming's philosophy of quality is what he termed System of Profound Knowledge (SoPK) and included an appreciation of a system, understanding variation, a theory of knowledge and understanding human behaviour (Dlugacz, 2017). Deming believed that when managers focused on improving quality, manufacturing costs would decrease and if they focused on costs, over time quality would decrease. He also encouraged managers to treat workers as partners and in so doing they would identify problems in the workplace without fear (Landesberg, 1999).

SoPK is a management theory that includes the four components of: 1) Appreciation for the system, 2) Knowledge about variation, 3) Theory of Knowledge, and 4) Knowledge of psychology. It provides a framework of thought and action necessary to manage complex organisations (Deming, 1993). The next section discusses Juran's Trilogy.

3.2.5 Joseph Juran's Juran Trilogy

Joseph Juran is credited for what is referred to as the "Juran Trilogy" of: quality planning to meet customer expectations, quality control to ensure processes are working efficiently, and quality improvement to optimise results (Juran, 1993). He applied the Pareto principle to quality with the idea that if improvements were focused on 20 percent of the causes, it would fix 80 percent of the problems. Juran realised that organisational culture must be overcome in order to implement change (Dlugacz, 2017).

Building on the research done by Juran, Lagrosen (2003) recognised that there is an important relationship between national culture and organisational culture and any attempt at change related to quality improvement had to consider the prevailing cultural factors in a country. Hofstede (2007) analysed data from 116 000 employees in 66 countries and developed a framework that defined four cultural dimensions. These dimensions are: 1.) Power distance which concerns inequalities in power and wealth between the population, 2.) Individualism and collectivism where in some countries people care more about themselves and immediate family while in other cultures, group identity is important, 3.) Masculinity and femininity is where male dominated culture is more likely to favour hard, rational, analytical values, and 4.) Uncertainty avoidance where phenomena that are viewed as foreign are seen as threatening or dangerous. Donabedian's structure, process and outcome model is discussed in the section that follows.

3.2.6 Avedis Donabedian's Structure, Process Outcome model

The prior quality scholars were focused on quality in production and industry with the purpose of becoming more competitive, reducing waste, and ultimately increasing profit. Avedis Donabedian, who is widely acknowledged leader in healthcare quality, adopted and adapted the industrial quality approaches to the healthcare sector (Dlugacz, 2017). He added the ethical dimension to quality and is quoted as saying "You have to love your patient, you have to love your profession, you have to love your God. If you have love, you can then work backward to monitor and improve the system" (Donabedian, 1988). The elements of Donabedian's model will be discussed in the paragraph that follows.

The three elements in Donabedian model are structure, process, and outcomes. The structure determines the framework in which healthcare takes place. The process implies the healthcare itself and a method of its delivery. The outcome is the effects of the healthcare and the subsequent health status of the patient. Given the complexity of health systems, all three concepts and their authors have relevance to quality in healthcare (Reerink, 1989; Campbell et al., 2003).

Each element in the Donabedian triad has both advantages and disadvantages. Structure is not always actionable, improvements in process do not always lead to improved outcomes and outcomes may not be associated with structure and process only. The organisational culture model is discussed next.

3.2.7 Edgar Schein's Organisational Culture model

Edgar Schein defines organisational culture as a

> pattern of basic assumptions which a given group have invented, discovered or developed in learning to cope with its problems of external adaptation and internal integration, which have worked well enough to be considered valid and therefore to be taught to new members as the correct way to perceive, thing and feel in relation to this problems (Schein, 1983:1).

Shahzad et al. (2012) report that the organisational culture determines how employees identify with their organisation, how they engage with each other, internal and external stakeholders, and their clients. Organisations have been found to have differing cultures as well as sub-cultures that may co-exist or be in conflict. The organisational culture determines how knowledge is created and shared and the resistance there may be to change. The next section focuses on Improvement science theories and models.

3.3 IMPROVEMENT SCIENCE THEORIES AND MODELS

Improvement science is regarded as the scientific foundation that uses evidence to guide how quality improvement can best be undertaken (Pap, et al., 2018). Quality is a human construct and was initially associated with manufacturing and production. Quality in healthcare as an objective dates back to the 1850's when hand washing was associated with a reduction in disease (Juran, 1993). The present day quality management has its roots in Shewhart's value generation theory of production (Koskela et al., 2019). Quality management theories have evolved over time, with different approaches and philosophies guiding organisations in their quest for improved product and service quality. The quality management theory of Total Quality Management will be discussed in the next section.

3.3.1 Total Quality Management (TQM)

Total Quality Management is a comprehensive management framework that focuses on continuous improvement and having employees focused on customer satisfaction. TQM emphasises the involvement of employees at all levels in the organisation in the quality improvement process (Deming, 1993). This requires training of employees and streamlining processes to improve the customers experience (Lagrosen, 2003). One of the pioneers of TQM is W.E. Deming, whose work greatly influenced the Japanese quality movement (Landesberg, 1999).

TQM has been implemented in hospitals and other healthcare organisations to reduce costs, improve efficiency and improve the overall quality of patient care. TQM's emphasis on customer satisfaction results in timeous delivery which then leads to improved quality. The improvement in healthcare management and administrative services made the hospitals more competitive. TQM is criticised for lacking specific and standardised guidelines for implementation. This makes it challenging for organisations to know where to start and how to measure progress effectively. It is also resource intensive requiring time, training and a cultural shift within the organisation (Cua et al., 2001). The following section discusses the Six Sigma model.

3.3.2 Six Sigma

Six Sigma is a data-driven methodology that aims to answer the question: how confident are we that what was planned to happen will happen? By reducing defects and variations in processes near-perfect quality levels can be achieved (Patel, 2009). Six Sigma utilises statistical tools and techniques to identify and eliminate the root causes of problems and deviations. Six Sigma aims for zero defect that is built into the product design specification. Motorola and General Electric are among the companies that have successfully implemented Six Sigma methodologies. The next paragraph discusses the Six Sigma model in healthcare.

In healthcare, Six Sigma has influenced how quality is managed and contributed to a shift away from quality assurance towards continuous quality improvement (Pap et al., 2018). In healthcare, Six Sigma has the potential to reduce bottlenecks, redundancies and waste. This has led to improved employee and patient satisfaction. The Define-

Measure-Analyse-Improve-Control (DMAIC) process is followed to problem solve and improve services and processes (Lighter, 2015). The next paragraph will discuss the weakness of the Six Sigma model.

Six Sigma can become overly complex, with an excessive focus on statistical tools and methodologies. This complexity can lead to confusion among employees and make it challenging to implement effectively, especially in smaller organisations with limited resources. There is a view that it may not be as well-suited for non-manufacturing environments like health services where the emphasis on standardisation and reduction of variation may not always be applicable (Mason et al., 2015). Lean management model will be discussed in the next section.

3.3.3 Lean Management

Lean management, also known as Lean Thinking or Lean Production, is based on the Toyota Production System. Lean focuses on eliminating waste, improving flow, and delivering value to customers with the least amount of resources (Antony et al., 2018). Lean only accounts for individual processes and not the whole system. As a result, some organisations have begun merging Lean and Six Sigma to increase process performance and capability (Antony et al., 2018). The next paragraph discusses the use of the Lean Six Sigma model.

Lean Six Sigma methods have been reported to be effective in public hospitals, higher education and police services (Antony et al., 2019). Although the UK health services have been found to be proponents of Lean methodologies, Mason et al. (2015) conducted a systematic review of the use of Lean and Six Sigma in surgery and found that in the 23 studies Lean was utilised in 11 studies and both Six Sigma and Lean Six Sigma was utilised in six studies.

Rogers al. (2019) reported on the findings of four case studies using Lean Six Sigma in the UK policing services. A key finding was that there was a lack of knowledge on the role of various problem-solving tools and there was no data-driven culture within the organisation. Examples of the problem-solving tools are illustrated in Table 3.1. These tools could be adapted to be used for quality improvement in EMS.

Table 3.1: DMAIC steps to problem solve and improve systems and processes

DMAIC	TOOLS
Define Determine the scope of the services and desired target area for improvement.	Voice of Customer Project Charter Supplier, Input, Process, Output (SIPOC) Current state map
Measure The current and improved states of the system	Critical-to-Quality (CTQ) Data collection planning Process Mapping Run Chart Survey
Analyse Data collected will be analysed	Univariate and Multivariate Regression Cause Effect Diagram 7+1 forms of waste analysis Pareto analysis Root cause analysis
Improve Identify mitigation strategies to address the areas with the most significant influence.	Standard operation procedure Brainstorming Piloting solution Future state map
Control Implement process improvement projects	Standard operation procedure Run Chart Control Plans

Source: Adapted from DMAIC Tools utilised in police service improvement (Antony et al., 2019)

The benefits of implementing Lean Six Sigma included improved internal customer satisfaction, reduced defect rates in administrative processes, increased productivity and reduction in waste across business processes (Antony et al., 2019).

Although the lessons learnt from hospitals and police services can be applied to EMS, there is currently little literature on the use of Lean and Six Sigma in EMS. Villarreal et al. (2018) conducted a study of the turn-around time or cycle time of ambulances in a metropolitan EMS organisation in Mexico. Delays with the turn-around time at hospitals reduces the availability of the fleet which in turn can significantly increase ambulance response times and place patients at risk. The study reported improvements based on the Theory of Constraints[43] and elimination of waste by reducing ambulance turn-around times (Villarreal et al., 2018). These quality management theories have been widely adopted and adapted by organisations worldwide to enhance their processes, products, and services while achieving higher levels of customer satisfaction and organisational performance. The next section discusses the integration of the Theory of Constraints and DMAIC.

3.3.4 Theory of constraints

The Theory of Constraints (TOC) was introduced by Eliyahu Goldratt in 1984 and provides a framework to identify and resolve constraints that impede the overall performance of a system. TOC aims to improve the organisational efficiency and effectiveness by focusing on the leverage points and removing the bottlenecks in the system (Goldratt, 1990). TOC adopts a systems view and builds in buffers into the system to protect it from unexpected problems. The overall aim is to bring about ongoing improvement by focusing on what should be done (Villarreal et al., 2018).

TOC provides a logistical approach to work flow processes. Integrating DMAIC and TOC can reduce medical errors, and improve the performance of healthcare services (Ahmed, 2019). Managers need to determine what constraint tools can be used to achieve organisational goals. The steps in TOC are related and used to improve Lean processes but eliminating bottlenecks.

[43] Theory of Constraints is a management philosophy espoused by Eliyah Goldratt that focuses on the weakest link in the chain to improve performance of systems (Goldratt, 1990).

3.4 ADULT LEARNING THEORIES

Any change will require managers to undergo education and training. It is important to consider the adult learner when constructing a framework for quality improvement. The theories of Andragogy, Social Cognitive Theory, Situated Learning Theory and Activity Theory will be discussed in this section.

3.4.1 Andragogy

The theory of andragogy assumes that there are differences between how children and adults learn and if they learn differently, then they need to be taught differently. Malcolm Knowles was among the first to advance the theory of andragogy. Knowles' five assumptions about (1) self-concept, (2) prior experience, (3) readiness to learn, (4) learning orientation, (5) motivation to learn, informed his perspective on adult learning. This was a move away from behaviourism and acknowledged that the world and the individual are not separate as it is the individual's construction of meaning through experience of the world that is important to learning. Andragogy is therefore based on the principles that knowledge is constructed by the learner and that learning involves interaction through interpretation, integration, and transformation of the learner's experiential world (Pratt, 1993).

Andragogy recognises the individual's autonomy and ability for self-direction. The theory favours human agency and the power of the individual to use education to break free from political and socioeconomic oppression. As Paulo Freire notes adult learning is not separating practice from philosophy: adult learning is a philosophical stance for the purpose of emancipating the individual which leads to societal change (Freire, 1970). Social Cognitive Learning Theory will be discussed in the next section.

3.4.2 Social Cognitive Theory

Scholar's regard Social Learning Theory and Social Cognitive Learning Theory as theories that acknowledge that our learning is social in that we learn from our interaction with others and from our environment. Albert Bandura's Social Cognitive Theory initially was based on learning through imitation or modelling of the behaviour of others. This required the learner to firstly pay attention or be attracted to gain attention, secondly there must be retention, thirdly reproduction and lastly motivation

which is supported by reinforcement and motivation. Later he expanded the theory to focus on how children and adults operate cognitively on their social experiences which in turn influence behaviour and development (Bandura, 1998).

The theory recognises that learning is because of the interaction of three determinants: behavioural, environmental, and personal. Personal and environmental factors are not independent of one another as people's attitudes, values, experience, and perceptions are used to create and alter the environment. These three factors will vary in influence depending on the circumstances. As an example, when the work environment is busy, people will do whatever is necessary to get the job done (Maisto et al., 1999).

Bandura identified five basic capabilities that form the basis of our learning. These are: (1) Symbolising capability where symbols are used to transform and internalise our experience, (2) Forethought capability where we can set goals that motivate our behaviour, (3) Vicarious capability where learning occurs through direct experience or observation of others, (4) Self-regulatory capability where our behaviour is regulated by our internal standards, and (5) Self-reflective capability where we reflect critically on our experiences (Swanwick, 2014). Lave and Wenger's Situated Learning theory is discussed in the section that follows.

3.4.3 Situated Learning Theory

Lave and Wenger introduced the concept of situated learning in a community of practice. The theory has a sociocultural basis where learning occurs through participation in community activities where novices interact with senior members of the community. Novices enter the community at the periphery and as they learn and take on more responsibilities, they graduate towards the centre and come to understand the knowledge, values, and practices specific to that community. Key to the participation in the community is the discourse which reflects the way we see and frame the world (Wright, 2008; Lave & Wenger, 1991).

Situated learning is closely related to informal learning which is a significant dimension of learning that takes place in the course of our employment. This learning occurs in the absence of a teacher. This can be regarded as the informal or hidden curriculum.

Situated learning is aligned to constructivism where learners construct their knowledge based on their prior knowledge and experience. As learning in the context of a community of practice is a social activity, the knowledge is constructed jointly by the community in which the learning occurs (Swanwick, 2014). Jack Mezirow's Transformative Learning Theory is discussed next.

3.4.4 Transformative Learning Theory

Transformative Learning Theory is a psychological and educational framework that was conceptualised by Jack Mezirow in 1978 (Kitchenham, 2008). Mezirow was influenced by the Frankfurt School of critical theory and the theory is built on the principles of emancipatory learning, critical reflection, and discourse (Fleming, 2018). The theory is based on the idea that learning is more than acquiring new knowledge, it is also about challenging and reconstructing the values, assumptions, and beliefs of the learner. The theory is particularly relevant to adult learners who are able to critically reflect on their assumptions and reframe their understanding of the world (Mezirow, 1997).

Transformative Learning Theory has undergone several revisions and has changed the way adults are taught today (Kitchenham, 2008). This applies to the EMS manager where the developing skills and knowledge are essential to becoming critically self-reflective of assumptions. This implies learning about a society that is critical, questioning, emancipatory, participative and democratic (Fleming, 2018). The next section will discuss Activity Theory as it relates to work and learning.

3.4.5 Activity Theory

Activity theory is about who is doing what, why and how? has been able to provide a rich holistic understanding of how people do things together with the assistance of tools in complex dynamic environments (Jones & Hassan, 2014). The theory has its roots in the work of the Russian psychologist Vygotsky who saw that human activity as a dialectic relationship between subject (the human doer) and object (the thing being done) that was mediated by tools, the most significant being language. Tools expand our possibility to transform objects but also have limitations which then stimulates the improvement of the tool. Tools can be physical or tangible, internal or mental or large schemes or ecosystems (Engeström, 2001).

AT acknowledges cultural influences and social interaction as elements that impact on learning. In AT, it is understood that learning is socially influenced or mediated and therefore difficulties that exist during this mediated activity are believed to have historical and cultural roots. AT as an analytical tool uses the nature of the elements in an activity system and uncover and work on the contradictions within and between elements of the activity system and identification and analysis of interactions between more than one activity system. Subjects can experience contradictions as either dilemmas, conflicts, critical conflicts, or double blinds. Once the contradictions have been identified, the subjects of an activity system try to resolve them through expansive learning (Engeström, 2001; Engestrom, 2018).

Engeström (2018) description of a formative intervention is based on Vygotsky's idea of double stimulation. In double stimulation a problem is introduced and then re-introduced with a mediating artefact (e.g., language or ideas) that enable the task to be completed. In Engeström's cycle of expansive transformation (i.e., formative intervention) is a cycle through a zone of proximal development. Most activities have a dual purpose, and the core of the activity is referred to as being dialectic, that is both objective and subjective. For example, healthcare quality can have one meaning for the patient and another meaning for the healthcare provider. The dialectic relationship suggests that any meaningful concept or thesis can have an opposite of antithesis and understanding this relationship gives a richer understanding of reality (Hasan & Kazlauskas, 2014). The section that follows presents the conceptual framework for this study.

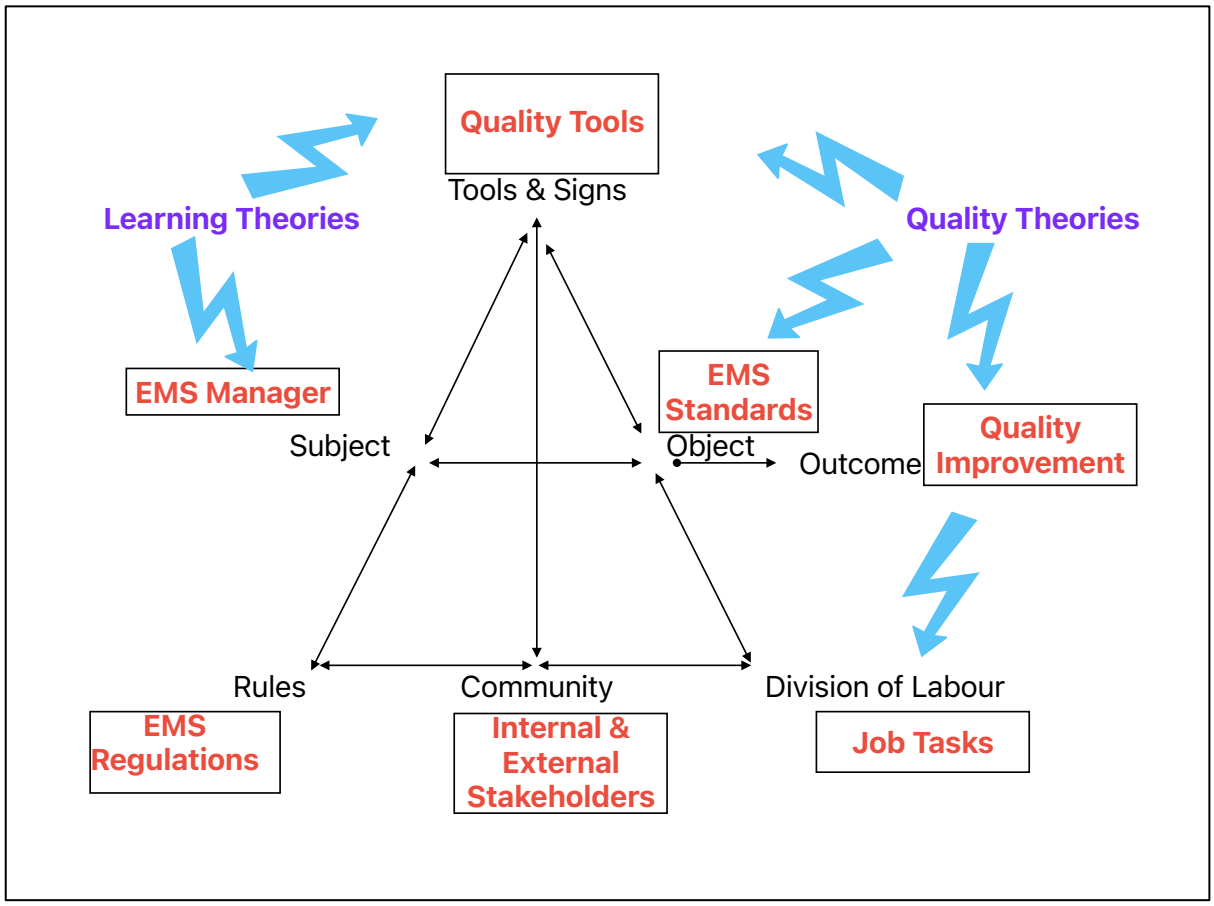
3.5 CONCEPTUAL FRAMEWORK

A conceptual framework can be described as a structure that helps present the main concepts of the research problem in an integrated way that allows for the explanation of the natural progression of the phenomenon to be studied. It defines and specifies the concepts that are the main variables of the study. The framework provides an integrated way in which the researcher will explain the relationships and interconnections between the variable problem being studied. The framework makes it easier to specify and define the concepts within the research (Adom et al., 2018).

To understand quality improvement in EMS, Activity Theory (AT) was used as the basis for the conceptual framework. The Framework Method was considered as the basis for the qualitative content analysis. AT provides a language and a set of frameworks for making sense of what is discovered about the situation through survey, and interviews, and in so doing helps to provide a rich holistic understanding of the complex patterns of activities of QI situations and problems in healthcare (Hasan & Kazlauskas, 2014). AT is a means of both analysing and intervening in organisational processes or simply about 'who is doing what, why and how'? (Hasan & Kazlauskas, 2014). AT was thought relevant to be used in this study to explore the relationships between the subject (EMS Manager) and the object (Quality Improvement) or the thing being done. The object of the activity encompasses the activities focus and purpose, while the subject of the activity unpacks the subject's various motives and how the desired outcomes are enabled or constrained by mediating artefacts. In the analysis, the data did not lend itself to the AT frame and was only partially considered.

Healthcare is not just about treating patients and finding cures, it is increasingly about reorganising and reconceptualising care across disciplines and institutions and for EMS where the narrow focus is on emergency care, this is necessary. Engestrom (2018) describes healthcare as a field of struggles and uncertainty. Lave & Wenger (1991) introduced us to the concept that skilled human activity is a 'community of practice' rather than an isolated individual. This suggests that teamwork is required to solve complex problems in healthcare.

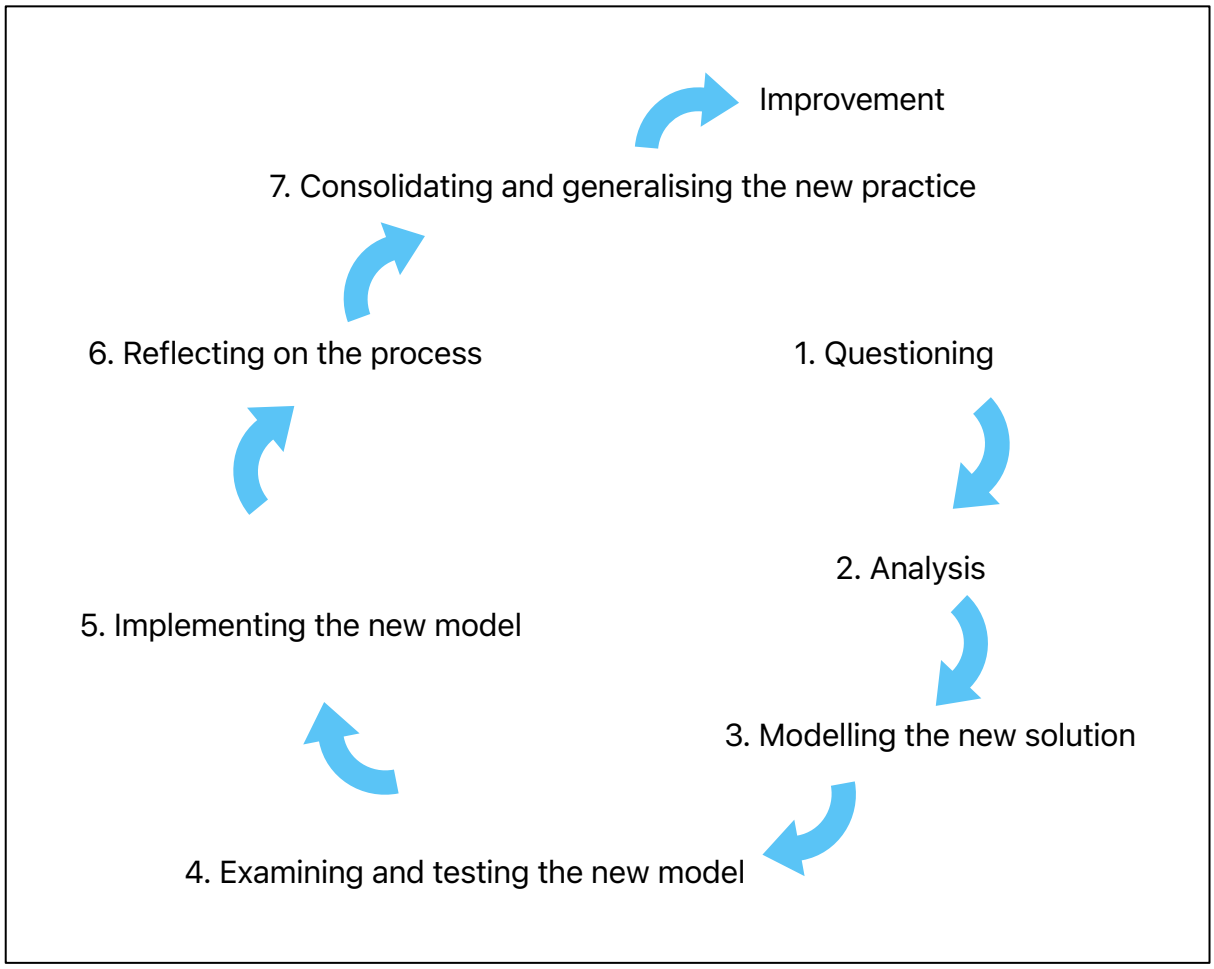
Figure 3.1: Activity theory of EMS quality



Source: Adapted from Engestrom (2018:18)

The activity system diagram in Figure 3.1 represents human activity. All human activity is social and has an object with intended outcomes which in this study would be quality improvement. The relationship between the subject (e.g., EMS Manager) and their achievement of this object (e.g., Quality Improvement) is mediated by instruments or tools (e.g., Ideal EMS Tool). A tool can be physical, or a concept or theory. The subject is part of a community, (e.g., users, community, internal and external stakeholders) and the relationship between the subject and the community is mediated by rules which may be written or implied. Meanwhile, the relationship between the community and the object is mediated by the division of labour. Ultimately all the elements of the activity system have influence upon the object of that activity and intended successful outcome.

Figure 3.2: Expansive Learning Cycle



Source: Engestrom (2018:19)

This transformative cycle leads to new ways of working on a problem or a new activity. The first phase in the cycle is "The need state" which is the primary contradiction. Engeström refers to Leont'ev (1978:185) "… it is necessary that learning should enter into life, that it should be a vital sense for the learner." For participants to engage, it must be a topic that they really care about to activate the "need state". For EMS personnel this could be their own experience where patient outcomes were compromised because of poor quality systems. This phase involves root cause analysis of problems that are personally meaningful. Table 3.2 provides a summary of the theories and how they relate to the conceptual framework. The conceptual framework presents the key concepts as they relate to answering the main research question: how the EMS KAP can be transformed so that EMS organisations may develop the capacity to comply with the regulations relating to the standards for EMS.

Table 3.2: Summary of theories and models

Theories & Models	Author	Strengths	Weaknesses	Application
Environmental theory	Florence Nightingale (Frello & Carraro, 2013) (Selanders, 2010)	Acknowledged as the founder of modern nursing Credited for using statistics to draw associations between the environment that led to infection and mortality Social reformer who promoted women's rights and the questioning of the role of the doctor as the sole custodian of healthcare	Criticised for focusing on hospital administration rather than patient care	Use of statistics in healthcare management to determine outcome measures
End Result System	Ernest Codman (Howell & Ayanian, 2016) (Bernstein, 2015)	We can determine how well a treatment works by assessing how well it works. Prior to this the approach was to consider how the treatment	Critics argue that outcomes in hospitals without quality improvement programmes are no different to those without.	Using and measuring evidence informed decision making may improve healthcare outcomes

Theories & Models	Author	Strengths	Weaknesses	Application
		aligned with the theories of disease. Employ treatment based on empirical evidence.		
Value generation theory of production – PDSA	William Shewhart (Koskela et al., 2019) (Dlugacz, 2017)	Developed the control chart. The PDSA model is incorporated into most quality improvement models.	The original model has been extended and adapted since it was introduced in the 1930's.	Control charts and PDSA can be used in EMS to trace processes and systems to identify areas for improvement
System of Profound Knowledge	Edward Deming (Deming, 1993) (Landesberg, 1999)	Focusing on improving quality would decrease manufacturing cost	It requires an understanding of human nature and interpersonal interactions.	It acknowledges that the workforce are partners and therefore can assist to identify and resolve problems.
Total Quality Management (TQM)	Edward Deming (Deming, 1993)	Framework that focuses on continuous improvement and having employees focused on customer satisfaction	Lacks standardised guidelines. Resource intensive requiring time, training and a cultural	The TQM principles can be applied to EMS by focusing on the client satisfaction

Theories & Models	Author	Strengths	Weaknesses	Application
			shift within the organisation	
Juran's Trilogy	Joseph Juran (Juran, 1993) (Landesberg, 1999)	Applied the Pareto 80:20 principle. The trilogy: Quality Planning, Quality Control and Quality Improvement.	Overcoming cultural resistance is key.	The Pareto principle can help identify the key causes of poor quality in EMS
Structure, Process, Outcome	Avedis Donabedian (Donabedian, 2002) (Dlugacz, 2017)	Structure focuses on the framework, Process is the healthcare delivered and Outcome is the effect.	Structure is not always actionable, Improvements in process do not always lead to improved outcomes and Outcomes may not be associated with structure and process only.	Separation into the three categories provides a base from which to identify where the challenges lie and who would be responsible
Organisational Culture	Edgar Schein	Assumptions that have been invented, discovered, or developed in learning to cope with its problems which have worked well enough to be	Need to consider that Organisations have been found to have differing cultures as well as	EMS has a unique organisational culture that must be factored into the quality improvement framework.

Theories & Models	Author	Strengths	Weaknesses	Application
		considered valid and therefore to be taught to new members.	subcultures that may co-exist or be in conflict.	
Lean Thinking	Toyota	Focuses on eliminating waste, improving flow, and delivering value with the least amount of resources.	Lean do not account for the whole system and focus on individual processes.	Identifying areas of waste are key to improving efficiency in EMS.
Six Sigma	Motorola	Aims to reduce defects and variations in processes to near-perfect quality levels	Can become overly complex. Not be as well-suited for non-manufacturing environments	The use of Lean and Six Sigma can reduce variation in EMS.
Theory of constraints	Eliyahu Goldratt	Organisations can be measured or controlled by measuring throughput, operational expense and inventory. A constraint is anything that prevents the system from achieving its goal.	It may be a weak model by itself but can be integrated with Lean to identify bottlenecks	When combined with Lean it helps managers analyse healthcare quality performance.

Theories & Models	Author	Strengths	Weaknesses	Application
Andragogy	Malcolm Knowles	Differences between how children and adults learn. Knowledge is constructed by the learner and that learning involves interaction through interpretation, integration, and transformation of the learner's experiential world	There is limited evidence to support the claims of the extent to which social interactions influence behaviour.	The principles can should be considered when developing a training programme for EMS managers
Social Cognitive Theory	Albert Bandura's	Learning is because of the interaction of three determinants: behavioural, environmental, and personal	There is criticism that different aspects of the theory such as observational learning and self-efficacy may not be connected.	The Social Cognitive Theory should be factored in the training programme for EMS managers
Situated Learning	Lave & Wagner	Learning occurs through participation in community activities where novices interact with senior members of the community.	Criticism is that it does not acknowledge that people can learn through self-study.	EMS managers would have learnt from their peers. This needs to be factored into their development

Theories & Models	Author	Strengths	Weaknesses	Application
Transformative Learning Theory	Jack Mezirow	Learning is a process of utilising prior knowledge and experience to construct new or revised interpretations of the meanings of one's experiences and using this to guide action	Theory criticised for not have an adequate social dimension that led to further development of the theory. It is focused on individual change.	Any contemporary adult learning programme should consider the two kinds of learning – instrumental which is learning about the 'how'; and communicative which is the ability to understand oneself and others.
Activity Theory	Engeström	Cultural influences and social interaction as elements that impact on learning.	It assumes the social nature of humans and that the mind, thinking and activity are linked	The AT provides a reference from which to identify the contradictions within and between the elements that affect the outcome. These can be mitigated through a framework that provides a structure for quality improvement in EMS.

Source: Researcher's own construction

3.6 SUMMARY

The proposed outcome of this study is to build a quality improvement framework that will inform the development of EMS managers, and in so doing prepare the manager to meet the quality criteria contained in the regulations relating to standards for EMS. The theories presented in this chapter and summarised in Table 3.1 helped to steer and guide this study as to what is possible and likely to work in EMS quality improvement. The theories describe the complex nature of rendering quality in healthcare services. An appreciation for the complexity of understanding human behaviour, motivation and the social and cultural influences is fundamental to developing a quality improvement framework for EMS managers. The theories reflected on are not mutually exclusive. The researcher does not intend an *application* of any one theory but consider the *implications* of these theories on quality improvement in EMS and to enable a theoretically laden analysis.

CHAPTER FOUR
RESEARCH METHODOLOGY

4.1 INTRODUCTION

The previous chapter presented the theories and conceptual framework that informed this study. The purpose of this chapter is to discuss the research design and methodology that enabled the answering of the research questions. The paradigm of critical theory (CT) was used to underpin this study. Mixed methods were used to collect quantitative survey data from public EMS managers who attended workshops held by the NDOH. Qualitative data was obtained from non-participant observations at the workshops and from interviews with key informants. The quantitative data was analysed using R Core Team® (2023). ATLAS.ti® (version 23.2.0) software aided the analysis of the qualitative data. The research design, philosophy, research approach, research methods, data collection, population, sampling strategy, data analysis, validity, trustworthiness, and reliability are discussed here. The chapter concludes with a discussion of ethical considerations. The next section begins with the research design.

4.2 RESEARCH DESIGN

Research design is the overall strategy that integrates the various components of the study to ensure that it is logical and coherent. The research design considers the research question and uses the best philosophy and methodology to investigate the research question (Maree et al., 2014). It provides the plan for answering the research questions. Evans et al. (2014) emphasise that it is essential to frequently examine whether the research methods chosen for the study are relevant to the study's goals and would yield the anticipated results. A sequential explanatory mixed methods design was implemented through the paradigmatic lens of critical theory. The research aims and questions for this study are listed in this chapter to help with reflection on how well the research methodology selected for this study aligns to the research objectives and questions.

4.3 RESEARCH PROBLEM

The research problem includes the purpose and objectives. The purpose statement speaks to why the research question is important. The research objectives provide an indication of how the study has satisfactorily addressed the research problem. The next paragraph will outline the purpose statement.

The purpose of this study was to critique the SA public EMS manager's knowledge, attitude, and practices to construct a quality improvement framework that strengthens the managers response to the Regulations Relating to Standards for EMS. In SA, the EMS managers are appointed based on their medical qualifications and often lack any management training and experience. The purpose of this study is supported by research undertaken by Howard et al. (2020), which reported the poor knowledge of organisational specific quality systems and concluded that there was a need for a standardised quality system for EMS in South Africa. The research objectives of the study follows.

The research objectives considered the knowledge gaps identified in the literature review and narrowed the focus to guide the research process to achieve the aim. It is within the research inquiry to identify and explore the benefit and impediments to implementing sustainable quality improvement systems in the public EMS and develop a framework for quality improvement in EMS.

The study aimed to potentiate eligibility and compliance with the regulations relating to standards for EMS. This study intended to recontextualise the quality improvement discourse through the construction of a quality improvement framework that strengthens the public service EMS manager's response to the standards for EMS.

Restating the objectives:

1. To facilitate a quality self-audit including the critical appraisal of the knowledge, attitude and practice of EMS managers who are the power brokers in relation to EMS quality improvement.

2. To observe and document the EMS managers, who are quality champions, perspectives on the application of the standards for EMS and reasons for non-compliance.
3. To develop a framework that explicates how change in EMS policy and praxis may lead to quality improvement in public EMS organisations, in the interest of patient safety and organisational sustainability.

To determine the research posture, it is necessary to determine the ontological lens (i.e. what is the form and nature of reality?), what is the epistemological position (i.e. what is the belief about knowledge?) and finally what is the methodological paradigm required for the research to answer the aims and objectives of the study (Naidoo, 2011b). A study of the different research philosophies is necessary before embarking on any research endeavour. The next section will discuss the research philosophies considered in this study.

4.4 RESEARCH PHILOSOPHY

The ontological lens of the researcher influences epistemological position and methodological paradigm (Guba & Lincoln, 1994). Polit & Hungler (1999) argue that research paradigms are lenses that help to focus on the phenomena to deliberately narrow our intellectual curiosity. Naidoo (2011) points out that scientific inquiry is defined at the level of the paradigm and not the methodology.

Knowledge, the epistemological assumptions, and methods meant to produce it are not value neutral. All conceptual paradigms require some means of identifying and assessing trustworthiness of knowledge claims (Maree, et al. 2014). For quantitative research the focus is on objective detachment from the object of the study whereas in qualitative research the focus is on where the knowledge is situated and its subjective origins. Mixed methods take on a pragmatic approach through the paradigm of Pragmatism. The next section will discuss the critical theory paradigm.

4.5 CRITICAL THEORY PARADIGM

Critical Theory (CT) was chosen as the paradigm as it acknowledges the historical construction of knowledge and advocates for change and redress. It therefore aligns

with the aim of this study to critically evaluate and enhance quality improvement in EMS to transform quality improvement practices by EMS managers. The CT approach argues that reasoning can be used to criticise and challenge the nature of existing phenomena within societies. This study does so by critiquing quality improvement in EMS, a health structure in the society. CT also requires the researcher to be objective and not just to study and understand the phenomena but seek to critique phenomena to bring about transformative change, which again is given expression to in this study by developing a framework that explicates how change in EMS policy and praxis may lead to quality improvement in public EMS organisations, in the interest of patient safety and organisational sustainability (de Vos et al., 2011; Babbie, 2010). The next paragraph will discuss how reason informs human action.

CT recognises that reason is possible and necessary for human action and what, and why people do what they do. This is as important as what they cannot do, to critique and change what is being done (Kelemen & Rumens, 2011). Reason supplies the link between the immanent and transcendent; that is between knowledge within the realm of possible experience and the condition of the possibility of knowledge. CT is subjectivist in design; where value mediated findings are attainable through dialectic reasoning and ethics (Higgs & Titchen, 1995; Budd, 2008). The historical realism value of CT is ontologically aligned to the historical constructions of EMS. CT and truth are discussed in the paragraph that follows.

The assumption of CT is that reason can yield truth, that people are historical agents who are participants in action and subject to action, and that ideology shapes the relations between people and that this provides the ontological and epistemological starting point for inquiry (Kelemen & Rumens, 2011). Critical theorists believe that we can create an uncreate truth and that there is no such thing as objective truth (Budd, 2008). In doing so critical theorists challenge rather than accept what the authorities tell them but are not only outwardly critical by also self-critique. They respect neither human tradition nor social status but place emphasis on ethics. CT is not about merely criticising but rather proposes an understanding of the contextual analysis and historical conditions of phenomena so as to establish the truth (Mosqueda-díaz et al., 2014). The notion of power is discussed in relation to CT in the next paragraph.

Contemporary critical theorists argue that citizens in democratic societies are not free but are regulated by forces of power through either domination or subordination (Steinberg & Kincheloe, 2010). A key facet of CT is the claim that human societies are structured around power (Mosqueda-díaz et al., 2014). Theorist Max Horkheimer described CT as a theory that seeks “to liberate human beings from the circumstances that enslave them” (Horkheimer 1984:244 in Brunkhorst, 1996). In the CT context, each individual is granted dignity and therefore human suffering because of decisions people make, is viewed as unacceptable and must be analysed, interpreted and changed (Steinberg & Kincheloe, 2010). The paragraph that follows discusses CT and transforming of society.

The question asked in CT is if ideas come from society and society is flawed, how then can we transform society – the response is through praxis or theory-in-practice. So by reflecting on society we can unpack the power relationships (Budd, 2008). As CT is primarily associated with emancipation and oppression, power that is related to this research question. All good legislation and regulations hold a CT perspective and has a historical reality, something that has violated rights and created the need for regulation. CT and change will be discussed next.

CT is concerned with change in that it improves protection of rights and holds offenders to account. The quality brokers are power brokers; that power might put profit before patients and risk before worker safety; the power is not overtly political but inequitable power relations is what causes patient harm or financial harm for workers. Therefore, there are regulations. CT will be considered in the construction of the survey, formulation of the interview questions and analysis of the qualitative data. The weakness of the CT paradigm will be discussed below.

CT emphasises the critique of power relations and the status quo, with the aim of promoting social change. While it offers several strengths, it also has some weaknesses that have been criticised by some scholars. Some of the main weaknesses are that CT is often seen as subjective and politically motivated, which questions objectivity and impartiality of the findings. CT does rely on ideological

arguments; some of the empirical evidence may be undermined thus leading to questions about the validity and reliability of the findings (Kelemen & Rumens, 2011). The next paragraph discusses the CT limitations, complexities, and ideological bias.

The specific power relations associated with CT can lead to the complexities of social phenomena being ignored. The focus on challenging and changing power relations can be difficult to measure and evaluate. The researchers' personal and political beliefs can sometimes result in an ideological bias which can influence the interpretation of the results (Mosqueda-díaz et al., 2014). The sample sizes used in CT are often small which can limit the representativeness and generalisability of the results. While CT offers a valuable perspective for understanding and challenging power relations in society, it also has several limitations that need to be taken into consideration when using it as a research paradigm. The next section will discuss the research approach used in this study.

4.6 RESEARCH APPROACH

A research approach is a broad strategy and process for carrying out the research study. The recognised approaches can be categorised as the quantitative approach that applies deductive reasoning (moving from the general to the specific), qualitative approach that applies inductive reasoning (moving from the particular to the general), and mixed methods that reside on a continuum between the two approaches. These approaches to research approaches will be discussed below:

The quantitative approach aligns with the positivist philosophy[44]. The approach is used to answer questions about relationships among measured variables. The approach

[44] POSITIVISM

The positivist paradigm has been the dominant paradigm in the social sciences for many years. It is therefore not surprising that emergency medicine is dominated by the positivist ideology that values observation and measurement in pursuit of the deductive logic of cause and consequent effect (Naidoo, 2011a). Positivists hold the belief that mechanisms that govern an objective world that exists independently of individual experience and that cause-and-effect interactions can be determined. Positivists view the world as being controlled by objective laws that govern natural and social

tests the validity of assumptions, theories, and assumptions with the purpose of predicting and controlling phenomena (de Vos et al., 2011). It involves collecting and analysing data through structured methods, which in the case of this study was a survey of the EMS managers to test propositions and draw statistically valid conclusions. Quantitative research is a systematic, numerical approach to understanding phenomena. The goal of quantitative research in this study was to establish any cause-and-effect relationships related to quality and EMS and make predictions that would inform the quality improvement training framework. The type of experimental quantitative research includes experimental (e.g., pre-test-post-test control group), quasi-experimental (e.g., static group comparison) and single system (e.g., simple time-series). Descriptive, exploratory, and observational research includes cohort, case study and as was used in this study, cross sectional survey (Crowe & Sheppard, 2012). The weaknesses of the quantitative approach for this study will be discussed next.

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phenomena by observable, unchanging rules (de Vos et al., 2011). This approach is used in the physical sciences, and focuses on quantitative data, experimental designs, and statistical analysis. In answering the research questions, the positivist stance of observation through the senses precludes the personal insight, opinion, and emotion of the research participants. In some contexts, this may be seen as a strength and in others a weakness. The weaknesses associated with this philosophy will be discussed below.

Alvesson & Skoldberg (2000) identified several weaknesses that have led to criticism of the philosophy. Some of the main weaknesses include the tendency of positivism to simplify complex social phenomena into measurable quantities while neglecting the nuances of human behaviour and social interactions. Positivism assumes that social phenomena can be predicted and controlled, ignoring the role of free will and agency in shaping human behaviour. There is a lack of contextual understanding of the social processes where the context and background of social phenomena are lost. Okere (2011) argues that positivists tend to impose Western scientific methodologies ignoring the cultural and historical differences that shape social phenomena. Positivism relies on quantifiable data, which is assumed to be reliable and free of manipulation. Positivism also assumes that knowledge can be acquired through empirical observation and measurement, ignoring the importance of intuition, personal experience, and subjective knowledge (de Vos et al., 2011). Overall, the positivist paradigm is a valuable framework but there are a number of drawbacks that must be taken into consideration when applying it as a research tool. The next section will discuss interpretivism.

Quantitative research is a research approach that emphasises the collection and analysis of numerical data, with the aim of testing hypotheses and drawing generalisations about a population. When considering its strengths, it is also important to note that it has some weaknesses. Some of the main weaknesses include that it can ignore the context and complexity of social phenomena, leading to an oversimplified understanding of the results. Quantitative research relies on standardised procedures and rigid research designs that are difficult to modify to changing circumstances. It can be difficult to accurately measure abstract or subjective concepts, leading to questions about the validity of the results. The reliance on self-reporting data, can be influenced by social desirability biases and limitations in memory and accuracy. The sample size and representativeness of the data can be limited. These limitations need to be taken into consideration when using it as a research approach. The inductive or qualitative approach will be discussed below.

The inductive approach gives expression to the interpretative philosophy[45]. It contributes to the emergence of new theories and generalisations. Qualitative

[45] INTERPRETIVISM

Interpretivism is a philosophy that emerged from the social sciences that emphasises the interpretation of human meaning and understanding. In interpretivism, social reality is constructed through shared meaning and interpretation. The researchers employ qualitative methods such as in-depth interviews and observation, to understand the subjective experiences and perspectives of individuals and groups (Scotland, 2012). Interpretivists hold the belief that objective truth cannot be attained, and that research should focus on exploring and understanding the perspectives and experiences of individuals in context (Naidoo, 2011a).

Interpretivism is a paradigm that emphasizes the subjective and interpretive nature of social reality. While it provides a useful alternative to the positivist paradigm, it also has some weaknesses that have been criticised by some scholars. Some of its main weaknesses are that it is criticised for its subjectivity which can lead to the findings lacking objectivity. Interpretivist studies use qualitative methods, such as in-depth interviews and observation, which can be difficult to replicate, leading to questions about the reliability of the results (Steinke, 2004). Studies in this paradigm often focus on the subjective experiences of individuals, which then make the results difficult to generalise to a larger population. Interpretivist studies often require a lot of time and resources, as they involve collecting and analysing large volumes of qualitative data. As these studies often lack clear and testable hypotheses, it makes

research is a method for exploring and understanding the perspectives and experiences of individuals, which in this study are key informants in the South African EMS. It is characterised by a flexible and inductive approach, where in this study the questions were developed following the analysis of the survey data (Northcote, 2012). The analysis is based on identifying themes that emerge from the transcripts of the in-depth interviews. The research process values individual experiences and aims to capture the complexity of the phenomenon (Maree et al., 2014). The disadvantages of the approach are outlined below.

Qualitative research aims to gain a rich and in-depth understanding of social weaknesses that have been criticised by some scholars. Denzin (2009) argues that the evidence-based and audit culture associated with the Cochrane and Campbell's criteria in medicine are an external threat to the qualitative research endeavour. Northcote (2012) highlights that some of the key weaknesses are that qualitative research often focuses on small, specific cases and provides limited generalisability to larger populations, albeit good generalisation toward a theory. Secondly, the researchers often rely on subjective interpretation and can be difficult to replicate, leading to questions about the reliability and validity of the results. Thirdly, the research often relies on the subjective perspectives and interpretations of the researcher, leading to questions about the objectivity of the results. These are some of the key limitations that need to be taken into consideration when using it as a research approach. The mixed methods approach will be discussed in the next section that follows.

Whereas traditionally positivist research and interpretivist research paradigms were viewed as two opposing paradigms that should not be mixed, recent research has found that the two paradigms can complement each other when used in one research study (McManamny et al., 2014). Maree et al. (2014) noted that it is less about quantitative versus qualitative but rather where on a continuum between the two

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the drawing of conclusions about the findings difficult. The sample sizes are often small and can therefore limit the representativeness and generalizability of the results (de Vos et al., 2011). These limitations need to be taken into consideration when using the interpretivist methodology.

paradigms the study is positioned. Onwuegbuzie & Leech (2005) found that mixed methods[46] can be advantageous in answering complex research questions and

[46] PRAGMATICISM

A secondary consideration is a paradigmatic position, consistent with an overarching critical theory, as the study aims to make practical changes to the practices of emergency medical services. In pragmatism, pragmatists are driven by the desire to achieve their goal, the focus is on the external reality is our interaction with it. The ontology is framed through action of our experiences and value is placed on action rather than abstraction, argument, or philosophical theory. James and Dewey hold room for a variety of ways of understanding what is real (Peterson & Bredow, 2013). The epistemological orientation of pragmatism centres around action where knowledge is seen to be built and modified through action and interactions within communities – there is a focus on getting things done. This allows for flexible approaches. Truth is sought through scientific enquiry and experimentation also acknowledging that this would depend on who the participants are. The pragmatists acknowledge the significant impact of social structures and power on truth-making. Method and knowledge impact upon and create each other in a pragmatist perspective (de Vos, Strydom, Fouche & Delport, 2011).

Pragmatism emerged as a theory in the USA in the late 1870's Charles Pierce and William James is regarded as one of the originates of the philosophy (de Vos et al., 2011). John Dewey is credited with establishing the pragmatic theory of knowledge. Dewey is quoted as saying: "when seeking knowledge, the impact is central concern. What will it do? Who will it help?" Dewey linked knowledge and practice as having a reciprocal relationship impacting each other (Kadlec, 2007). It's a philosophy that is based on results, the reality is justified through research and experimentation. Roty, R (1989) and Putman, H (1987), (cited in Brunkhorst, 1996) are credited with introducing new critical perspectives to pragmatism such as feminism, ecology and race theory. Roty rejects a world independent of human experience but holds that experience is insufficient to determine the truth of any theory, so two conflicting worldviews may be compatible with any possible experience thereby creating a better reality (Maxwell, 2013). The weakness of pragmatism must be considered and is discussed below.

Pragmatism is a philosophical and research paradigm that emphasises the practical and applied nature of knowledge and its use in solving real-world problems. Shaw, Connelly & Zecevic (2010) argues that some of its main weaknesses are the lack of consistency in research design and methods, as the focus is on finding practical solutions, rather than using established research methodologies. The goal of pragmatism is to meet the individual's needs for personal fulfilment to prepare for life whilst the goal for training in Essentialism is to meet the needs for the society and country and the goal of existentialism is to develop the talents, abilities and interests of the learner. The evaluation of the validity and reliability of the results can be difficult, as the focus is on practical outcomes rather than the scientific rigour. There is a perception that Pragmatism can be subjective and biased, as the researcher's personal

increase the generalisability of the results. When the methods are mixed, the strengths of the one research method can be used to overcome the weaknesses of the other.

4.7 RESEARCH METHODOLOGY

Mertens & Hesse-Biber (2013) argue that paradigms do not dictate methods but rather guide the thinking about methodological decisions and that the methods should be driven by the evaluation questions. The research methodology chosen is this study was guided by the CT philosophy. The research methods include sampling, data collection, data analysis and ethical considerations. The findings were used to generate knowledge on the quality improvement in EMS. The mixed methods design used in this study is discussed in the next paragraph.

A sequential explanatory mixed methods research design (Creswell, 1999) was selected as it aligns with the overarching study aim and research objectives. Mixed methods research is a methodology that involves the logic inquiry of induction, deduction, and abduction to answer the research question. It involves collecting, analysing and integrating both qualitative and quantitative data so as to get a better understanding of the research problem (Maree et al., 2014). The disadvantages of the mixed methods approach are now presented.

Kajamaa et al. (2020:268) identified the disadvantages associated with mixed methods. These disadvantages include that the research may be resource intensive as diversity of viewpoints may take more time to resolve. Mixed methods research may also prove a challenge for a lone researcher to conduct. Managing a team with multiple team members with different methodological preferences and world views can also be challenging. The interdisciplinary research experience of the research

values and beliefs can influence the research design and results. The results from research undertaken are usually focused on a specific practical problem and therefore not generalizable to other contexts. There is an emphasis on short-term, practical solutions, rather than addressing long-term, systemic problems. Similarly, as the focus is on practical solutions, Pragmatism has been criticised for a lack of theory development. The limitations of this paradigm must be considered before it is selected as an approach to answer a given research question.

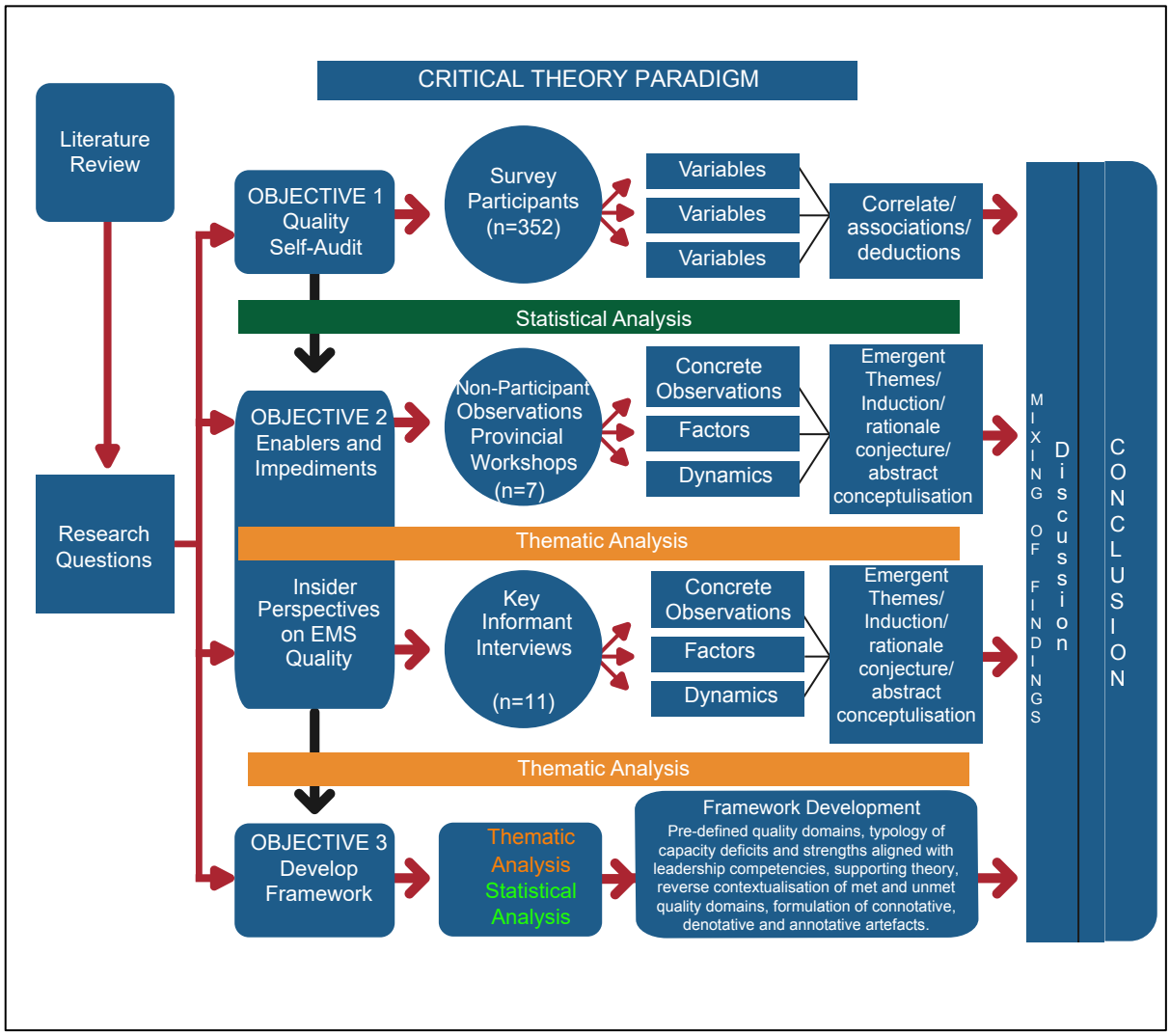
supervisors guided the researcher and provided key references and resources on mixed methods research. The next section discusses the data collection.

4.8 DATA COLLECTION

Data collection is the gathering of information from a population. In quantitative research the term data is usually associated with numbers where it can be split into categories based on their measurement type: nominal (e.g., gender), ordinal (e.g., rank), interval and ratio. Qualitative research most often is associated with words such as those from surveys, interviews, and reports (Schreiber, 2008). In this research both qualitative and qualitative data was collected.

The discussion on data collection will include the how, where, and why the data was collected. It will describe the population and the sampling methods. The construction of the survey instrument (Appendix A) and the pilot testing will be discussed, as will the non-participant observations and interviews with key informants. The next section will discuss the setting and population. Figure 4.1 outlines the sequential explanatory mixed methods used. The literature review led to the formulation of the study objectives and research questions. The quantitative survey results and analysis were explored in greater depth than the qualitative phase. The findings of both quantitative and qualitative data were unpacked in the discussion chapter that ends with a framework.

Figure 4.1: Overview of study sequential explanatory mixed methods

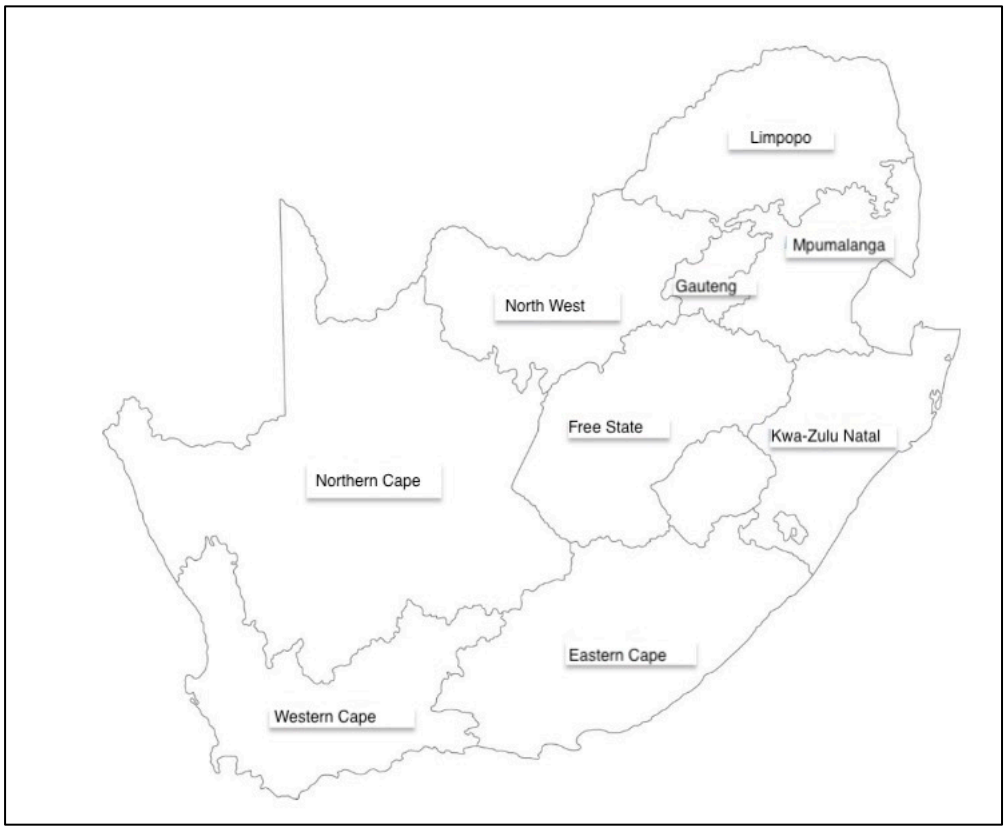


Source: Researcher's own construction

4.9 RESEARCH SETTING AND POPULATION

South Africa is a vast country of 1.22 million km^2 with a diverse population of 60 million spread across nine provinces (South Africa. Department of Health, 2019). Although the provincial EMS organisations have a lot in common in terms of structure (e.g., medical qualification, rank, uniform, vehicles), there are significant variations between the public EMS service in the provinces. The variations necessitated the study being conducted with public EMS managers in all nine provinces. The map in Figure 4.2 provides the geographical illustration of the provincial boundaries. This will be followed by a discussion on the study population.

Figure 4.2: Map of provinces (state jurisdictions) of South Africa



Source: Adapted from https://southafricamap360.com (Accessed 30 June 2023)

4.9.1 Population

Within the pragmatic constraints of time and available resources, it was decided to conduct the survey of public EMS managers in all nine provinces and to exclude the private sector EMS. The provinces were surveyed in the following order: KwaZulu-Natal, Gauteng, North-West Province, Free State, Northern Cape, Western Cape, Eastern Cape, Limpopo, and Mpumalanga. The surveys were conducted from June 2022 to May 2023. The EMS managers in the provinces are representative of the EMS managers across all provinces in relation demographic, socio-economic, rural-urban divide, population and type of EMS and health services delivered. Further information on the EMS manager is shared in the paragraph that follows.

The participants in this study are public sector EMS managers who are employed by the provincial governments in each of the provinces. They hold a minimum of an Ambulance Emergency Assistant (AEA) qualification and are registered with the Health Professions Council of South Africa (HPCSA). They are employed in a

supervisory category at least as a Shift Leader and higher or has been acting in this position. The next section provides more detail on the workshop participants.

4.9.2 Phase 1 and 2 (a) Participants

The participants that participated in the survey and workshops were EMS managers. The EMS Regulations, 2017 defines an EMS Manager as a person who is duly appointed as a responsible manager for the EMS and who is registered with the HPCSA in terms of the HPCSA Act 56 of 1977 (as amended). The EMS managers are described by the Department of Public Service and Administration (DPSA), Occupation Specific Dispensation (OSD) in the supervisory levels as either holding or acting in the positions of EMS Shift Leader[47], EMS Station Manager, EMS Sub-District Manager, EMS District Manager, EMS Operations Manager and EMS Provincial Manager. The EMS qualifications are explained below.

EMS managers may hold various emergency medical care qualifications that are registered with the Professional Board for Emergency Care (PBEC) at the HPCSA. The registration categories with the HPCSA are Basic Ambulance Assistant (BAA), Ambulance Emergency Assistant (AEA), Critical Care Assistant (CCA), Emergency Care Technician (ECT), Paramedic (ANT), Operational Emergency Care Orderly (OECO) and Emergency Care Practitioner (ECP). The formal and non-formal EMS qualifications are described below.

These qualifications are the minimum requirement to occupy any one of the supervisory positions in the public sector EMS. The type of qualification would determine the clinical scope of practice and what managerial position the holder would be entitled to occupy. The BAA are in the category of supervised practice and therefore unlikely to be appointed in positions that will oversee quality (Sobuwa & Christopher, 2019). Only the ECP who would hold a four-year, NQF level 8, professional Bachelor's degree qualification would have done management practice as a formal subject as part of their education and training (Gangaram, 2015). Naidoo et al. (2014) found that public sector EMS managers had undertaken management short course training

[47] EMS Shift Leader were included in the survey as participants although they are identified more as supervisors rather than managers in some provinces (Naidoo et al., 2014)

provided by their employer during their employment. Information on the interview candidates is discussed in the next paragraph.

4.9.3 Phase 2 (b) Participants

Phase 2 followed the data analysis of the quantitative survey. Fifteen key informants were purposively sampled and selected based on their position in the department of health, provincial EMS, and the EMS industry. Operational and Provincial EMS Managers, officials of the Directorate of EMS and Disaster Management, and a senior manager from the OHSC were identified as key EMS informants to be interviewed. Of the 15 key informants who were invited to participate via email, 11 responded and interviews were scheduled on Microsoft Teams® (Version 1.6.00.17554). The demographic profile and adequacy of experience of the key informants is captured in Table 4.1. where there is representation in terms of gender, qualification, local, provincial, and national platforms, clinical, operational, and strategic management experience. The remaining four interview candidates failed to accept the invitation to participate. Data saturation was reached at the conclusion of interview #9 with no new information emerging. Interviews #10 and #11 were conducted as scheduled. Interviews #10 and #11 yielded similar findings and therefore confirmed data saturation. The next section discussed the sampling strategy.

4.10 SAMPLING STRATEGY

Different sampling strategies are used in qualitative and quantitative research. In qualitative research, sampling is a critical step that involves selecting participants that are familiar with the phenomenon under study and are therefore able to answer the research questions. For the qualitative phase of this study, purposeful sampling was used to select participants that met the criteria were most likely to provide rich and relevant information.

4.10.1 Purposive sampling

Purposive sampling is used when the researcher decides to select participants from the population. The sample is selected based on the researcher's judgement that they are the right people directly associated with the phenomenon under investigation (de Vos et al., 2011). The criterion used in selecting the key informants included that they

occupied positions of seniority in EMS South Africa, by virtue of their position and experience, were able to provide rich in-depth knowledge of the phenomenon under study during the interview. Table 4.1 provides the professional profile and experience of the participants that agreed to be interviewed.

4.10.2 Sampling

Sarantakos (2000:139 in de Vos et al., 2011:224) states that sampling is done because it is seldom practical nor feasible to survey an entire population because of time and cost constraints. Because the time, cost and effort are limited, using smaller sample sizes are likely to provide better quality, in-depth information. In determining the sample size, a guide that was taken into consideration is that the larger the population the smaller the size of the sample needs to be and *vice-versa*, noting that the sample needs to be representative of the population. De Vos et al. (2011) note that the sample size influences the statistical sensitivity of the results were in very large samples almost any effect will be insignificant. The sample size also influences the degree of reliability as well as the homogeneity and heterogeneity of the population (Elmusharaf, 2012).

Table 4.1: Profile and experience of interviewees

Interviewee	Employer, Past and Present	Gender	HPCSA Category	Experience	EMS Management Expertise
#1	Provincial Government and NGO	Male	ECP	34 years	Operational Paramedic, Operational Manager, General Manager
#2	Local and Provincial Government	Male	ECP	35 years	Operational Paramedic, Station Manager, Education & Training Manager, Deputy Director, Director
#3	Provincial and National Government	Female	ANT	38 years	Operations, Shift Leader, Station Manager, District Manager, Deputy Director
#4	Provincial and National Government	Male	ECP	23 years	Rural operations, Station Manager, Education & Training, Deputy Director
#5	Provincial and National Government, OHSC	Female	Nurse	33 years	Nurse, HOD, Executive Manager
#6	Provincial Government	Male	ECP	26 years	Operations, Education & Training, Deputy Director
#7	Provincial, Higher Education and National Government	Male	ECP	37 years	Operations, Education & Training, HOD, Director
#8	Provincial Government	Male	AEA	37 years	Operations, Shift Leader, Station Manager, Sub-District Manager,
#9	Provincial Government	Male	ANT	40 years	Operations, Shift Leader, Station Manager, District Manager

#10	Provincial Government, Private Sector	Male	ANT	27 years	Operations, Shift Leader, Station Manager, Operational Manager
#11	Provincial Government, Private Sector	Female	ECP	16 years	Operations, Shift Leader, Education & Training, Private Sector Operational Manager

Source: Researcher's own compilation

Census sampling is a statistical method that aims to cover the entire population of interest by surveying every individual in a population (Polit & Beck, 2010). The advantages of census sampling include that it can produce highly accurate data. Census sampling also reduces the risk of sampling error and ensures that there is representation from all groups (de Vos et al., 2011). The invitation to attend the workshop and participate in the survey was extended to all EMS managers in each of the provinces. Those that did attend were representative of all the EMS managers in the province in terms of rank, gender, race, qualification, and years of experience. Further considerations regarding census sampling are discussed in the paragraph that follows.

The downside to census sampling method includes the cost and the time it takes especially if the population is large and widely distributed. In this study it required the researcher to travel to each of the nine provinces over a period of twelve months. Large sample sizes can also result in data overload where data becomes difficult to manage. The use of Microsoft Excel® (Version 16.75.2) aided in capturing the data. Although there is a reduction in the risk of sampling error, it does not reduce the risk of incomplete or inaccurate data entries. Purposive sampling that was used to select the key informants is discussed in the next section.

Table 4.2: Public EMS Stations per Province in SA

	Public EMS Infrastructure			
Province	**Health Districts**	**Ambulance Stations**	**Purpose-Built Stations**	**Licenced Ambulance Stations**
Eastern Cape	8	84	6	8
Free State	5	59	7	8
Gauteng	5	57	0	20
KwaZulu-Natal	11	75	2	55
Limpopo	5	57	26	0
Mpumalanga	3	37	15	10
North-West	4	20	3	13

Northern Cape	5	62	8	8
Western Cape	6	51	15	51
TOTAL	**52**	**502**	**82 (16%)**	**173 (34%)**

Source: Personal communication A Bham (18 October 2021)

In the nine provinces there are a total of 52 health districts and 502 EMS stations. It is assumed that each station has a Station Manager, and each district has a District Manager, each province has an Operations Manager and a Provincial Manager. It was assumed that the districts would have at least two Sub-District Managers as the number of these posts are determined by the geographic and population size of the district. Table 4.3 details the allocation of EMS stations and districts per province and was used to estimate the number of EMS managers in each province. There are an estimated 566 EMS managers in the nine provinces, and it was assumed that 33% would not be able to attend the workshop (refer to workshop setting below) for reasons that they were required on the day to be on operational duty, may have worked a night shift on the night before, may be on leave or may have other reasons such as the vast distances to travel to the workshop venue. The total number of participants in this census was predicted to be 379. The sample size is discussed next.

Table 4.3: Estimated EMS managers per province

Province	Station manager	Sub-district manager	District manager	Operational manager	Provincial manager	Est. total	less 30%
KwaZulu-Natal	75	22	11	1	1	110	74
Gauteng	57	10	5	1	1	74	50
North-West	20	8	4	1	1	34	23
Free State	59	10	5	1	1	76	51
Northern Cape	62	10	5	1	1	79	53

Western Cape	51	12	6	1	1	71	48
Eastern Cape	84	16	8	1	1	110	74
Limpopo	57	10	5	1	1	74	50
Mpumalanga	37	6	3	1	1	48	32
Estimated TOTAL	**427**	**82**	**41**	**8**	**8**	**566**	**379**

Source: Adapted based on the personal communication with A Bham (18 October 2021)

4.10.3 Sample size

It was communicated by A. Bham (personal communication, 18 October 2021) that there were 502 ambulance stations in the public sector of which only 82 (16%) have been purpose built and 183 (34%) have been licensed as they meet and comply with the requirement of Section 7 (1) of the Emergency Medical Service Regulations, 2017 (Department of Health South Africa, 2017). Barron & Asia (2001: 19) stated that there are 53 health districts in nine provinces across South Africa. These districts form part of the District Health system of which EMS is a part and align with the municipal boundaries. The next paragraph discusses the survey instrumentation.

Table 4.4: EMS manager sampling strategy

SAMPLING STRATEGY:	**Census Sampling = 566 - 33% = 379**	**Actual Number of Participants per Province Completed survey**	**Estimated Number of participants per province that attended the EMS workshops[48]**	**Purposive Sampling**
PHASES OF STUDY:		PHASE 1 Survey	PHASE 2(a)	PHASE 2(b)

[48] The number may have been higher as some managers may have left before the end of the workshop. An equal number of surveys and consent forms were returned at the end of the workshop.

STUDY SITE:	EMS Managers		EMS Managers	Key Informants
Gauteng	50	20	20	Senior Managers, Policy Makers
KwaZulu-Natal	74	46	46	
North-West	23	36	36	
Free State	51	85	85	
Northern Cape	53	31	31	
Western Cape	48	22[49]	22	
Eastern Cape	74	19[50]	19	
Limpopo	50	50	50	
Mpumalanga	32	43	43	
TOTAL	**379**	**352**	**352**	**11**

Source: Adapted based on the personal communication with A Bham (National Health) (18 October 2021)

4.11 SURVEY INSTRUMENTATION

A survey was constructed to collect, analyse, and interpret the knowledge, opinions, attitudes, and perceptions of participants in a sample population (Appendix A). The advantages of a survey is that it allows for a collection of a large number of data from primary sources (World Health Organisation, 2008). A survey instrument must be appropriate, valid and reliable to attain the objectives of the study (Ponto, 2015). There are various survey methods to collect data. In this study a group administered survey was done.

In a group survey, the researcher gathers a group of participants in one location, and each sample population fills out the questionnaire simultaneously and submits it to the researcher. A group-administered survey gives participants the chance to ask the

[49] The low attendance was attributed to a miscommunication between the national office and the province that resulted in managers from only two districts attending.

[50] The low attendance was due to an illegal health workers strike that resulted in access to the entrances to health facilities in the province being block by rocks and burning tires.

researcher questions and get his or her answers. The advantages of this strategy are its affordability, the ability to gather respondents from remote locations, and the provision of high-quality, accurate data. The sample population was chosen on purpose rather than at random, therefore it might not be a true representation of the sample (World Health Organisation, 2008). The advantages and disadvantages of the survey method will be discussed below.

4.11.1 Advantages of survey method

A significant advantage of the survey method is that it is efficient and has wide reach, in that many people can be surveyed in a short time. It is also cost effective as it does not require large resources and manpower. The internet and mobile technology available today has made it easier to conduct online and telephone surveys (Salkind, 2010). As all the participants are asked the same questions, there is standardisation, thereby leading to more reliable results. Surveys are anonymous which can increase the honesty and accuracy of the responses (de Vos et al., 2011). The survey tool was selected as it is versatile, cost effective and efficient in terms of time and resources. The strength of a survey was that the information found is generalisable not just to the sample but to the entire population (Polit & Hungler, 1999). Despite these advantages, there are disadvantages that also need to be considered.

4.11.2 Disadvantages of using survey method

There is a risk of response bias where participants may not answer truthfully or may not understand the question. Surveys often have low response rates, especially amongst some groups such as students in higher education, who are a convenient group, and who may have survey fatigue. Survey fatigues can also occur from incorrect targeting, poor design and long surveys (Porter et al., 2004). Low response rates can affect the validity of the results. Surveys only provide limited information as they often ask closed-ended questions, which may not fully capture the complexity of a participant's thoughts and experiences (Salkind, 2010). The results of a survey can only be generalised to the specific sample population that participated in the survey, and not necessarily to the larger population (de Vos et al., 2011). The next section will discuss how the survey tool was implemented.

4.11.3 Development of the survey instrument

A specifically designed survey was used to gather quantitative data in Phase 1. The survey was initially developed with the assistance of an expert group that were engaged in related research projects. Included in the expert group were research supervisors, a statistician, employees from the NDOH and the employees from the OHSC. The expert group reviewed the initial draft survey questions related to quality improvement. The EMS domains were used to formulate the questions related to the Regulations Relating to the Standards for EMS, the Ideal EMS Framework and the 2020 Quality Management Program Assessment Tool developed and tested in SA by Howard et al. (2020). In addition, other survey instruments that were available in the literature were considered (World Health Organisation, 2008; Gagliardi et al., 2010; Department of Health of South Africa, 2018; Redlener et al., 2018; Hamilton et al., 2020; Department of Health, 2021). The validity of the survey tool is presented next.

To ensure construct and content validity, two officials from the Office for Health Standards Compliance and two officials from the Directorate of Emergency Medical Services and Disaster Management at the National Department of Health examined the appropriateness and comprehensiveness of the survey to measure the KAP related to quality management in EMS. This was done prior to the pilot testing of the instrument. Details of the survey instrument are presented in the paragraph that follows.

The survey comprised 62 questions of which two questions related to the age and gender demographics, seven questions asked about their work experience, 18 questions enquired about quality management practices in the workplace, the remaining questions asked about the six domains in EMS assessment tool (Appendix A). Overall, the question options assessed the participants KAP and identified factors that inhibit and promote quality improvement using closed ended questions and a five-point Likert scale. The trail of translating the survey is discussed in the paragraph that follows.

As there are nine official languages it was initially decided that the survey would be translated into IsiZulu as KwaZulu-Natal was the first province in which the survey

would be administered. None of the participants at the KwaZulu-Natal workshop requested the IsiZulu translated version and therefore no further language translations were done of the survey for the remainder of the workshops as this would have added to the cost and time of the study. None of the participants requested assistance with the translation or explanation of the survey questions during the administration of the survey. The next section discusses the pilot testing of the survey.

4.12 PILOT TESTING OF THE SURVEY

de Vos et al. (2011) suggests that a pilot study is useful to detect and correct any errors; identify and remove any ambiguity, discrepancies, and deficiencies in the questions; identify any bias questions; and ensure that the survey is appropriate and has the capacity to collect the information required for the study. The following paragraph elaborates on the details of the pilot survey.

Piloting of the survey was done after the survey was developed and prior to phase 1 of the data collection. After several iterations, the draft survey was ready for pilot testing. The survey was piloted on Emergency Care Practitioners, private EMS managers, and educators. The next section discusses the selection of the pilot study participants.

In the first round of the pilot, an email with an invitation and link to a Google Form® was sent to 30 participants who were purposively sampled. The criteria for selection included that the pilot participant had to be an Emergency Care Practitioner that had more than 10 years of experience and held a senior position within their respective organisation. The Google Form® required participants to give their consent prior to commencing with answering the questions. Of the participants, 18 provided consent and responded in the first round of the pilot survey. Their responses included comments on the wording of questions, redundant questions, and missing questions.

Of the 142 invitations sent out to participate in the pilot survey, there were 24 responses received. The survey was edited following the feedback and comments from the respondents. There were numerous grammatical and structural changes, such as ambiguity, that that were made during the editing process. The robustness of

the survey tool was confirmed in that none of the participants that completed the survey during the data collection phase misunderstood or required assistance with any of the survey questions.

The Department of Health intended to conduct workshops with public EMS managers in the provinces. Permission was requested to conduct the survey during these workshops. A Microsoft Word® version of the survey was printed and handed out to all EMS managers at each of the workshops. The pilot improved the content of the survey and aided with the face and content validity of the instrument. The next section focuses on the site approval and consent.

4.13 SITE APPROVAL AND ETHICS CONSENT

Site approval was obtained from the Department of Health as part of the research projects conducted for the National Health Quality Improvement Plan by master's and doctoral students based at the Cape Peninsula University of Technology in the Faculty of Business and Management Sciences. The approval was granted by the Acting Director General in the National Department of Health for the studies to be conducted in all nine provinces (Appendix C). The approval for access to the workshop is presented next.

The Directorate of Emergency Medical Services and Disaster Management in the Department of Health had scheduled a series of Ideal EMS Framework workshops in each province. The purpose of the workshops was to monitor progress on the implementation of the Ideal EMS Framework and inform provinces about the pending implementation of the Regulation Relating to the Standards for EMS. The next section discusses the non-participant observation undertaken during the workshops.

4.14 NON-PARTICIPANT OBSERVATION (N-PO) IN THE WORKSHOP SETTING

Observation can be defined as a systematic description of events and behaviours of the people under study in the natural setting by active looking, informal interviewing, and writing detailed field notes (Kawulich, 2005). It allows researchers to observe and note information that informants may be unable or unwilling to share in an interview. As the number of participants being observed may be large, such as in these EMS

workshops, the observation was able to provide a holistic understanding of the phenomena and increase the validity[51] of the study (DeWalt & DeWalt, 2010). The limitations of observation that apply to this research follow.

Kawulich (2005) notes that observation is filtered through the interpretative frame of the researcher, and that the detail of the observation is determined by the skill of the researcher to observe, document, and interpret what is being observed. Although the researcher is in the same profession and therefore can be viewed as an insider member of the group, the researcher did not participate in the discussion and was interested in just observing. It did have the disadvantage of not being able to probe participants during the workshop. It should be noted that four of the key informants who were interviewed were also present at one or more workshops. The workshop arrangements are discussed in the following paragraph.

The EMS Provincial Manager, who is the head of EMS in each province, invited all EMS staff holding the rank of shift leader, station manager, subdistrict manager, district manager, and operational manager to the workshop. The date, time and venue for the workshop was circulated via email to all participants several weeks in advance. The workshop was co-chaired by the representatives for national directorate emergency medical services and disaster management and the most senior provincial EMS manager present. The researcher's role is expanded upon in the paragraph that follows.

The researcher was introduced to the participants during the introduction to the workshop and the participants were informed that the researcher will be observing and there would be an opportunity to engage in the research survey during the workshop. The researcher proceeded with a Microsoft PowerPoint® (version 16.75) presentation that provided the context, aim and objectives for the study, explained the purpose of the survey and explained the purpose of the consent form. Participants were informed that they could ask questions for clarity or withdraw from participating in the survey at any stage without prejudice.

[51] Validity refers to context and face validity or trustworthiness as described by Lincoln and Guba (1994).

The consent form and survey were printed with each survey form stamped with a unique identifying number which corresponded with the number on the consent form. Once all participants had completed and signed the consent form, the survey was distributed to the participants who had given consent and agreed to participate. Each participant was given the option to indicate on the consent form that they wished to be contacted if they wanted more information on any future training being undertaken by the NDOH. The participants handed in the surveys and consent forms at the end of the workshop. All the surveys were matched with the consent forms. The next paragraph explains how the survey data was captured.

The survey data was captured by a research assistant in a Microsoft Excel® (version 16.75.2) template created by the researcher. The research assistant was trained on how to capture the data using the Microsoft Excel® feature of drop-down menus to minimise error. The Microsoft Excel® data was checked for accuracy by the researcher before analysis. After capture the survey documents were archived as per the Data Management Plan (Appendix F). The data was discussed and shared with the statistician who conducted the analysis guided by the researcher. The next section will discuss the factors considered in conducting the interviews with key stakeholders.

4.15 INTERVIEWS

The factors that were taken into consideration before the interviews were conducted with the key stakeholders included selecting the participants (discussed earlier) who can discuss topics related to the research objectives and aligning the interview questions to the research objectives. The interview guide (Appendix E) contained open ended questions and opportunities were created to probe and prompt to thoroughly explore the interviewee's perspectives. The researcher's experience is elaborated upon in the paragraph that follows.

The researchers prior experience in conducting interviews was obtained in his prior research activities. Having previously undergone interviewer training, the researcher was able to conduct the interview in a professional and ethical manner. Microsoft Teams® was used as the online platform to conduct the interview. The advantage of

using the technology included that it ensured privacy, and the participant was comfortable in their own setting (either home or work). The interviews were scheduled at a convenient time for each participant. The interviews took between 45 minutes and an hour to complete. Microsoft Teams® allowed for the recording of the interview, and consent was obtained from the participant to record. The interview is conducted in an ethical manner, respecting the participant's rights, and obtaining informed consent. The advantages of the interview are discussed in the paragraph that follows.

Interviews were deemed appropriate as a research method as it provided rich data and provided in-depth and detailed information about the participant's experiences, opinions, and perspectives (Polit & Hungler, 1999). The interviews allowed for flexibility in that the questions were adapted to the participant's responses, allowing for more in-depth exploration of topics (de Vos et al., 2011). There was also opportunity for clarification and probing thus ensuring a more complete understanding of the participant's responses. A rapport was established between the interviewer and the participant at the start of the meeting that led to more honest and open responses. The disadvantages of the interview method are discussed in the next paragraph.

The disadvantages of the interview method were taken into consideration from the outset. These included that interviews can be time-consuming to conduct, transcribe, and analyse, especially with a large number of participants (de Vos et al., 2011). The potential that the interviewer's personal biases and beliefs may influence the responses of the participant was considered. There was also the possibility that participants may give socially desirable answers, which may not reflect their true beliefs or experiences. Importantly, that the results of the interviews may not be generalisable to a larger population, as the participants may not be representative was factored into the selection of participants (Maree et al., 2014). The transcription and coding of the data is explained in the paragraph that follows.

After the interviews were transcribed by the researcher by listening to the audio recording and editing the transcription. A copy of the transcription was sent to the interviewee to check for correctness and made any amendments. Two of the

transcriptions were returned with typographical corrections. The considerations during the coding of the interviews will be discussed next.

The coding categories that were used to analyse the data were based on the research questions and objectives. To researchers prior experience in coding whilst co-supervising other postgraduate research ensured that the coding was consistent across all interviews and coders (Benaquisto, 2008). Verification of the coding by conducting a second round of coding, was done, and checked by the research supervisor to ensure that the coding is accurate. The analysis led to the coded data being put into identifiable themes from the patterns that emerged from the responses. Quotes were tracked that illustrated each theme (Hsieh & Shannon, 2005). These quotes were used as evidence to support the findings. To ensure that the data is kept confidential and that participants are not identifiable in the analysis or reporting of the findings, a unique number was assigned to each interview. Transparency was maintained in the coding process by documenting the decisions made and the reasoning behind them. This allows for reproducibility and for other researchers to verify the findings. After capture the transcripts and the digital recordings were archived as per the Data Management Plan (Appendix F). The next section will focus on data analysis.

4.16 DATA ANALYSIS

4.16.1 Analysis of quantitative data

With the assistance of a statistician, R® statistical software (R Core Team, 2023) was used to analyse the quantitative data. The statistical data was presented using descriptive statistics (e.g., bar plots, Likert plots, histograms, frequency tables, and cross-tabulation tables). Hypotheses concerning associations between variables were tested using appropriate statistical methods. The description of each statistical method follows:

Table 4.5: Summary of statistical analysis

Objectives	Question	Data Analysis	Reasoning
Facilitate a quality self-audit of EMS managers	What is the knowledge, attitudes, and practices of EMS managers who are quality champions, in the public EMS organisations in relation to quality improvement?	Reliability tests	Relationship between the domains
	EMS Assessment Index	Kendall's nonparametric correlation coefficient	Level of education and training associated with knowledge of national standards
	QI KAP between provinces	ANOVA and Multiple comparison difference using Tukey-Kramer	Relationship between education and training in provinces
	KAP amongst job levels	ANOVA	Is there a relationship between the job levels
	KAP between medical qualifications	ANOVA	Is there a relationship between the qualifications of the EMS managers
	Prior QI training and KAP	ANOVA	Does prior QI training improve KAP

Source: Researcher's original work

4.16.1.1 Analysis of Variance (ANOVA)

ANOVA is a statistical method used to test for differences in means between two or more groups. It compares the variance between group means to the variance within each group to determine whether the differences in means are statistically significant or simply due to random chance (de Vos et al., 2011).

There are several types of ANOVA, including one-way ANOVA, which compares the means of two or more groups on a single independent variable, and two-way ANOVA, which compares the means of groups on two independent variables. ANOVA uses the F-test to calculate a p-value, which indicates the probability of obtaining the observed differences in means if the null hypothesis (that there is no significant difference between groups) is true. If the p-value is less than a predetermined level of significance, typically 0.05, the null hypothesis is rejected, and it is concluded that there is a statistically significant difference between groups (Ebrahim & Bowling, 2005).

ANOVA is a powerful statistical method that can analyse differences in means between multiple groups. It can test for interactions between independent variables, which can provide deeper insights into the relationships between variables. ANOVA can handle both continuous and categorical independent variables (Polit & Hungler, 1999). The disadvantages will be discussed in the next paragraph.

The disadvantages of ANOVA include that it assumes that the data is normally distributed and that variances are equal across groups, which may not always be the case. It does not identify which group means are different from one another, only that there is a significant difference between groups. ANOVA is sensitive to outliers, which can skew the results (Ebrahim & Bowling, 2005). Cronbach's alpha is discussed in the next section.

4.16.1.2 Cronbach's Alpha

(Cronbach, 1951) is a statistical method used to measure the internal consistency and reliability of a psychometric scale or questionnaire. It is a coefficient that represents the extent to which items on a scale or test are measuring the same construct or idea.

The Cronbach's alpha coefficient ranges from 0 to 1, with higher values indicating higher internal consistency and reliability of the scale. Typically, a value of 0.7 or higher is considered acceptable for research purposes. Cronbach's alpha is calculated by comparing the variance of the observed scores to the variance of the scores that would be expected if all items on the scale were measuring the same construct. The formula involves calculating the mean of all item variances and covariances and then computing the ratio of the observed variance to the expected variance (Ebrahim & Bowling, 2005). Specifically, Cronbach's Alpha can be computed as,

$$\alpha = \frac{k\bar{c}}{\bar{v} + (k-1)\bar{c}} \ ,$$

where *k* is the number of items in the scale, $\bar{v}$ is the average of the variances of the *k* item scores across the *n* responses, and $\bar{c}$ is the average of the pairwise covariances between the *k* items. The values of the Cronbach's Alpha statistic range between 0 and 1, and a conservative threshold is that it should be at least 0.7 for the scale to be considered reliable in terms of internal consistency (Ebrahim & Bowling, 2005). Further explanation of Cronbach's alpha is presented next.

Cronbach's alpha is a widely used and well-established method for measuring internal consistency and reliability of a scale. It provides a simple and straightforward way to assess the quality of a scale or questionnaire (de Vos et al., 2011). It allows researchers to identify problematic items that may need to be revised or removed from the scale. The disadvantages are discussed in the paragraph that follows.

Disadvantages of using Cronbach's alpha include that it assumes that all items on the scale are measuring the same construct, which may not always be the case. It does not provide information about the validity of the scale, which refers to whether the scale is measuring what it is intended to measure. It may not be appropriate for use with certain types of data, such as ordinal or binary data (Blumberg et al., 2014). In the present case, Cronbach's Alpha was used to measure the internal consistency of the multi-item scales formed by grouping the survey questions within each domain of the EMS Assessment Index. The next section discusses Kendall's nonparametric statistical method.

4.16.1.3 Kendall's Nonparametric Statistical Method

Kendall's nonparametric statistical method (Kendall, 1970) is a technique used to test the association between two variables in a sample, without assuming any distribution of the data. The method is commonly used when the data is not normally distributed, or when the sample size is small. Kendall's method measures the strength and direction of the association between two variables by comparing the number of concordant and discordant pairs in the data. A concordant pair is one in which both variables have the same rank order, while a discordant pair is one in which the rank order of the two variables is different. Kendall's coefficient of concordance, denoted by W, ranges from 0 to 1, where 0 indicates no association and 1 indicates perfect association. A value of W close to 1 indicates a strong association between the two variables, while a value close to 0 indicates no association (Ebrahim & Bowling, 2005). The strengths of the methods are discussed next.

Kendall's nonparametric method is a robust statistical method that does not require the assumption of a particular distribution of the data. It can be used with small sample sizes, unlike some parametric tests. It provides a measure of the strength and direction of the association between two variables, which can be useful for interpreting the results (Ebrahim & Bowling, 2005). The disadvantages to consider are discussed in the following paragraph.

Kendall's nonparametric method also has disadvantages that include that it may be less powerful than parametric tests when the assumptions of parametric tests are met. It can be more computationally intensive than some other nonparametric tests and it does not provide information about the direction or nature of the relationship between variables (Ebrahim & Bowling, 2005). The next section discusses Tukey-Kramer honestly significant difference.

4.16.1.4 Tukey-Kramer honestly significant difference (HSD)

Tukey's HSD is a post-hoc test that is used to determine which specific pairs of group means differ significantly from each other in an analysis of variance (ANOVA). The method was developed by Tukey (1953) for equally sized groups and extended by

Kramer (1956) to the more general case where the number of observations in different groups is unequal. The test is designed to control for the overall experiment-wise error rate, which is the probability of making at least one Type I error in a set of multiple comparisons. The HSD test is based on the range of the means in each group, and it calculates a minimum significant difference that must exist between two means to be considered statistically significant. The minimum significant difference is compared to the difference between the means of any two groups, and if the difference is greater than the minimum significant difference, then the difference is considered to be statistically significant (Ebrahim & Bowling, 2005). The strengths of the method are discussed in the paragraph that follows.

Tukey's HSD is a conservative test that controls the experiment-wise error rate, which reduces the likelihood of making a Type I error. It is a flexible test that can be used to compare any number of groups, without requiring the use of multiple tests or adjustments to the significance level. It provides a simple and intuitive way to interpret the results, by indicating which pairs of means are significantly different from each other (Ebrahim & Bowling, 2005). Other considerations of the methods are discussed next.

It should be noted that Tukey's HSD can be less powerful than other post-hoc tests when the assumption of homogeneity of variance is violated. It can be more computationally intensive than other post-hoc tests, especially when the number of groups is large. It assumes that the data is normally distributed and the variances of the groups are equal, which may not always be the case (de Vos et al., 2011). The next section will present the analysis of the qualitative data.

4.16.2 Analysis of qualitative data

An inductive approach allowed for the systematic analysis of similarities within and between the non-participant observation findings and the interview transcripts to identify patterns and develop themes, sub-themes, and categories. The inductive approach assumes that there is a phenomenon that can be analysed repeatedly to build general knowledge (Brinkmann & Kvale, 2019). Brinkmann & Kvale (2019:6) argue that there is no 'technological fix' to arrive at deeper meaning and implications

of what is said in an interview. The quality of the analysis is dependent on the knowledge of the research topic, and mastery of the analytical tool for analysing the meaning expressed in language. The inductive thematic analysis was undertaken using Braun & Clarke's (2006) 6-step framework. Coding will be discussed in the next paragraph.

Coding is commonly used in analysis of text and language in social sciences. It involves attaching one or more keywords to a segment of text. It requires the use of code memos to capture the researcher's thoughts and define the codes used. In Phase 2 (a) and 2 (b) ATLAS.ti® (version 23.2.0) software was used to code the data. ATLAS.ti® is a program for analysing qualitative data, such as unstructured text, audio and video material, and images. The main advantages and features of ATLAS.ti® include that large volumes of qualitative data can be more easily categorised, arranged, and analysed by using ATLAS.ti® coding and annotation features. Finding and analysing pertinent data is made simpler by the software's variety of querying and data retrieval options. Network diagrams can assist in identifying linkages and trends in their data. The paragraph that follows will discuss how coding was used to create the themes.

Content analysis of the transcribed observation and interview data was guided by the framework described by Erlingsson & Brysiewicz (2017). A coding frame was created to lay out the key concepts and their definitions. These changed, as the data is read and re-read. The researcher kept a memo to capture personal insights, ideas, and patterns. Open coding was used to identify concepts and themes as it concerns the aims and objectives of the study. 295 codes were created from the interviews and workshops (Appendix I). Axial coding was used to create specific themes and selection coding will be used as the themes are integrated (Benaquisto, 2008:85; Saldana, 2008:27). The themes that emerged were used as a basis for the argument in the discussion around them. The next section discusses the validity of the survey instrument.

4.17 VALIDITY OF THE SURVEY INSTRUMENT

An instrument is said to be valid when it measures what is intended and encompasses aspects of the phenomenon under investigation. There are several types of validity that were considered in developing the survey. Firstly, content validity which refers to the degree to which the survey questions are representative of the construct being measured. To ensure content validity, the questions were written that were relevant, clear, and comprehensive.

Criterion validity refers to the degree to which the survey results can be compared to an external criterion. As there were no similar surveys to establish criterion validity by comparing survey results to other measures of the same construct, criterion validity was done by getting the opinion of EMS experts.

Construct validity is the degree to which the survey questions measure the underlying construct they are intended to measure. Construct validity is done by using statistical methods such as factor analysis. Face validity is discussed next.

Face validity refers to the degree to which the survey questions appear to measure what they are intended to measure. The use of expert review or pilot testing was used to assess face validity in this survey. Internal validity is discussed in the paragraph that follows.

Finally, internal validity, that is the degree to which the survey results are free from bias and confounding factors, was considered. This was done by ensuring that survey questions are clear and unbiased, and using appropriate statistical methods to analyse the data. The role of the expert panel is outlined in the next paragraph.

The expert panel checked the survey for content, criterion, face, and internal validity. This panel comprised officials from the National Department of Health and the Office for Health Standards Compliance. The panel was able to assist the researcher identify any ambiguity, deficiencies, or discrepancies. The survey questions were drawn from in part a validated survey done by Howard et al. (2020) and the statements in the Regulations Relating to Standards for EMS (2022). All feedback provided to the

researcher by the expert panel was incorporated into the survey instrument prior to pilot testing.

During the data analysis, the researcher was responsible to ensure the accuracy and relevance of the data. A statistician audited the data and ensured confirmability. Through this process it was established that their data was an accurate reflection of the participants' knowledge, attitude, and practices. The semi-structured interviews further assisted in confirming the external generalisability of the data.

The statistical generalisation, analytic generalisation and transferability of the findings were taken into consideration for this study. The statistical generalisability considers the generalisation of the findings from the selected sample onto the entire population. In this study, a census was done of all EMS managers in all nine provinces. The 352 survey responses of the managers that attended the workshops supports the conclusion that the findings from the study could be generalisable to any public EMS manager in any province in South Africa. After the validity of an instrument is found, the reliability needs to be confirmed. This will be discussed in the next section.

4.18 RELIABILITY OF THE SURVEY INSTRUMENT

The instrument is said to be reliable when the identical results are obtained after multiple measurements. In this study the identical survey tool was administered to a diverse population of EMS managers. The population was found to be representative of any EMS employed in the public EMS in South Africa. Table 4.6 shows how the survey instrument was used to answer the research objective and the associated research questions. Reliability is associated with trustworthiness of the instrument, which is discussed below.

Table 4.6: Association between research objectives, questions, and survey questions

Research Objective	Research Questions	Survey Question Range
	What is the knowledge, attitudes, and practices of EMS managers	Questions 2,3 relate to the age and gender demographics

Facilitate a quality self-audit of EMS managers	who are quality champions, in the public EMS organisations in relation to quality improvement?	Questions 4-9 relate to qualifications, job position, number of staff and work experience,
		Questions 10-25 relate to quality management education and training
	What are the factors that motivate and foster quality improvement amongst EMS managers within EMS organisations?	Questions 26-27 relate to factors that promote and impede quality improvement
	How do EMS managers perceive, interpret, and understand the regulations relating to standards for EMS?	Questions 28-62 include the Domains 1-6 in the Regulations Relating to Standards for EMS

Source: Researcher's own compilation

4.19 TRUSTWORTHINESS OF THE DATA

The strategy was to ensure the trustworthiness of the data gathered in Phase 2. This included verification of the survey data by the key informants as it was not practical to share the raw data with the participants in all provinces. Details of the trustworthiness of the qualitative research data is presented below.

In considering the trustworthiness of the qualitative research data, the model of Lincoln and Guba for qualitative research considers the credibility, dependability, confirmability and transferability of the research findings (Guba & Lincoln, 1994). Through the meaningful engagement with the key informants the credibility of their data collected was heightened. The time spent during the interviews allowed for an in-depth discussion that provided rich information based on the EMS experiences of the key informants in relation to quality in EMS. As the research questions were guided by the data obtained in Phase 1 and Phase 2 (a), researcher bias was reduced. Qualitative ATLAS.ti® software was used for the analysis of the findings. The transcripts of the MS Teams® interviews were emailed to the participants to ensure the discussions were

accurately reflected. The use of the ATLAS.ti® software allowed for sharing of the analysis with the research supervisor thereby minimising the research bias in analysis and interpretation of the findings and the coding.

The dependability of the data can be confirmed if it is neutral and objective and if there is agreement about the data relevance and meaning. A careful documenting of the decisions and conclusions during the data analysis helped support the dependability and confirmability of the data.

Analytic generalisation applies to the credibility of qualitative research. The purpose of sampling of the key informants is to ensure that rich information was obtained from the participants. New themes that emerged during the interviews were discussed in depth. This allowed for rich and thick descriptions of the findings. The interviews that were conducted would be transcribed verbatim. These transcriptions together with the researchers handwritten notes and digital recordings were used in the coding and analysis.

The transferability of the findings was made possible by selecting participants and key informants from the nine provinces across South Africa. The range of participants ensured representativity from all groups regardless of gender, ethnicity, experience, age, rank, and qualification.

In considering the confirmability, the unexpected findings in the data were discussed and reflected upon by the researcher and supervisors. There was member checking and discussion of the transcriptions that aided in triangulation. The next section focuses on the reflexivity of the researcher in relation to the research being undertaken.

4.20 REFLEXIVITY

The concept of reflexivity is important in critical science as it recognises that the researcher is an integral part of the research process, and it is therefore necessary for the researcher to acknowledge their own beliefs and attitudes (Brannick & Coghlan, 2007). Qualitative research depends on the researcher's subjective judgements which

are respected and valued. It is therefore important for the researcher to critique, appraise and evaluate how their subjectivity influenced the research enquiry. The approach to reflexivity in this study was not to neutralise, acknowledge or explain the researcher's influence but capitalise and recognise the researcher's knowledge and identity as being integral to the co-construction of the data and findings (Olmos-Vega et al., 2023).

The four intersecting dimensions of reflexive processes according to Walsh (2003) are: personal, interpersonal, methodological and contextual. Personal reflexivity relates to how our personal perspectives influence the research. Interpersonal reflexivity is how people, their relationships and power dynamics influence the research. Methodological reflexivity is about how methodological decisions are made and what are their implications. Contextual reflexivity is how the aspects of context influence the people and the research (Walsh, 2003).

The researcher conducted this study as part of the Doctoral degree in Public Administration. All the participants were made aware that the research was part of the degree. Methodological transparency was assured by the researcher engaging the research supervisors during the analysis of the raw data. The researcher was cognizant of having a bias as an insider with more than 35 years of insider EMS experience, and the research ideas drew from this experience. The researcher made participants aware during the consent briefing that he is an elected member of the HPCSA professional board for emergency care, past chairperson of the professional board and Head of Department at an academic institution. The researcher and the participants were made aware that the findings of the study may have implications for the emergency care profession as well as for current and future emergency care education and training. The next section will detail the ethical considerations of this study.

4.21 ETHICAL CONSIDERATIONS

When conducting surveys and interviews, there were several ethical considerations that were considered to ensure that participants were treated with respect and their confidentiality was maintained. The key considerations of consent, confidentiality,

respect, harm, and option to withdraw will now be discussed. Informed consent was obtained by informing participants about the purpose of the survey or interview, how their data will be used, and any potential risks or benefits associated with participation. The researcher was aware that participants that were recruited may be under duress especially during the interview. The first few minutes was spent having a general conversation to build a rapport and to make participants feel at ease. They were given the opportunity to ask questions and then given a consent information form on which they provided written consent to participate. The participant's confidentiality will be discussed in the next paragraph.

Another consideration was maintaining confidentiality of personal information by keeping all data confidential and secure. This also included assuring participants that their responses will not be linked to their identity. As the participants reflected on the racial and cultural diversity of the South African society, respect for participants' autonomy and dignity was paramount. Participants' cultural beliefs, values, and practices were considered when planning the interviews and asking questions. The consideration for physical or emotional harm is discussed next.

The risk of physical or emotional harm for this study was determined as being low. The risk however of deception or perceptions of deception was considered. Questions in the survey and interview were phrased in a way to avoid the perception where participants may have felt deceived into providing responses using leading questions. Participants were made aware that the data obtained from the surveys and interviews was only for the stated purpose and would not use it for other purposes without obtaining additional consent. Participants were also given the option to withdraw from the survey or interview at any time without penalty or repercussion. Any research involving human participants and the organisation in which they work will require the researcher to find the balance between the right to know versus the rights to privacy and not to be harmed (de Vos et al., 2011:12). In this regard the individual consent of participants and their respective EMS organisations, as their employer, was obtained and ethical clearance was obtained. The permission as well as the risk considerations are discussed in the paragraph that follows.

Site approval to conduct the study in each of the provinces was granted by the Department of Health (Appendix C). Care was taken to ensure that participants fully appreciated the nature of the study, and that participation was voluntary. Participants were briefed and informed consent was obtained before data collection. Although participants may have benefitted from the workshops, they were not compensated financially or materially. The study was deemed to have minimal risk to the participants. The risk of discomfort or harm anticipated was not greater than what any individual would have encountered in their daily life. The ethical principles that were considered are outlined in the paragraph below.

The study entailed obtaining detailed information from participants on how their EMS organisations manage quality. It is important to protect the anonymity of individuals and organisations during the research process. An important consideration was to triangulate any controversial findings as participants may inflate, conflate, or deflate information and facts for whatever reason. The ethical principles of beneficence and non-maleficence, equity and respect underpinned the study. The ethical norms and standards prescribed by Ethics in Health Research Policy of South Africa (2017) were used to guide the study (Wikler, 2010). The insider bias will be discussed next.

The researcher has been in the profession since 1987, it is important to recognise the researcher's bias as an insider as values and experiences will undoubtedly influence the research being undertaken (Corbin et al., 2009). The researcher was also aware that present and former roles could present a risk of formal or informal power (Fleming, 2018). To counter this, careful consideration was given to the research design in which the rigour and transparency of the data collection was considered. Including other insiders and outsiders from the OHSC in the expert panel and during the pilot study helped protect over any undue influence in the research design.

During the interview, the researcher was aware of the potential for informant bias. Each interview began with a disclaimer regarding personal views and experiences to attain a level of trust and build a rapport with the participant. Having the participants check the transcriptions later, allowed for independent reflection by the interview participants. The study has value in that it will likely inform quality improvement in EMS

organisations in LMICs and in so doing yield beneficence for the patient, the practitioner, and the EMS downstream.

The study has a low risk as no patient data or clinical intervention is required. Informed consent was obtained from each participant in the study and was assigned a unique code to anonymise the response. Participants were informed that they reserved the right to withdraw at any stage of the research process. The data management plan was completed and approved by CPUT (Appendix F). The plan detailed how data collected was stored and retrieved electronically on a password protected device. The data will be destroyed after the prescribed period on completion of the study. Ethics approval (Appendix B) for the study was granted by the FREC (Certificate No. 2021 FBMSREC 078).

4.22 SUMMARY OF THIS CHAPTER

The purpose of this study was to construct a quality improvement framework that strengthens the managers response to the Regulations Relating to Standards for EMS. The paradigm of Critical Theory was used as a lens to critique the knowledge, attitude, and practices of the EMS managers. The use of mixed methods first generated quantitative survey data that was analysed using R Core Team® (2023). The qualitative data from the workshops and interviews yielded deeper meaning of the quantitative results with the aid of ATLAS.ti® (version 23.2.0) software.

The data was collected with due consideration to the ethical principles and prescripts as stipulated by the Cape Peninsula University of Technology. The following chapter will present and discuss the quantitative survey data.

CHAPTER FIVE
PHASE 1 QUANTITATIVE DATA RESULTS

5.1 INTRODUCTION

The previous chapter presented the research methodology that enabled the data collection. In this chapter the quantitative survey results are presented. The interpretation and discussion follow. The findings, analysis and interpretation of data is conveyed with supporting figures, tables and other forms of data display. De Vos et al. (2011) argue that it is important to report on negative findings as knowing that two variables are not related is as important as to know that they are.

The quantitative survey with 62 questions was administered to 352 public service EMS managers at EMS workshops[52] that were held in all nine provinces in SA. The survey instrument was designed to evaluate the knowledge, attitude and practices of EMS managers in relation to quality improvement and the domains and related standards as stipulated in the Regulation Relating to Standards for Emergency Medical Service Standards (Republic of South Africa, 2022b).

The aim and objectives of the current study are repeated here to provide the context to this chapter. To potentiate eligibility and compliance with the regulations relating to standards for EMS, this study intended to recontextualise the quality improvement discourse through the construction of a quality improvement framework that strengthens the public service EMS manager's response to the standards for EMS. The main objectives were:

1. To facilitate a quality self-audit including the critical appraisal of the knowledge, attitude and practice of EMS managers who are the 'power brokers'[53] in relation to EMS quality improvement.

[52] The EMS workshops are facilitated by the National Department of Health: Emergency Medical Services.

[53] Power brokers are individuals who wield considerable influence over decisions of other parties.

2. To observe and document the EMS managers, who are quality champions, perspectives on the application of the standards for EMS and reasons for non-compliance.
3. To develop a framework that explicates how change in EMS policy and praxis may lead to quality improvement in public EMS organisations, in the interest of patient safety and organisational sustainability.

The next section of this chapter will present the descriptive data analysis, followed by the inferential data analysis.

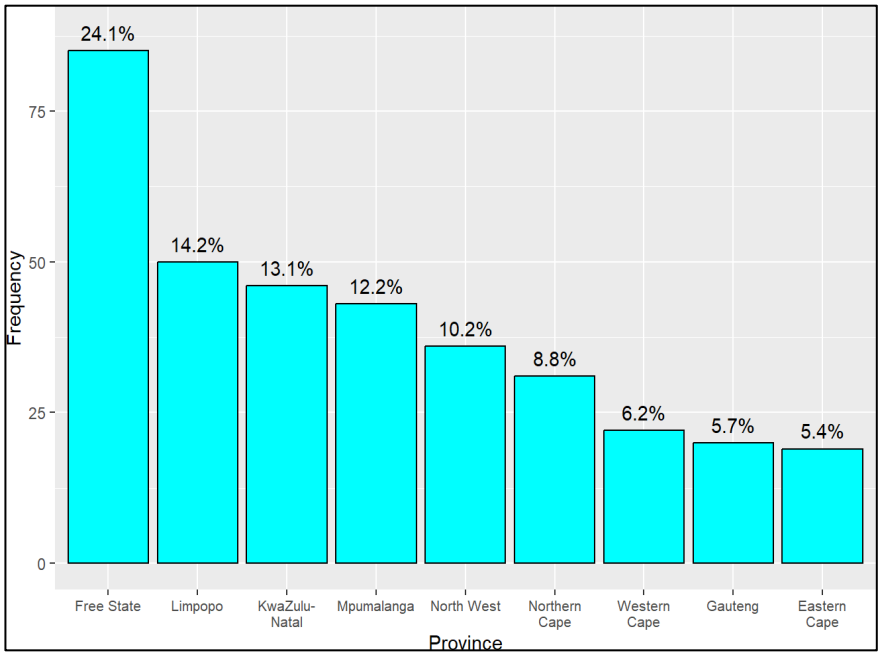
5.1.1 Descriptive data analysis

The survey tool has three main sections namely biographical data; knowledge, attitude, and practice in relation to quality improvement and the standards related to emergency medical services. The descriptive information relating to the age, gender, qualifications, years of experience and province are presented below.

5.2 RESPONSE BY PROVINCE

The survey was administered at workshops that were held in all nine provinces in South Africa. The distribution of the participants per province are presented in Figure 5.1. The workshop attendance was influenced by both internal and external factors. The National Education, Health and Allied Workers labour union strike coincided with the Eastern Cape workshop on the 6th of March 2023. The illegal national strike by health workers was due to salary increases. The researcher witnessed how striking workers blocked access to health facilities with burning tyres and rocks. Eastern Cape EMS managers from outlying areas had to remain in their stations and districts to manage the consequences of the strike and therefore were unable to attend the workshop. The Western Cape only invited two districts to the workshop. Other provinces had budget constraints that limited attendance from outer lying areas.

Figure 5.1: Survey participants per province

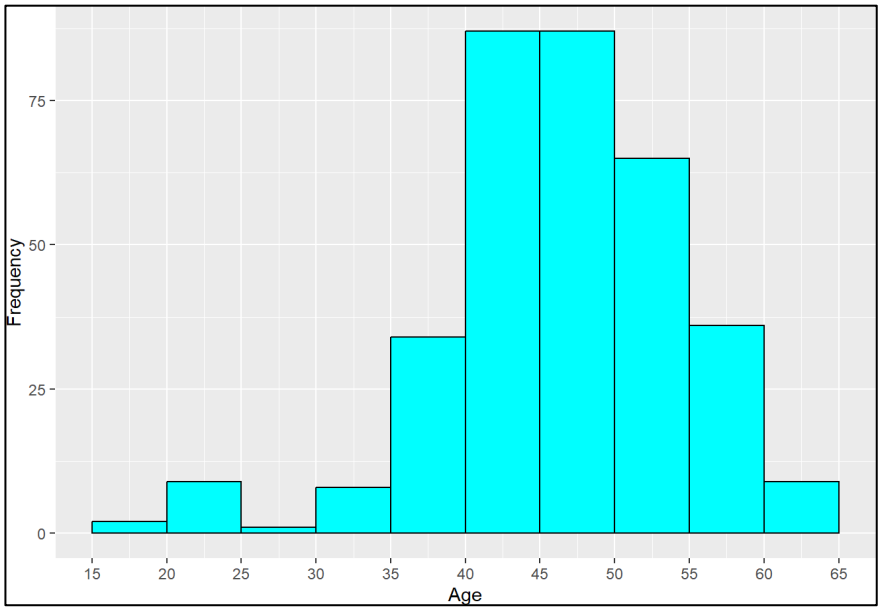


Source: Researcher's own compilation

5.3 AGE GROUP OF RESPONDENTS

The question was "Please enter your age in years?" The findings are shown in Figure 5.2. The mean age is 46 and median age is 46. The median age is 28 years in the South African population (Statistics South Africa, 2021).

Figure 5.2: Age group of the participants



Source: Researcher's own compilation

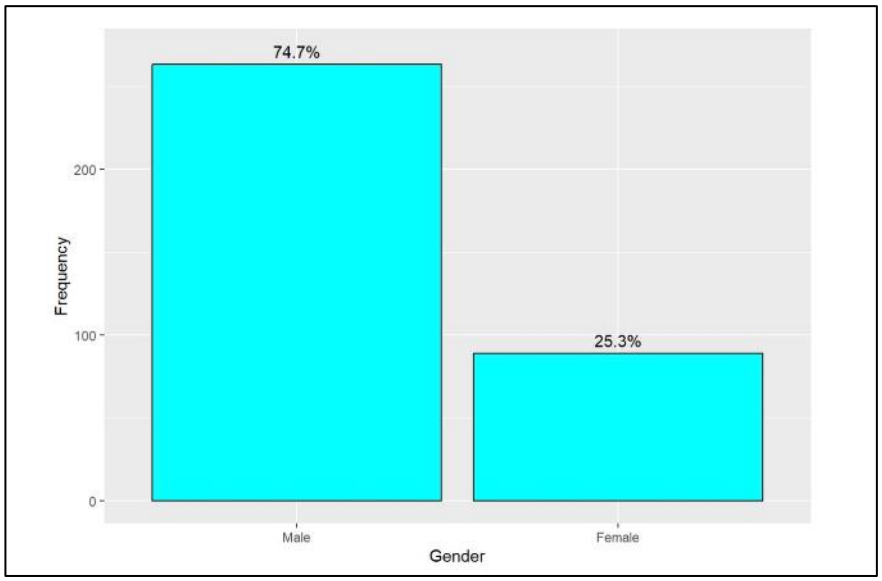
5.4 GENDER OF PARTICIPANTS

The question was “Please select your gender” with the options provided as:

- Female
- Male
- Prefer not to answer
- Gender-fluid
- Agender
- Non-binary
- Not listed

In Figure 5.3. 74,7% (n=263) of the respondents identified as male and 25,3% (n=89) identified as female[54]. None of the respondents identified with any of the other categories.

Figure 5.3: Gender of participants



Source: Researcher’s own compilation

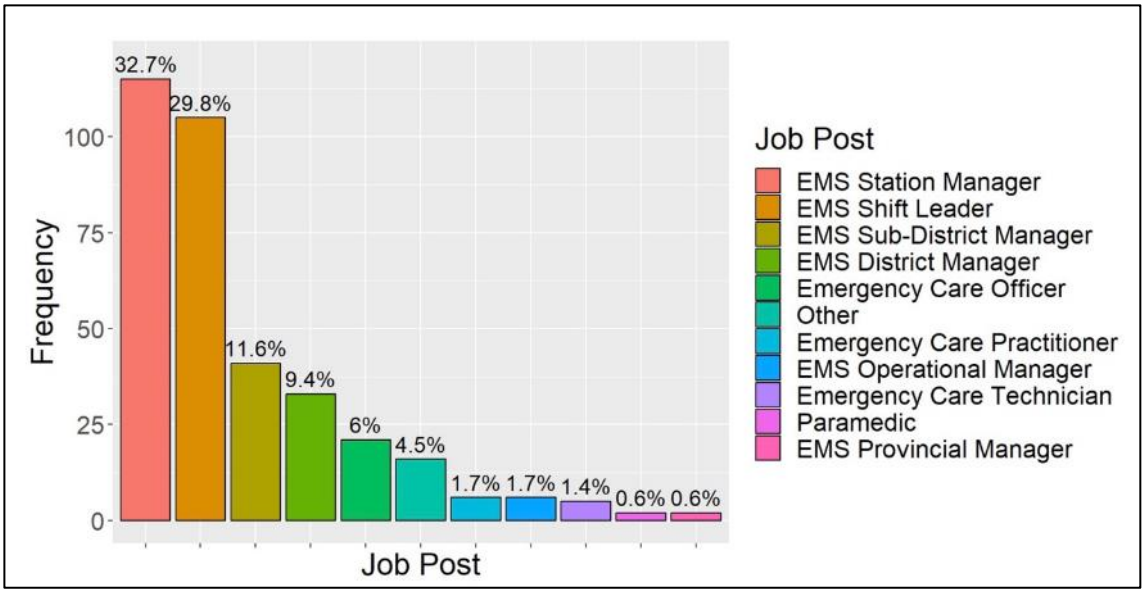
[54] In SA the percentage of female population is 50,76% compared to 49,24% male population (https://statisticstimes.com/demographics/country/south-africa-demographics).

5.5 OCCUPATIONAL POSITION

The question was “What position do you hold in your organisation?” The occupational position in the public service EMS is standardised across South Africa and participants would be appointed or be acting in one of these positions. The majority (n = 115; 32,7%) indicated that they were EMS Station Managers, followed by EMS Shift Leaders (n = 105; 29,8%), then EMS Sub-District Managers (n = 41; 11,6%), EMS District Managers (n = 33; 9,4%), 1.7% (n = 6) were Operational Managers and 0.6% (n = 2) were Provincial Managers. This distribution is representative of the public EMS management structure.

4,5% (n = 16) had selected “Other” which may indicate that they are in acting positions or employed in an undefined role within the organisation. It was noted that not all provinces have the same organisational structure as all districts. Some provinces do not have station managers and other do not have sub-district managers. In provinces without station managers, the shift leader performs these functions. Where there are no sub-district managers, the district manager performs this function.

Figure 5.4: Job position

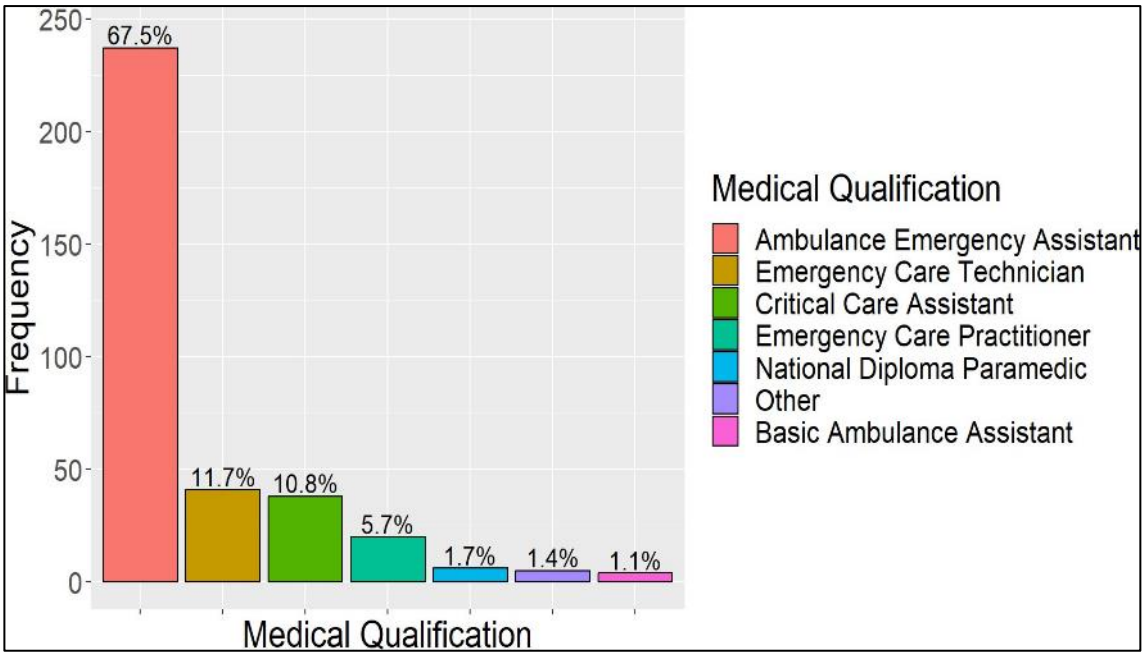


Source: Researcher’s own compilation

5.6 MEDICAL QUALIFICATION

The question was “Select your highest emergency medical qualification”. The reason for the question is that the Department of Public Service and Administration, Occupation Specific Dispensation specifies that the minimum medical qualification required to be appointed to the EMS management position in the public service. The medical qualification can be categorised into the formal NQF aligned qualifications obtained at a higher education institution and non-NQF aligned short courses in emergency care that were phased out in 2019 (Sobuwa & Christopher, 2019). The most frequent (n = 237; 67,5%) qualification held amongst those surveyed was the Ambulance Emergency Assistant (AEA).

Figure 5.5: Emergency care qualifications of EMS managers

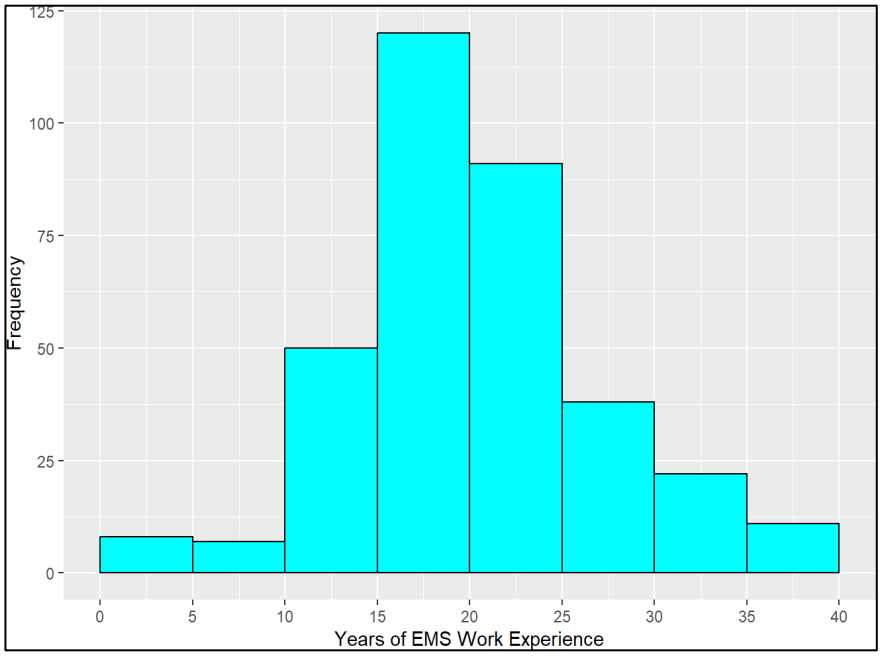


Source: Researcher’s own compilation

5.7 YEARS OF EMS WORK EXPERIENCE

The question was “Which year did you start working in EMS?” The mean number of years of experience is 21 and the median is 20. In Figure 5.6 the EMS work experience histogram, the bins are closed on the right. Thus, a bin from 0 to 5 includes the value 5.

Figure 5.6: Years of EMS work experience

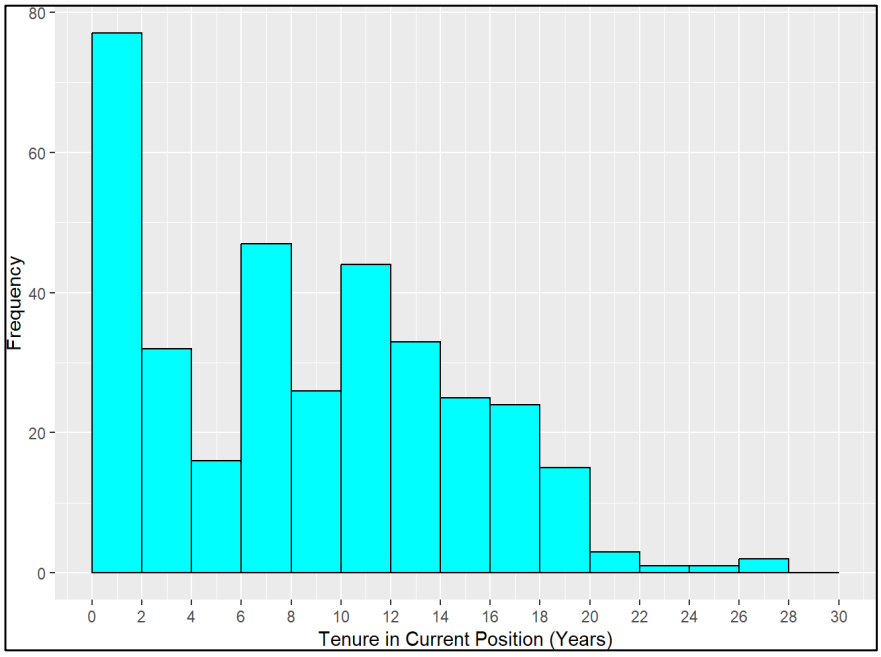


Source: Researcher's own compilation

5.8 TENURE IN CURRENT POSITION

The question was "Which year were you appointed to your current position?" The mean number of years of tenure is 9 and the median is 8. In Figure 5.7 the years of tenure in current position histogram, the bins are closed on the right. Thus, a bin from 0 to 5 includes the value 5.

Figure 5.7: Tenure in current position

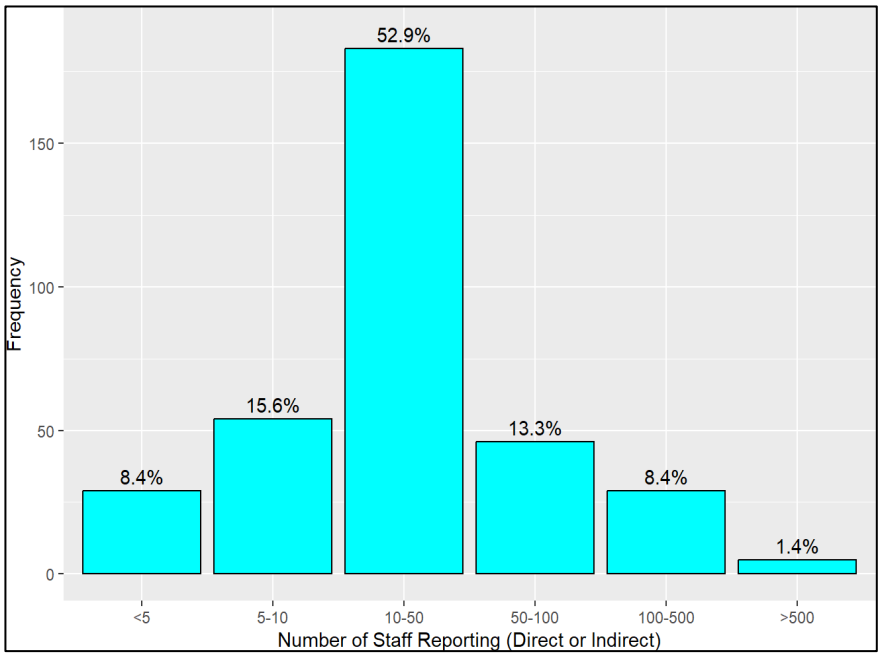


Source: Researcher's own compilation

5.9 NUMBER OF STAFF REPORTING TO MANAGER

The question "How many people report (directly or indirectly) to you?" Of the respondents, 52,9% (n = 183) indicated that between 10-50 people report to them.

Figure 5.8: Number of people reporting to manager

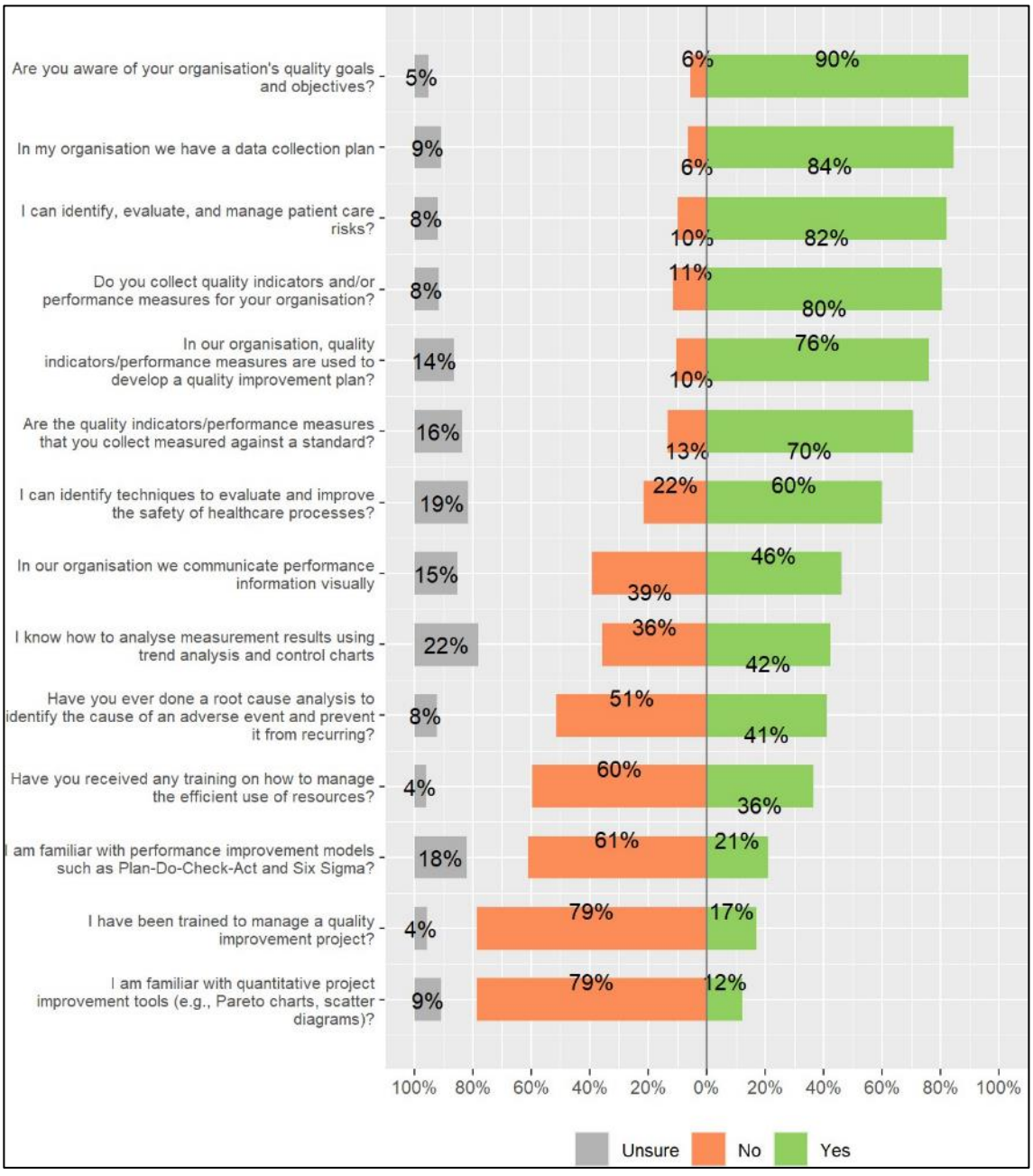


Source: Researcher's own compilation

5.10 QUALITY MANAGEMENT EDUCATION AND TRAINING

Questions 10 to 25 asked participants to respond to questions relating to their quality management knowledge, attitude, and practices. Seven questions each focused on knowledge, five on practices and two questions enquired about the participant's attitude. The participants could choose from one the options either: Yes, No or Unsure. Question 18 was "I have been trained to manage a quality improvement project?" to which 79% (n = 277) of respondents replied No and 4% (n = 15) answered Unsure.

Figure 5.9: Quality management knowledge, attitudes and practices

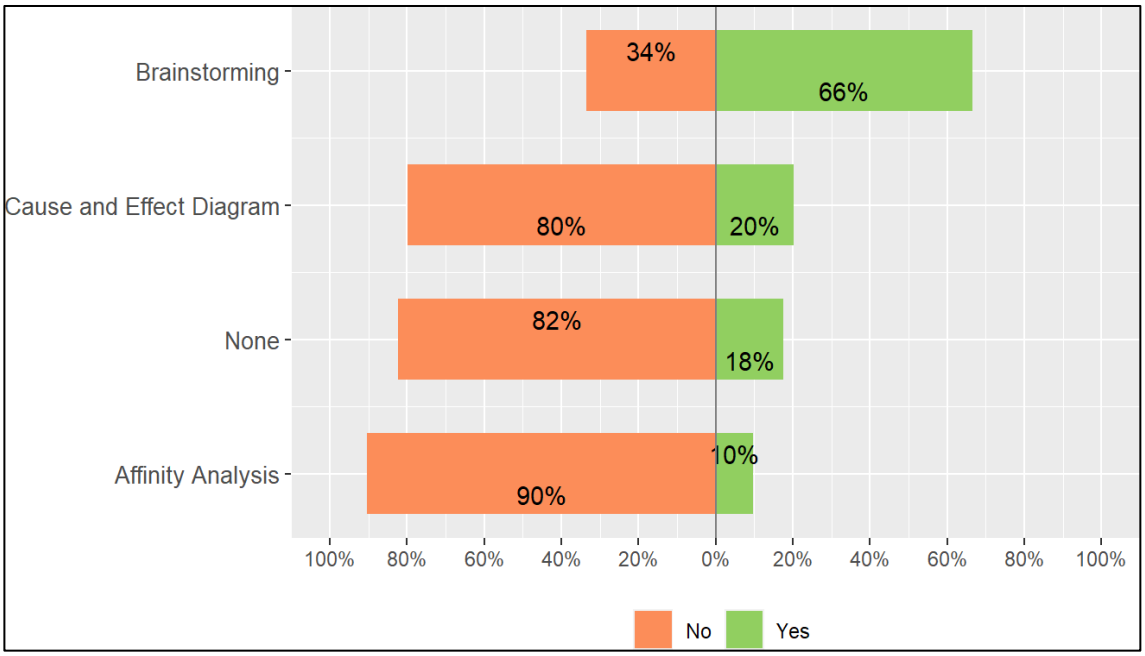


Source: Researcher's own compilation

5.11 FAMILIARITY WITH QUALITY MANAGEMENT TOOLS

In response to Question 23 which was "Which project improvement tools are you comfortable using? 66% (n = 234) of the respondents indicated that they were familiar with the Brainstorming technique.

Figure 5.10: Familiarity with quality improvement tools

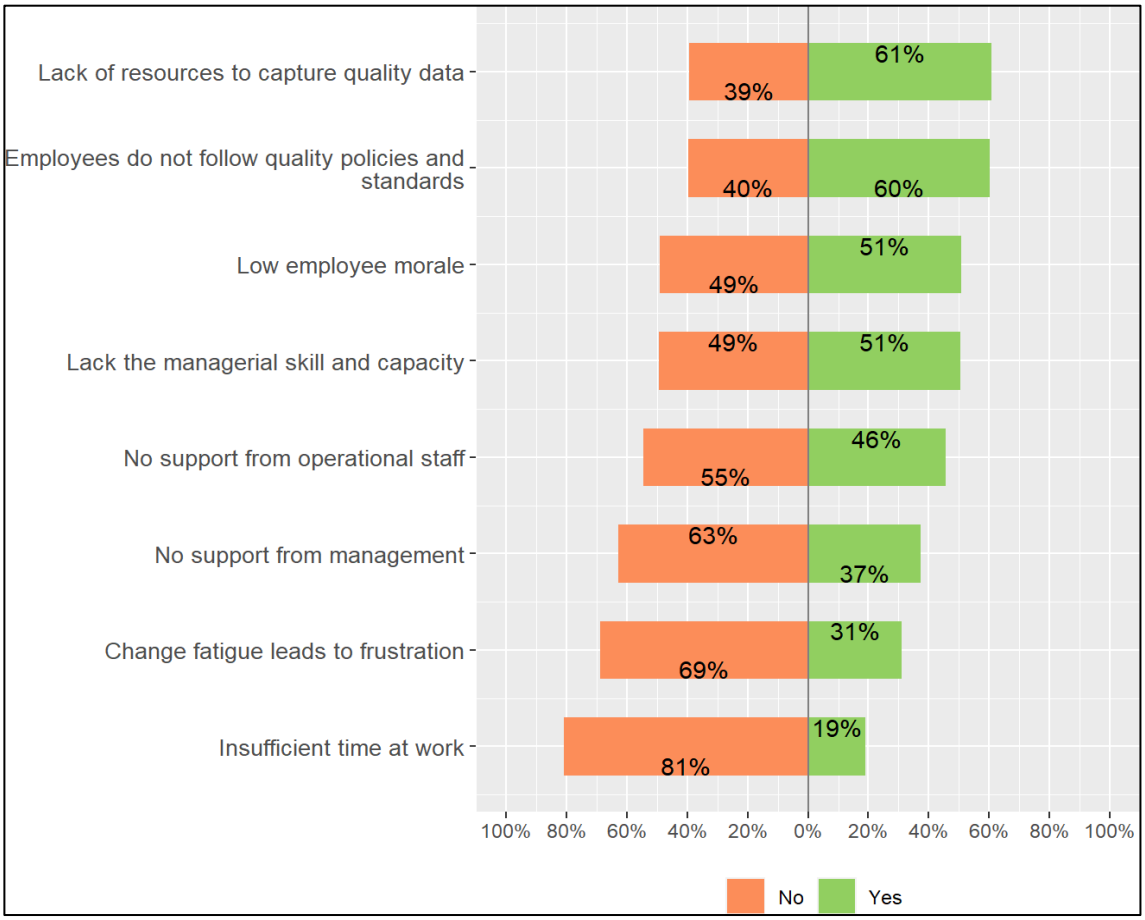


Source: Researcher's own compilation

5.12 FACTORS THAT HINDER IMPLEMENTING QUALITY IMPROVEMENT

Question 26 was "Which of the following hinder you from implementing quality improvement in your workplace?" The respondent could select more than one option as well as add any additional factors or comments in the "Other" option.

Figure 5.11: Factors that hinder implementing quality improvements in the workplace



Source: Researcher's own compilation

5.13 FACTORS THAT ENCOURAGE IMPLEMENTATION OF QUALITIMPROVEMENT

Question 27 was "Which of the following encourage you from implementing quality improvement in your workplace?" The respondent could select more than one option as well as add any additional factors or comments in the "Other" option.

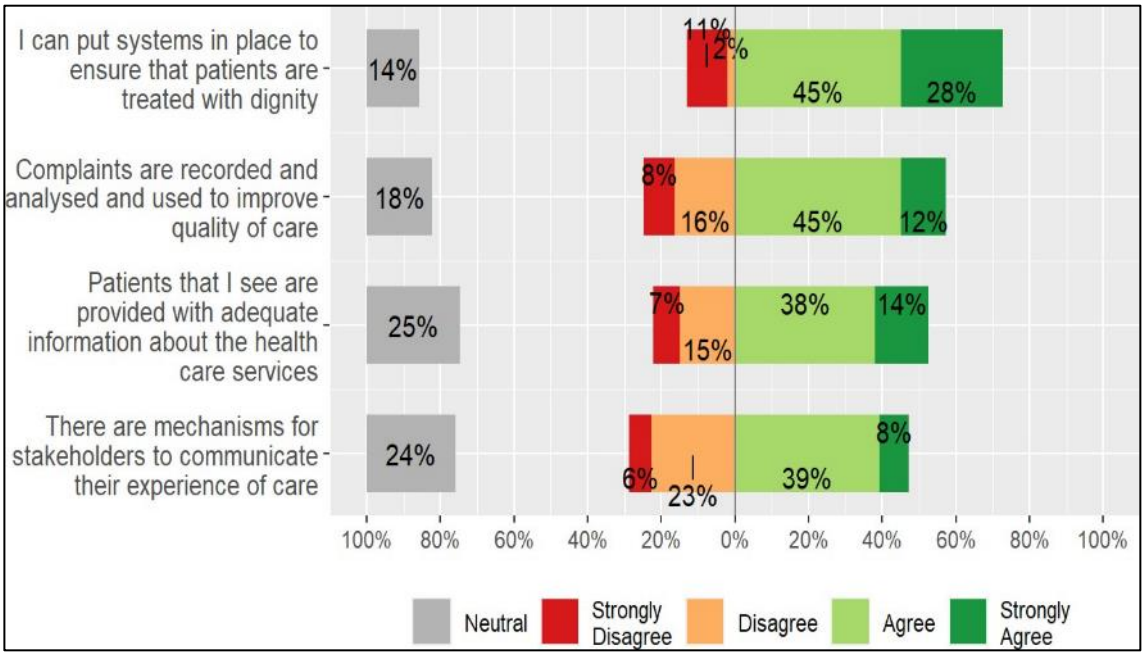
Figure 5.12: Factors that encourage implementing quality improvement in the workplace

Source: Researcher's own compilation

5.14 DOMAIN 1: USER RIGHTS

Survey questions 28 to 31 related to the practices in relation to the EMS standards on healthcare user rights. Respondents could select the level of agreement from a 5-point Likert plot. The options were: Strongly Disagree, Disagree, Neutral, Agree, Strongly Agree.

Figure 5.13: Domain 1: User Rights

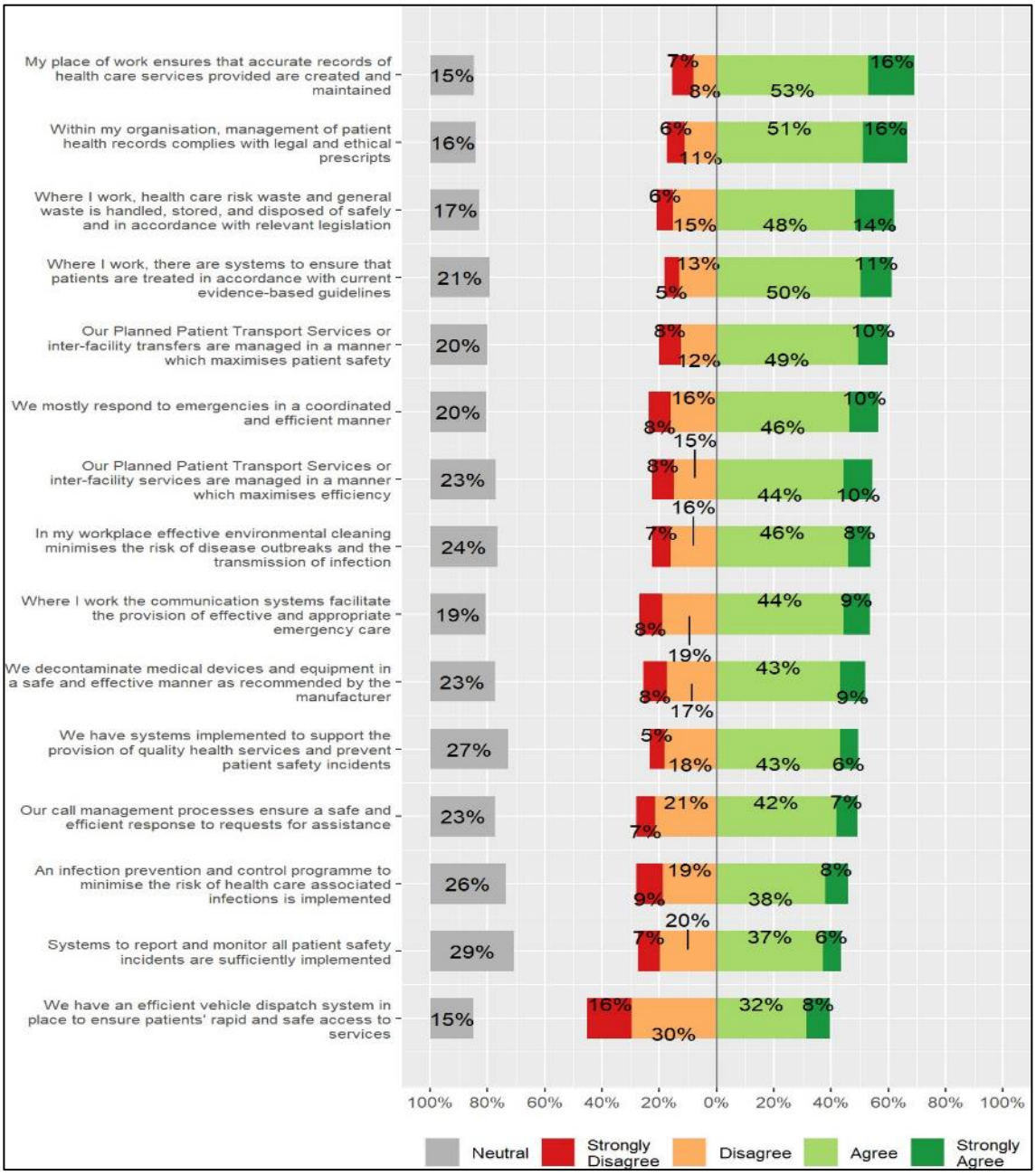


Source: Researcher's own compilation

5.15 DOMAIN 2: CLINICAL GOVERNANCE AND CLINICAL CARE

Survey questions 32 to 46 related to the practices in relation to the EMS standards on clinical governance and clinical care. Of respondents, 61% (n = 212) either selected the options: disagree (n = 104; 30%), Strongly Disagree (n = 55; 16%), or Neutral (n = 53; 15%) in response to the question "We have an efficient vehicle dispatch system in place to ensure patients rapid and safe access to services".

Figure 5.14: Domain 2: Clinical Governance and Clinical Care

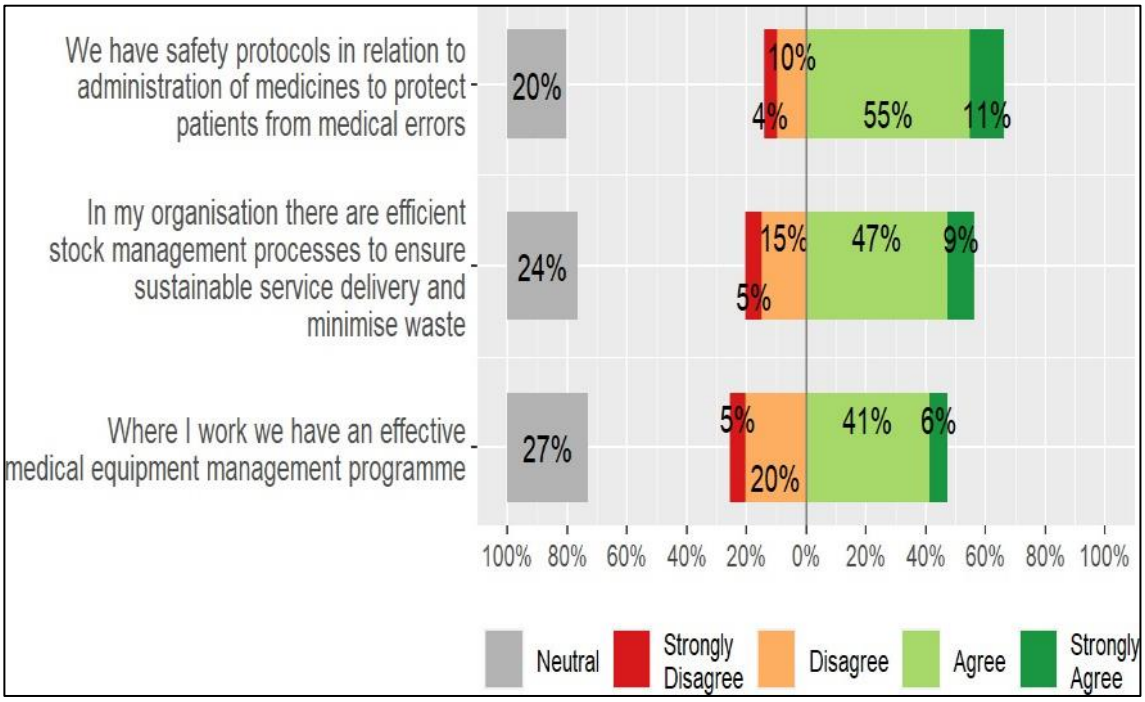


Source: Researcher's own compilation

5.16 DOMAIN 3: CLINICAL SUPPORT SERVICES

Survey questions 47 to 49 related to the practices in relation to the EMS standards on clinical support services.

Figure 5.15: Domain 3: Clinical Support Services

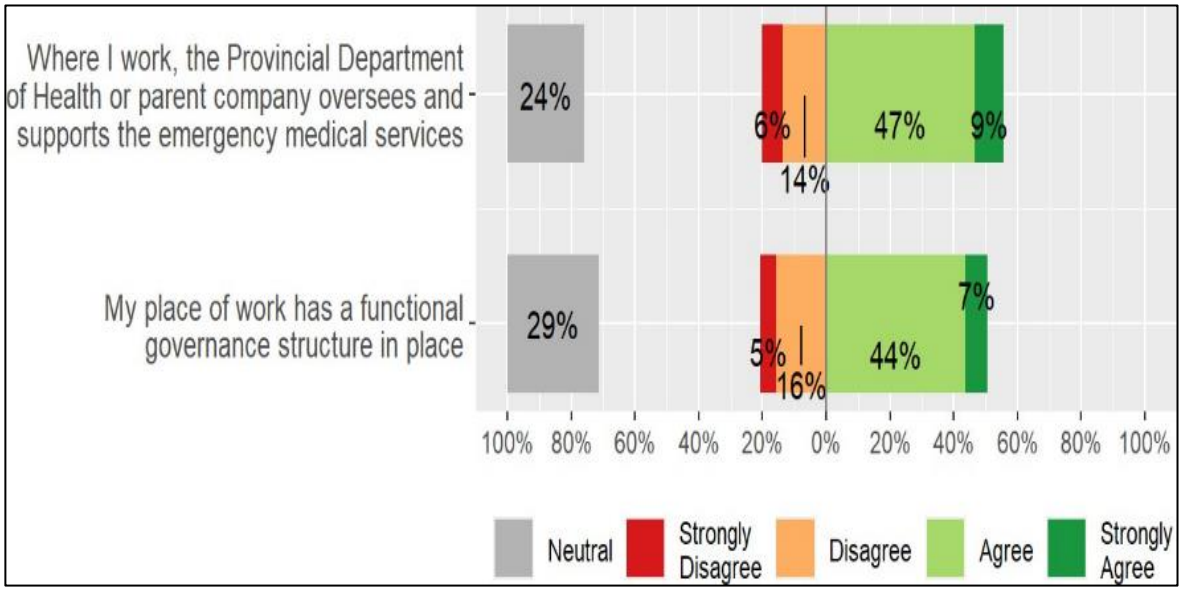


Source: Researcher's own compilation

5.17 DOMAIN 4: LEADERSHIP AND GOVERNANCE

Survey questions 50 to 51 related to the practices in relation to the EMS standards on clinical support services.

Figure 516: Domain 4: Leadership and governance

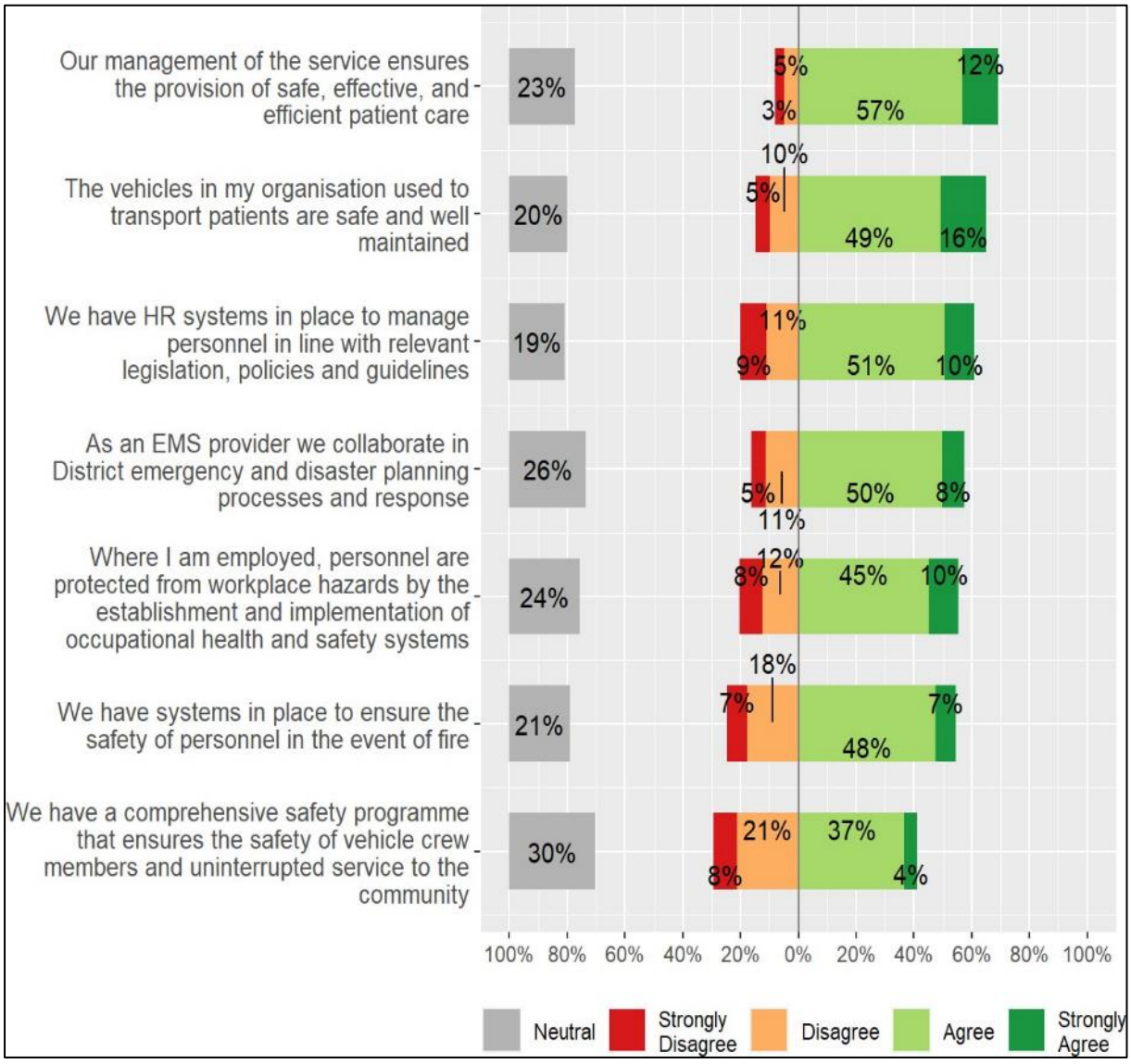


Source: Researcher's own compilation

5.18 DOMAIN 5: OPERATIONAL MANAGEMENT

Survey questions 52 to 58 related to the practices in relation to the EMS standards on operational management.

Figure 5.17: Domain 5: Operational Management



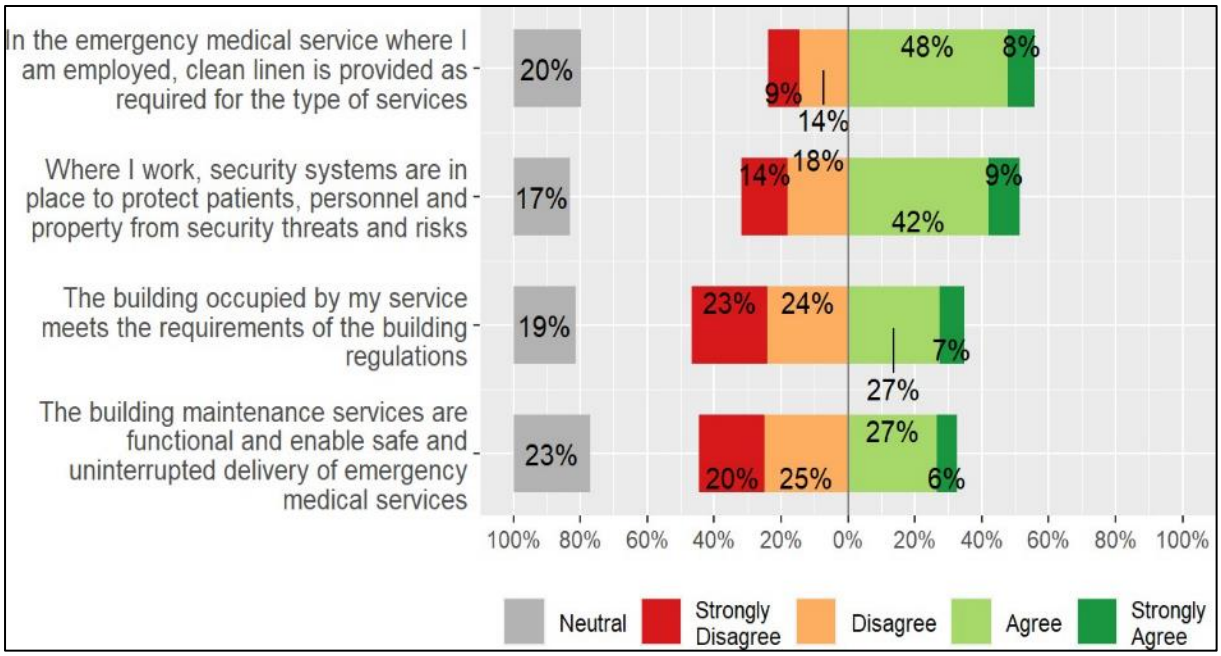
Source: Researcher's own compilation

5.19 DOMAIN 6: FACILITIES AND INFRASTRUCTURE

Questions 59 to 62 related to the practices in relation to the standards of EMS on facilities and infrastructure. In the survey, 66% (n = 228) of respondents selected either the disagree (n = 84; 24%), Strongly Disagree (n = 79; 23%), or Neutral (n = 65; 19%) option is response to the question regarding the building occupied by my services

meets the requirements of the building regulations. Similarly, 68% (n = 235) of respondents selected the disagree (n = 87; 25%), Strongly Disagree (n = 68; 20%), or Neutral (n = 80; 23%) option in response to the question regarding the building maintenance services. The next section will present the statistical analysis of the findings starting with the Knowledge, Attitude and Practice index.

Figure 5.18: Domain 6: Facilities and infrastructure



Source: Researcher's own compilation

5.20 STATISTICAL ANALYSIS PERTAINING TO SURVEY QUESTIONS

5.20.1 Knowledge, Attitude and Practice Index

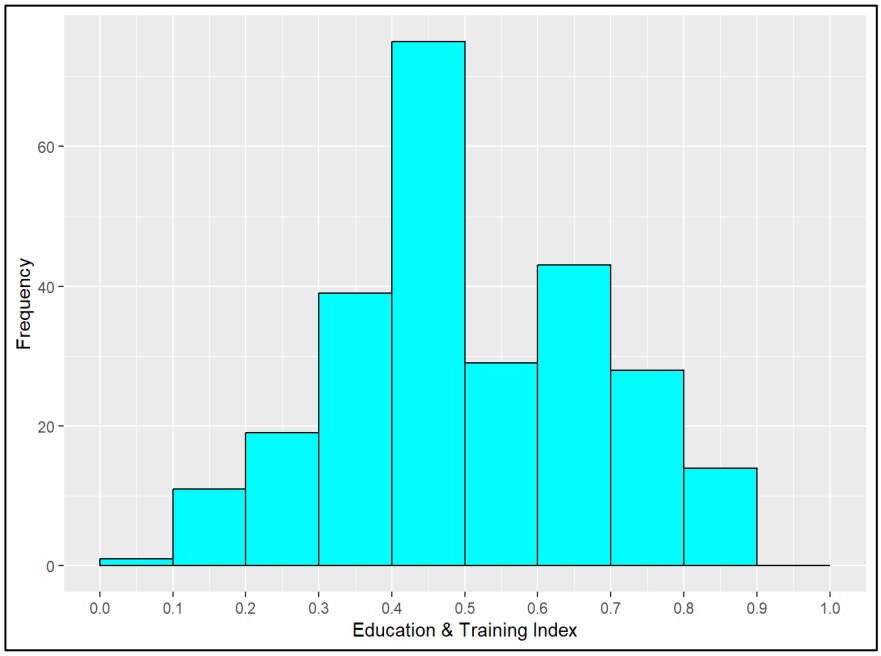
An aggregate knowledge, attitude, and practices (KAP) was obtained from questions 10 to 23 (excluding questions 22 and 23.4) and scoring a *Yes* as 1 and *Unsure* or *No* as 0. The scores from the 18 individual items were summed and divided by 18 to obtain an aggregate KAP index score between 0 and 1, where 1 represents the highest possible level of education and training and 0 represents the lowest possible.

For this index as well as the EMS Assessment Index discussed below, missing values (non-responses) were handled by imputation. Each missing value was randomly imputed either with the median response in the same column (for that item) or with the

median response in the same row (for that respondent), with equal probability. A histogram of these scores is shown below in Figure 5.19.

The mean KAP index is 0.48 and the median is 0.5. The histogram shows that the distribution is bimodal, with a large spike between 0.4 and 0.5 and a smaller spike between 0.6 and 0.7. This analysis contributes towards the first objective and secondary question of this study which is: what are the knowledge, attitude, and practices of EMS managers in relation to quality improvement.

Figure 5.19: Quality Improvement KAP Index



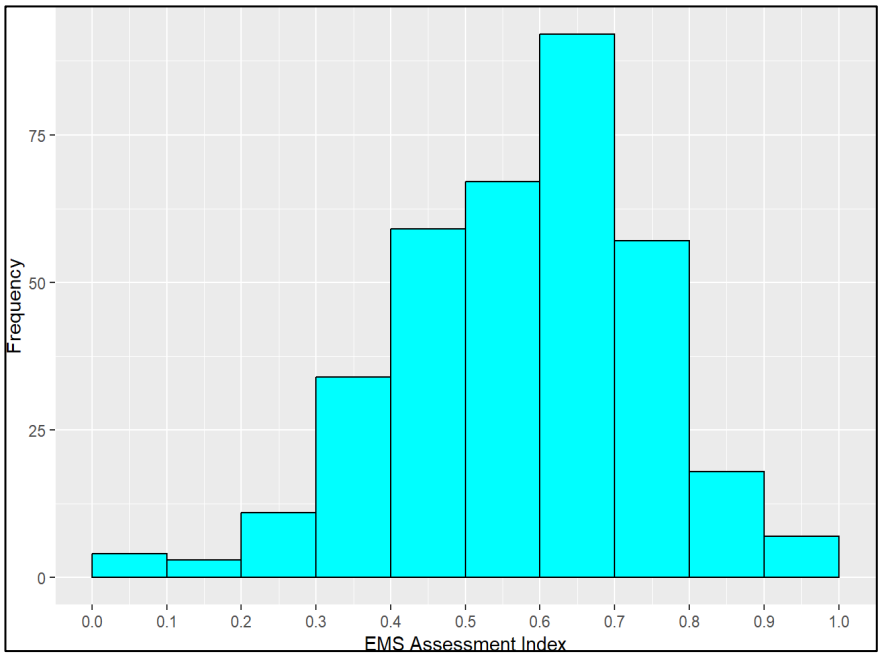
Source: Researcher's own compilation

5.20.2 EMS assessment index of EMS standards

An EMS Assessment conducted using 35 items based on the Regulation Relating to Standards for EMS. These 35 items were scored on a five-point agree/disagree Likert scale and subdivided into six domains: Patient Rights (4 items), Clinical Governance & Clinical Care (15 items), Clinical Support Services (3 items), Leadership & Governance (2 items), Operational Management (7 items), and Facilities & Infrastructure (4 items).

All the items were designed such that agreement corresponds to the desired outcome and disagreement to the undesired outcome. Thus, an EMS Assessment Index was constructed from these 35 items by assigning each item a score of 4 for strongly agree, 3 for agree, 2 for neutral, 1 for disagree, and 0 for strongly disagree. The total score was summed over the 35 items and divided by 140 (the highest possible total), again resulting in an index score between 0 and 1, where 1 represents the highest possible agreement with compliance of the standards and 0 the lowest possible.

Figure 5.20: Assessment of knowledge of the standards for EMS



Source: Researcher's own compilation

The mean EMS Assessment Index score is 0.58 and the median is 0.6. The histogram shows that the distribution is unimodal, with a mode between 0.6 and 0.7. It is slightly left-skewed, with a Fisher's skewness coefficient of -0.4.

Using Kendall's nonparametric correlation coefficient method, a positive correlation of 0.21 is detected between the Education & Training Index and the EMS Assessment Index, which is statistically significant (p-value: 1.4×10^{-8}). This suggests that a higher level of education and training is positively associated with EMS performance in terms of the national standards.

Cronbach's Alpha (Cronbach, 1951) is a measure of the internal consistency of a multi-item scale. Cronbach's Alpha is thus comparing the level of similarity between scale items (measured by $\bar{c}$) to the amount of variation among the responses to each scale item (measured by $\bar{v}$). The values of the Cronbach's Alpha statistic range between 0 and 1, and a conservative threshold is that it should be at least 0.7 for the scale to be considered reliable in terms of internal consistency (Ebrahim & Bowling, 2005).

For the EMS Assessment Index, the Cronbach's Alpha score is α=0.95, which is well above the minimum threshold for acceptability.

Table 5.1: Cronbach's Alpha of the six domains

Domain	**Cronbach's Alpha**
Patient Rights	0.76
Clinical Governance and Clinical Care[55]	0.92
Clinical Support Services	0.78
Leadership and Governance	0.54
Operational Management	0.87
Facilities and Infrastructure	0.77

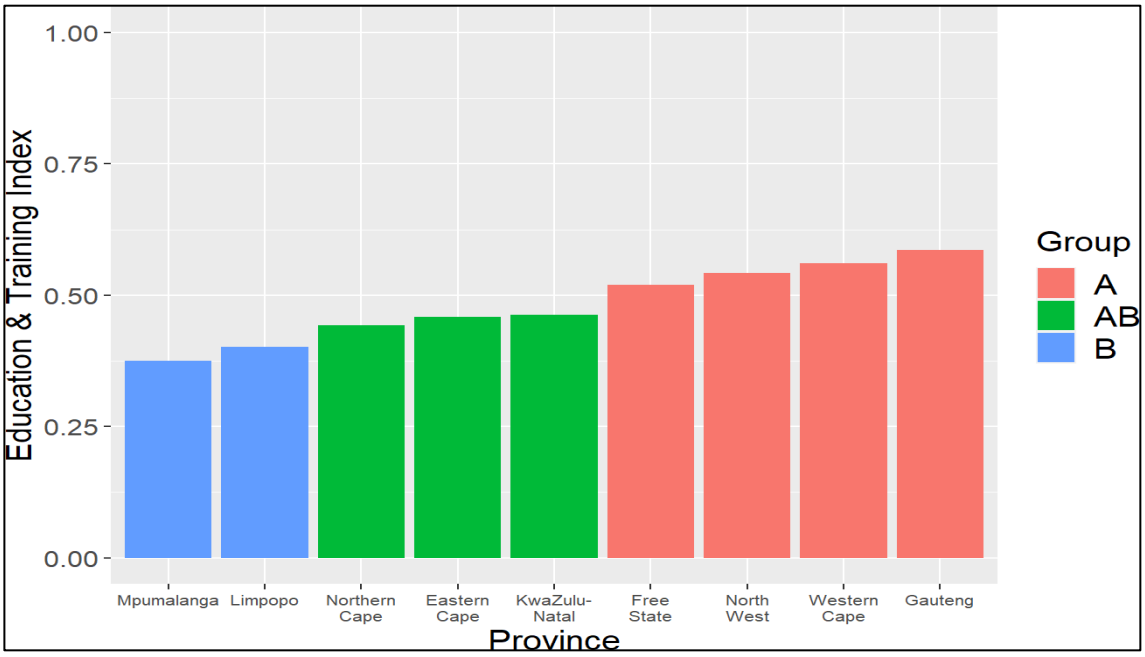
Source: Researcher's own compilation

Taking the Cronbach's Alpha of the subscales comprising the six domains, all of them have a Cronbach's Alpha above 0.7 except for Leadership and Governance at 0.57. This may be because of the small size of the subscale (only two items).

5.20.3 Mean index differences by province

[55] Clinical Governance and Clinical Care score was high in comparison with the other domains.

Figure 5.21: Education and Training Index differences by province

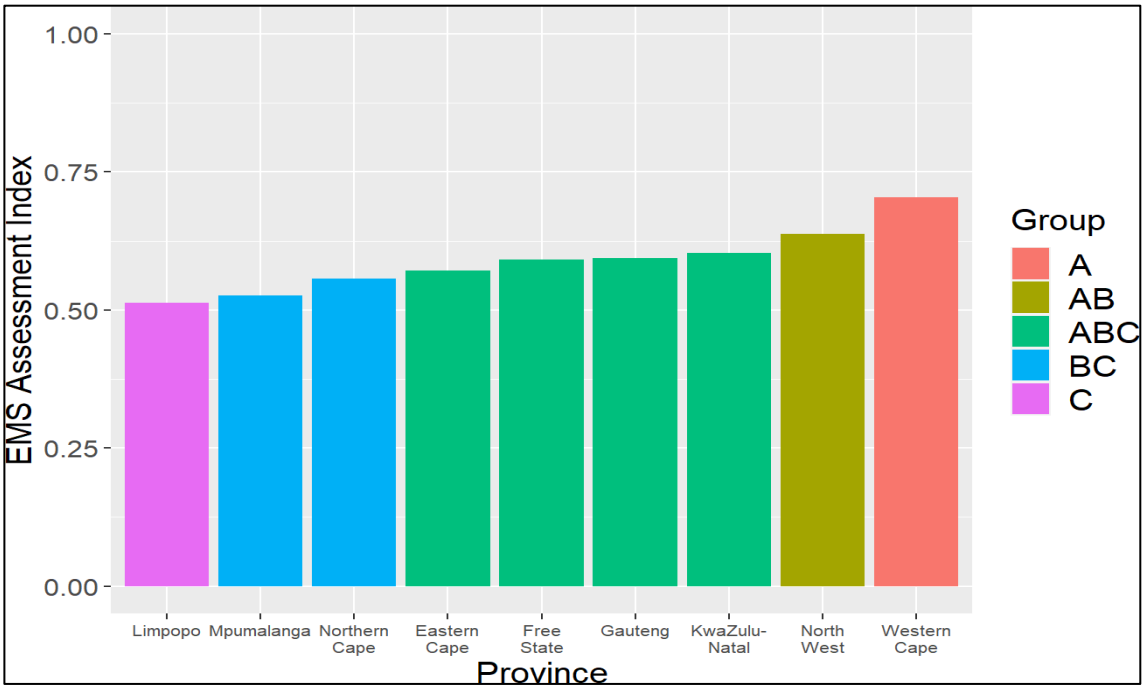


Source: Researcher's own compilation

Analysis of Variance (ANOVA) was used to test for any differences between mean Education & Training Index scores of the various provinces. The ANOVA p-value of 7.9×10^{-8} indicates that there is at least one statistically significant difference among the means. Multiple comparison analysis is therefore undertaken by Tukey's Honestly Significant Difference method.

Figure 5.21 shows the mean Education & Training Index score per province. The bar colours indicate groupings. The means of groups that share the same letter are not significantly different. Thus, in this case, the mean Education & Training Index score is lower in Mpumalanga and Limpopo than in Free State, North West, Western Cape, and Gauteng. There are no significant differences between any other provinces.

Figure 5.22: Differences between the EMS assessment index score of the provinces



Source: Researcher's own compilation

Analysis of Variance (ANOVA) was likewise used to test for any differences between mean EMS Assessment Index scores of the various provinces. The ANOVA p-value of 9.4×10^{-5} indicates that there is at least one statistically significant difference among the means. Multiple comparisons done using Tukey's Honestly Significant Difference Test show four significant differences: Limpopo differs from North West and from Western Cape, while Mpumalanga and Northern Cape differ from Western Cape.

5.20.4 Standard deviation of education and training by province

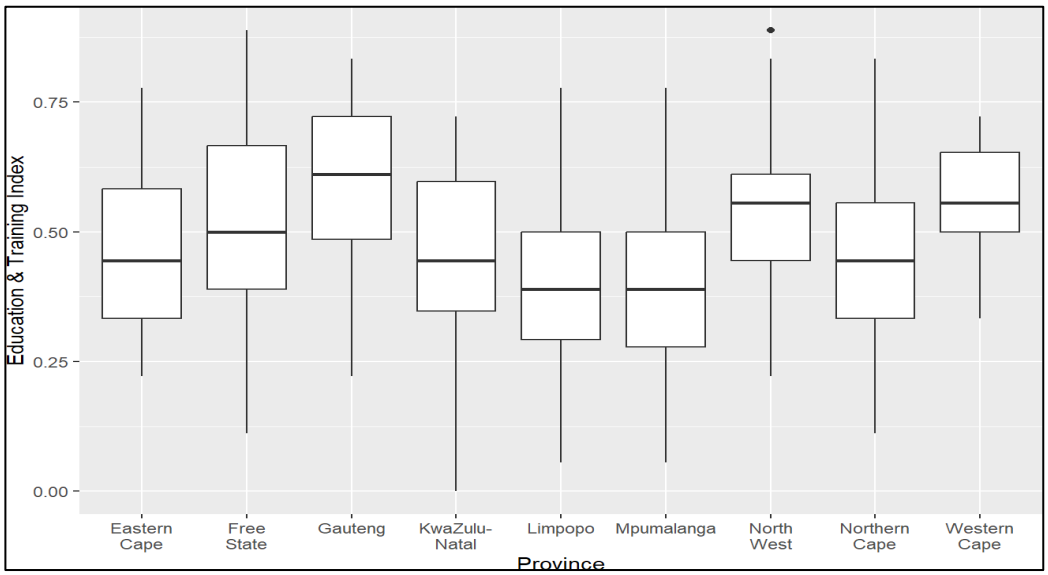
Box-and-Whisker Plots display a five-point summary of the numerical variable (index) for each province. The top and bottom of the whiskers represent the maximum and minimum respectively (except that any point classified as an outlier will be plotted separately outside the whiskers). The top and bottom of the box represent the third and first quartiles, and the horizontal line bisecting the box denotes the median. The standard deviations of Education & Training Index scores per province are also shown.

Table 5.2: Standard deviation of Education and Training Index by province

Province	Std. Deviation
Free State	0.1972684
Gauteng	0.1646812
KwaZulu- Natal	0.1443146
North West	0.1739761
Northern Cape	0.1856386
Western Cape	0.1096586
Eastern Cape	0.1822378
Limpopo	0.1548290
Mpumalanga	0.1590375

Source: Researcher's own compilation

Figure 5.23: Box-and-whisker plot standard deviation Education and Training by province



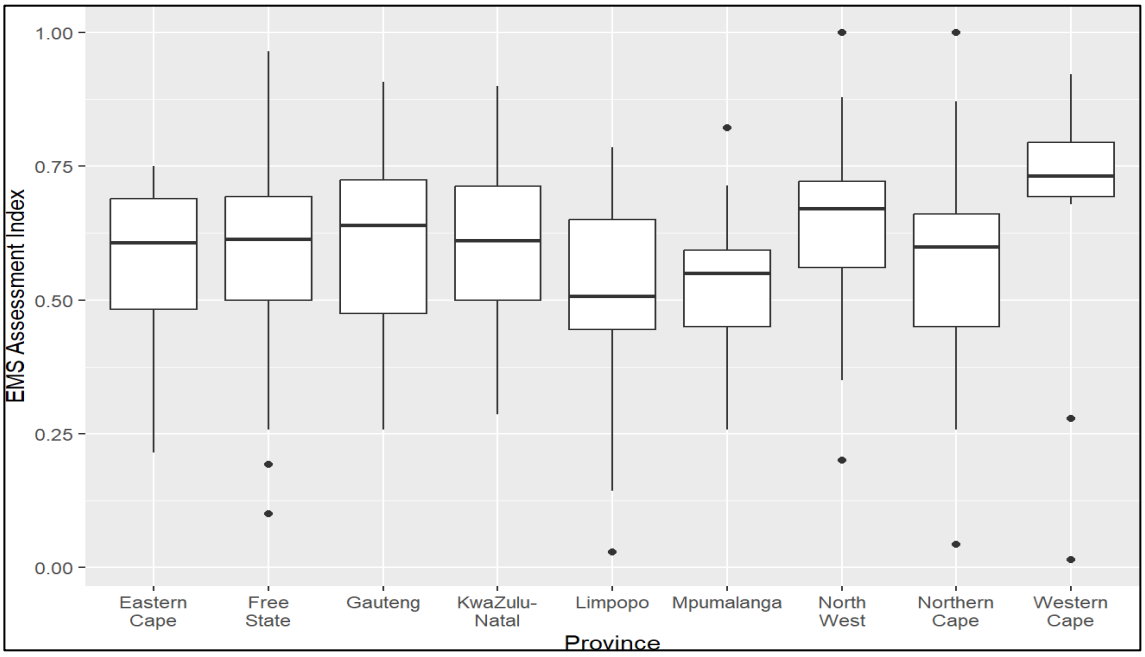
Source: Researcher's own compilation

Table 5.3: Standard deviation of EMS Assessment index by province

Province	Std. Deviation
Free State	0.1586777
Gauteng	0.1918436
KwaZulu-Natal	0.1443146
North West	0.1739761
Northern Cape	0.1951800
Western Cape	0.1983377
Eastern Cape	0.1460166
Limpopo	0.1558788
Mpumalanga	0.1148396

Source: Researcher's own compilation

Figure 5.24: Box-and-whisker plot EMS Assessment index per province

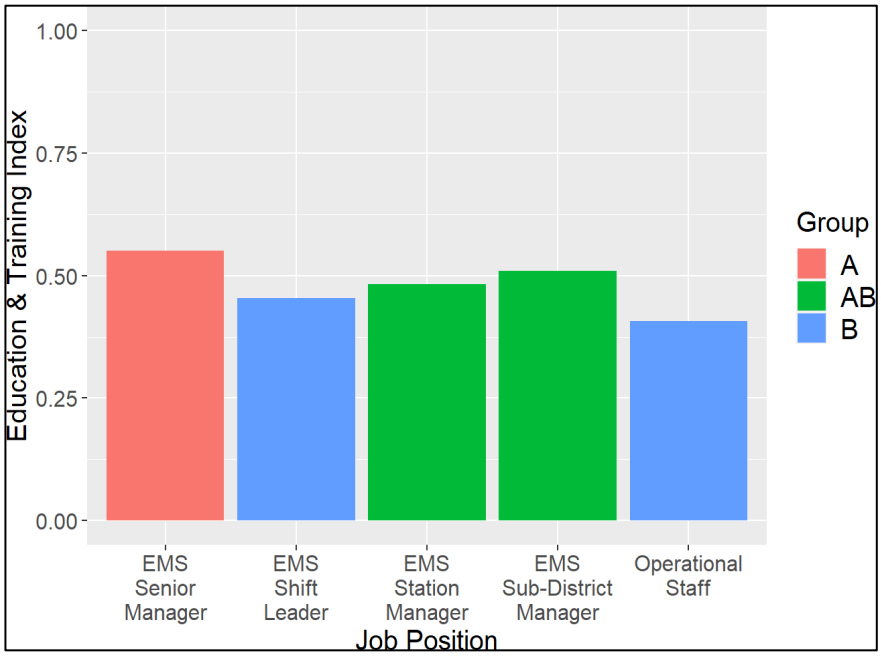


Source: Researcher's own compilation

5.20.5 Mean index differences by job position

Due to the low frequencies of some job positions, the categories were combined as follows: District, Operational, and Provincial Managers were combined into one EMS Senior Manager category, while Emergency Care Officer, Emergency Care Technician, Paramedic, and Emergency Care Practitioner were combined into one Operational Staff category. The job post "Other" was omitted for purposes of this analysis, leaving five categories each containing at least 18 respondents.

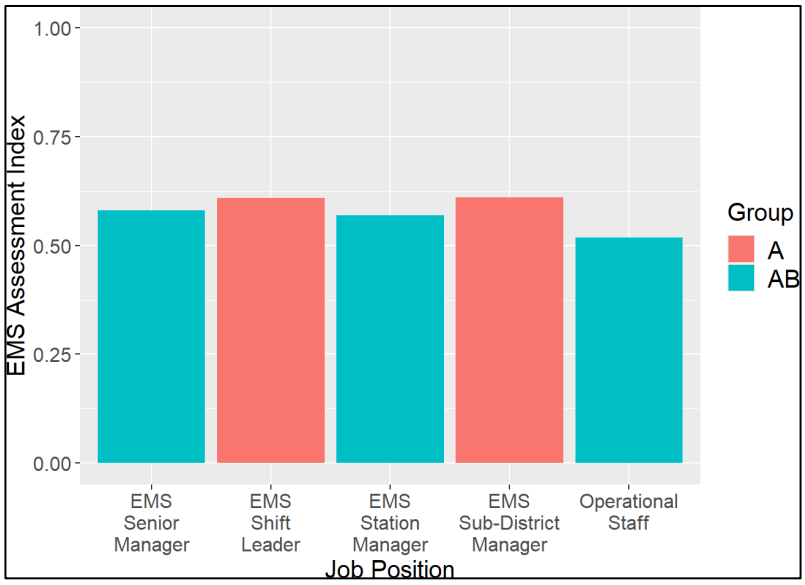
Figure 5.25: Education and training per job position



Source: Researcher's own compilation

The ANOVA p-value is above the 5% significance level (0.0038). Thus, there are significant differences in mean Education & Training Index score between job positions. Using Tukey HSD Test, we can be more specific and say that the mean Education & Training Index score of EMS Senior Managers differs from that of EMS Shift Leaders and of Operational Staff.

Figure 5.26: EMS Assessment Index and Job Position



Source: Researcher's own compilation

For the EMS Assessment Index across job levels, the ANOVA p-value is marginally above the 5% significance level (0.049). Tukey's HSD Test (as seen in the figure) does not actually identify any individual job positions as having significantly different EMS Assessment Index scores.

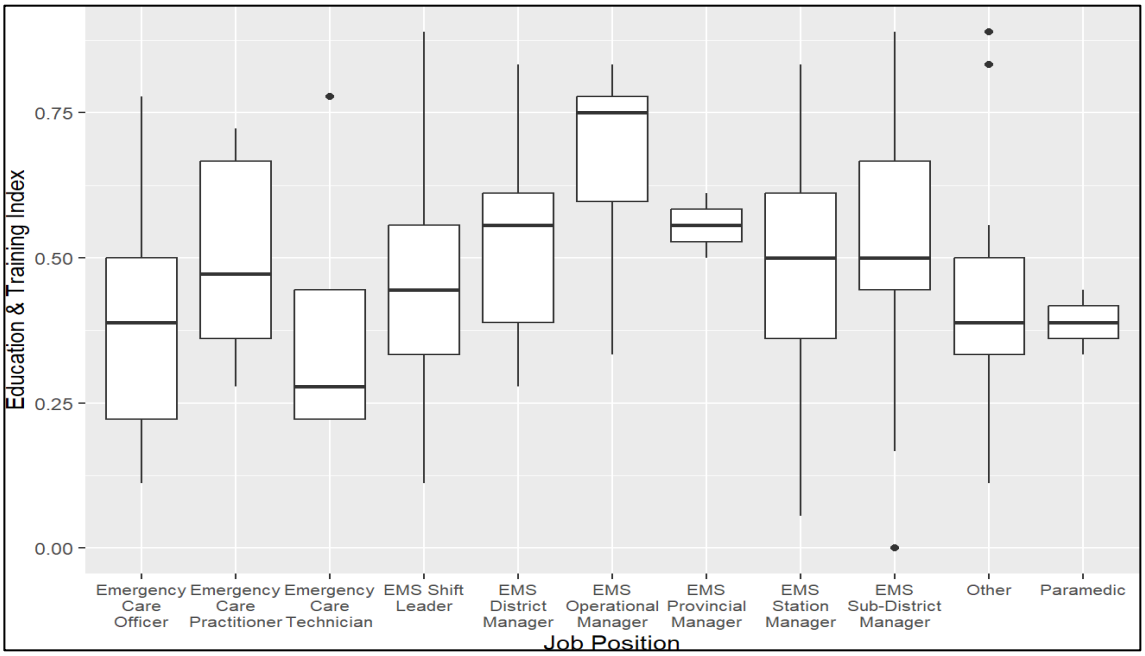
Box-and-whisker plots were constructed for the two indices by job position, and in this case all job position categories were left as is. It is evident from the box-and-whisker plot that Operational Managers have consistently high Education & Training Index scores.

Table 5.4: Standard Deviation of Education and Training Index by Job Position

Job Position	Std. Deviation
Emergency Care Officer	0.2044838
Emergency Care Technician	0.2357023
Paramedic	0.0785674
Emergency Care Practitioner	0.1892154
EMS Shift Leader	0.1672811
EMS Station Manager	0.1811710
EMS Sub-District Manager	0.1899896
EMS District Manager	0.1318503
EMS Operational Manager	0.1892154
EMS Provincial Manager	0.0785674
Other	0.1961237

Source: Researcher's own compilation

Figure 5.27: Box-and-whisker plot Education and Training Index scores by job position



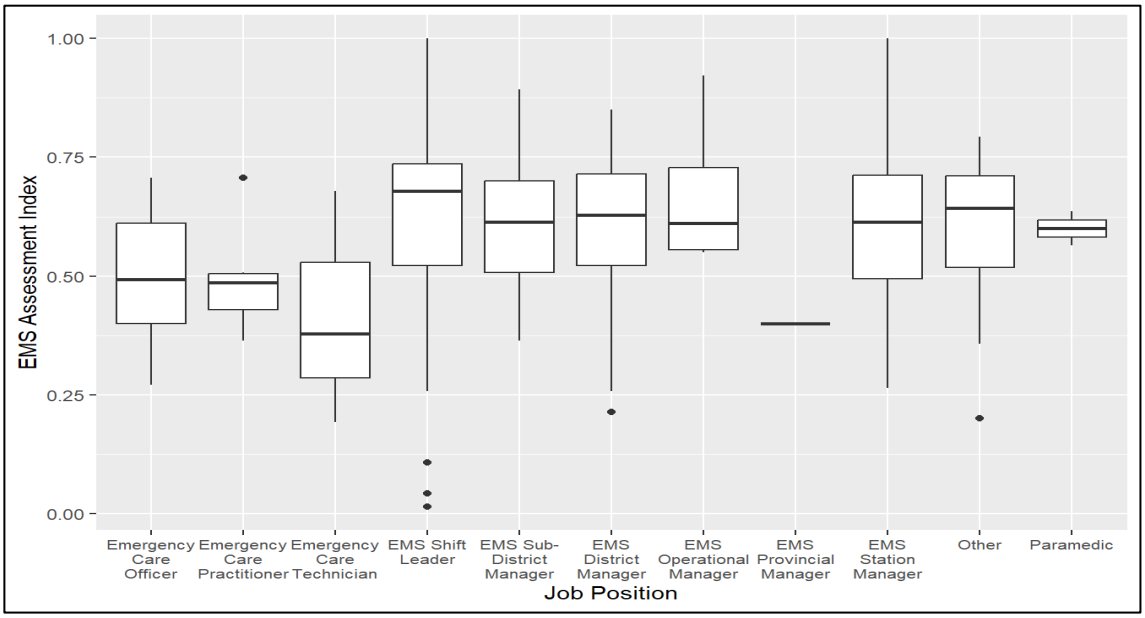
Source: Researcher's own compilation

Table 5.5: Standard Deviation of EMS Assessment Index by Job Position

Job Position	Std. Deviation
Emergency Care Officer	0.1708771
Emergency Care Technician	0.1912899
Paramedic	0.0505076
Emergency Care Practitioner	0.1177525
EMS Shift Leader	0.1934905
EMS Station Manager	0.1480575
EMS Sub-District Manager	0.1330843
EMS District Manager	0.1614665
EMS Operational Manager	0.1955978

Source: Researcher's own compilation

Figure 5.28: Box-and-whisker plot EMS Assessment Index by job position

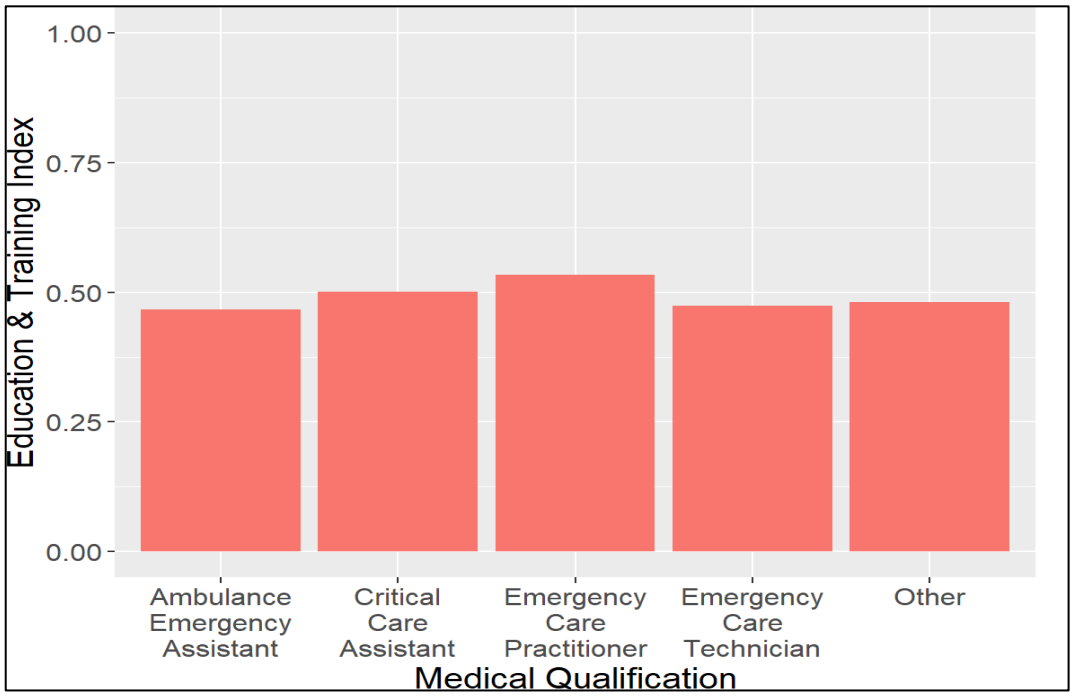


Source: Researcher's own compilation

5.20.6 Mean index differences by medical qualification

Due to the low frequencies of some medical qualifications, the categories were combined as follows: National Diploma Paramedic, Basic Ambulance Assistant, and others were put into a broader 'Other' category.

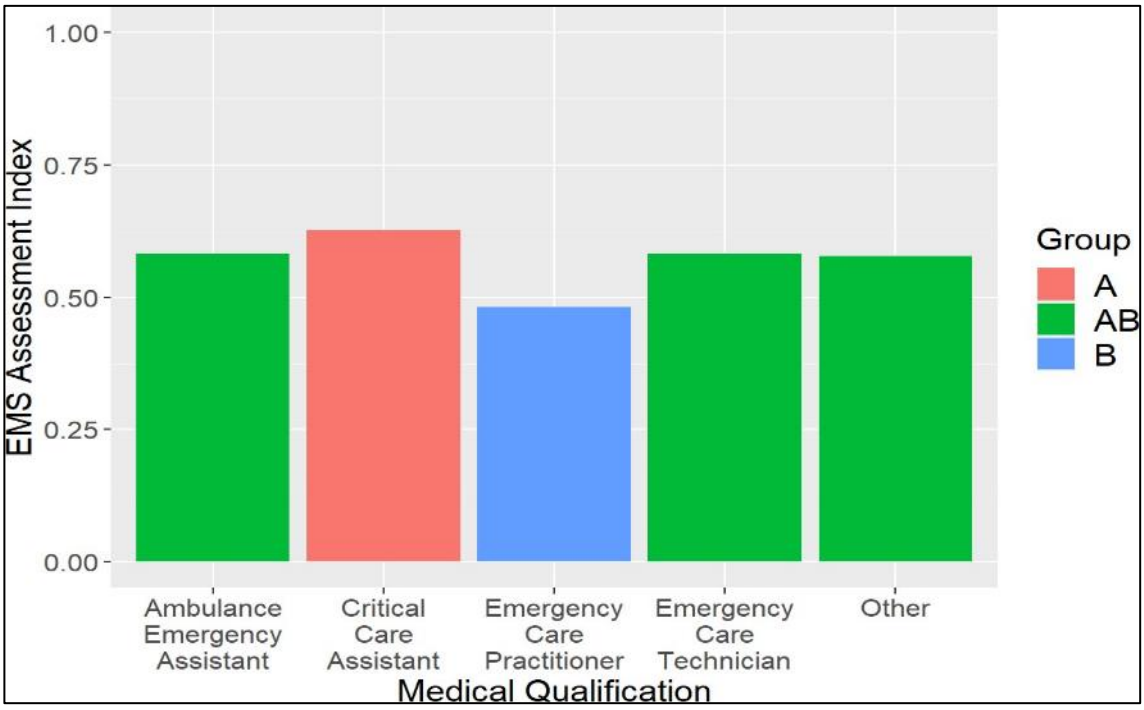
Figure 5.29: Education and training index by qualification



Source: Researcher's own compilation

The ANOVA p-value is well above the 5% significance level (0.49). Thus, there are no significant differences in mean Education & Training Index score between medical qualifications.

Figure 5.30: EMS assessment index by qualification



Source: Researcher's own compilation

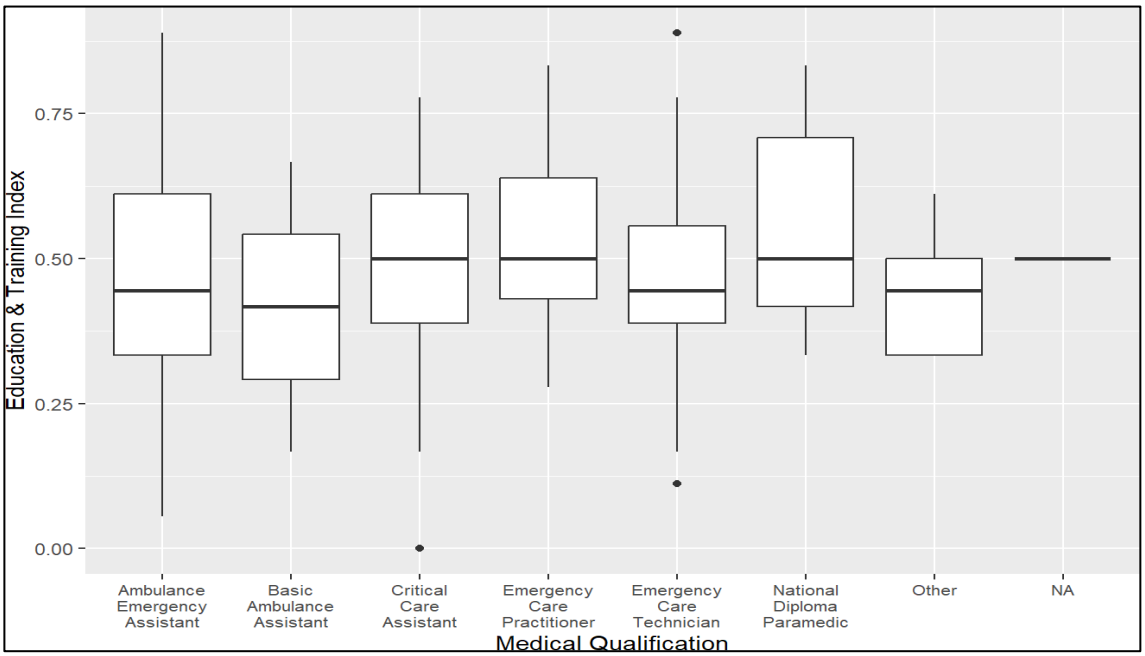
For the EMS Assessment Index across medical qualifications, the ANOVA p-value is below the 5% significance level (0.038). Tukey's HSD Test (as seen in the figure) identifies only one significant difference in mean EMS Assessment Index scores: those with CCA as their qualification score higher than those with ECP as their qualification. Box-and-whisker plots were constructed for the two indices by medical qualification, and in this case all medical qualification categories were left as is. No striking patterns emerge from the plot, except that ECPs tend to have quite low EMS Assessment Index scores.

Table 5.6: Standard deviation of Education and Training Index by medical qualification

Medical Qualification	Std. Deviation
Basic Ambulance Assistant	0.2151657
Ambulance Emergency Assistant	0.1833716
Critical Care Assistant	0.1815142
Emergency Care Technician	0.1657836
National Diploma Paramedic	0.2048788
Emergency Care Practitioner	0.1626215
Other	0.1178511
NA	NA

Source: Researcher's own compilation

Figure **5.31:** Box-and-whisker Education and Training index by qualification



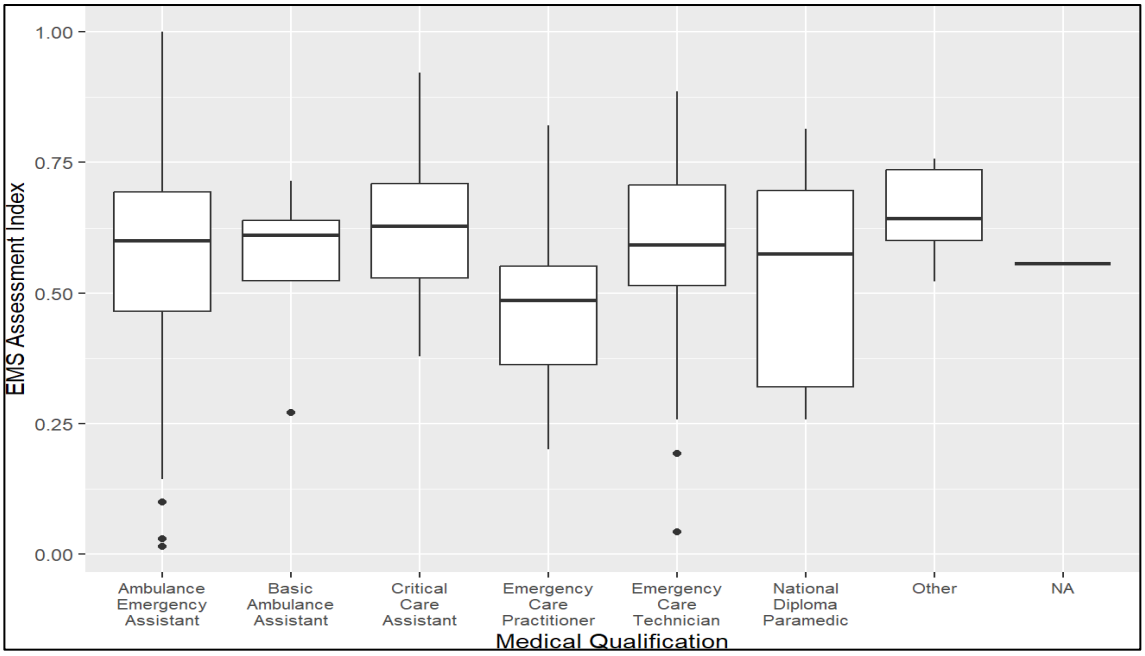
Source: Researcher's own compilation

Table 5.7: Standard deviation of EMS Assessment by qualification

Medical Qualification	Std. Deviation
Basic Ambulance Assistant	0.1931986
Ambulance Emergency Assistant	0.1685219
Critical Care Assistant	0.1303574
Emergency Care Technician	0.1724077
National Diploma Paramedic	0.2354652
Emergency Care Practitioner	0.1620740
Other	0.0973370
NA	NA

Source: Researcher's own compilation

Figure 5.32: Box-and-whisker EMS assessment index by qualification



Source: Researcher's own compilation

5.20.7 Mean index differences by years of experience

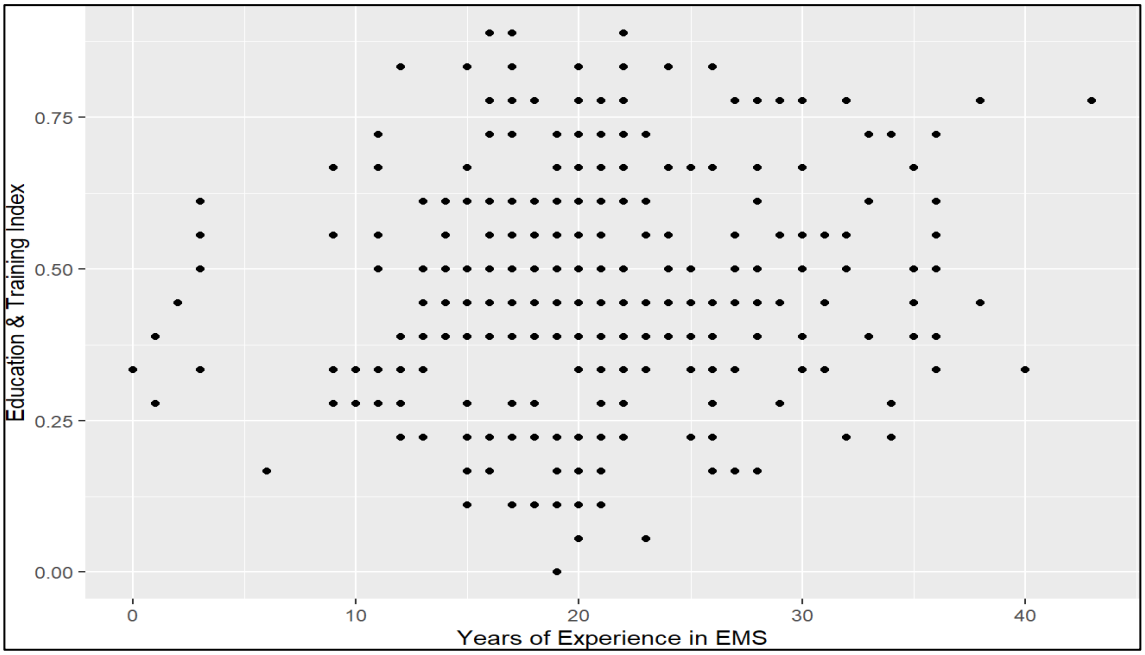
Since years of experience is a numerical variable, the statistical method of analysis in this case will not be ANOVA but linear regression.

Table 5.8: Mean Index Difference by years of experience

term	Estimate	std.error	statistic	p.value
(Intercept)	0.4175521	0.0301833	13.83389	0.0000000
Tenure.EMS	0.0029116	0.0013833	2.10483	0.0360268

Source: Researcher's own compilation

Figure 5.33: Scatter plot relationship between years of experience and Education and Training Index score



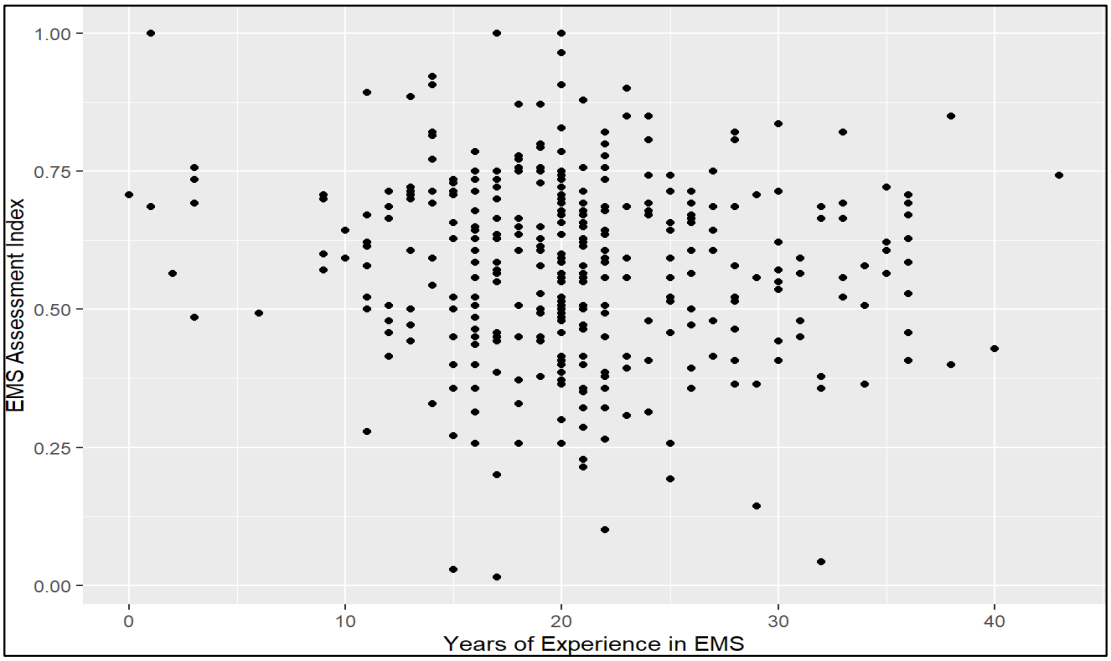
Source: Researcher's own compilation

The scatter plot does not show any obvious relationship between years of experience and Education & Training Index score, but the linear regression model does find a significant relationship (p-value: 0.036), which appears to be positive (since the estimate is positive). Thus, more tenured staff tend to have higher Education & Training index scores.

term	estimate	std.error	statistic	p.value
(Intercept)	0.6262995	0.0282020	22.20765	0.0000000
Tenure.EMS	-0.0021208	0.0012925	-1.64080	0.1017476

Source: Researcher's own compilation

Figure 5.34: Scatter plot relationship between years of experience and EMS index score

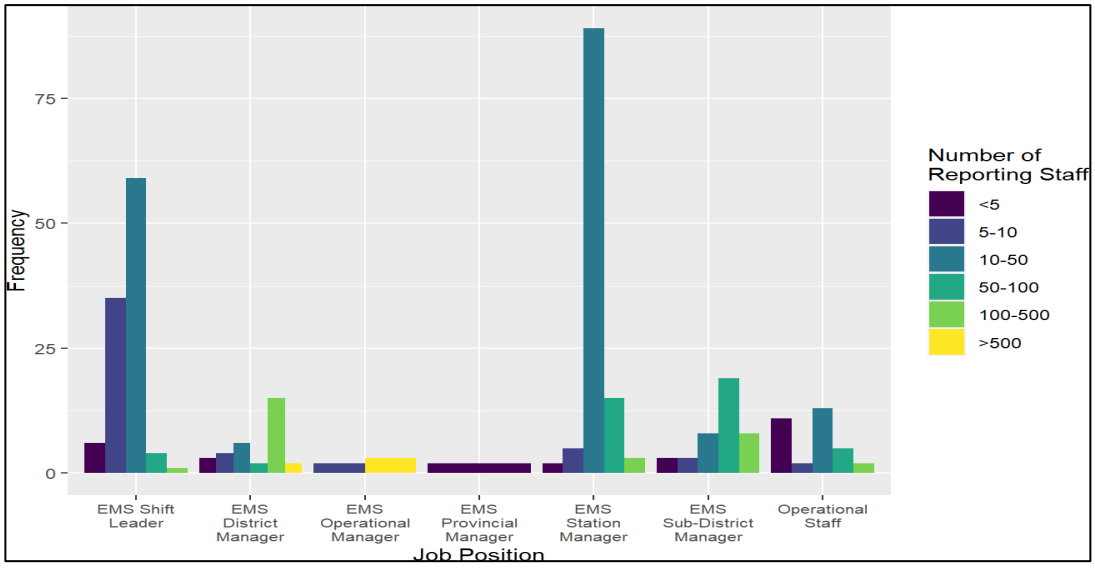


Source: Researcher's own compilation

The scatter plot does not show any obvious relationship between years of experience and EMS Assessment Index score, and the linear regression model does not pick up a significant relationship (p-value: 0.1).

5.20.8 Analysis of position held in organisation and number of staff reporting

Figure 5.35: Position held in organisation and number of staff reporting



Source: Researcher's own compilation

The fact that the one Provincial Manager who responded indicated less than five reports indicates that the reporting of the operational staff lies with the District Managers. The district managers would report to the Provincial Manager.

5.20.9 Comparing Education and Training index to prior quality improvement training

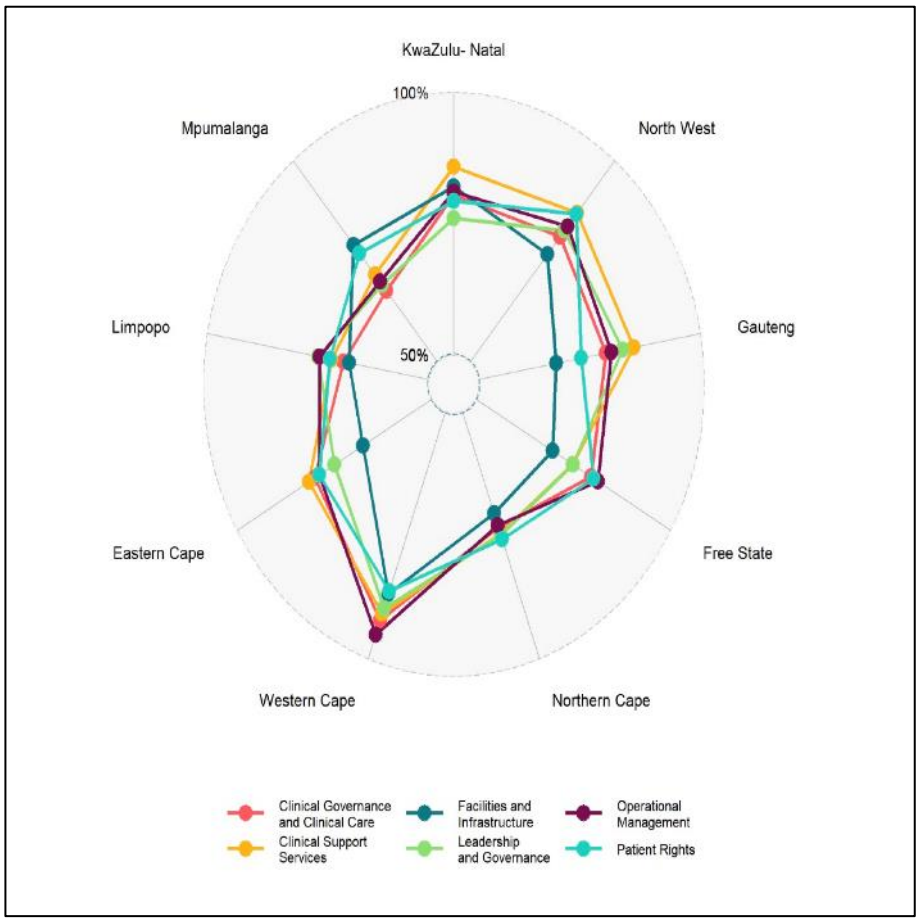
Figure 5.36: Education and Training index and prior quality improvement training

Source: Researcher's own compilation

The ANOVA p-value is 1.6×10^{-11}, so there are statistically significant differences in mean Education and Training Index (with question 18 omitted) between those who answered No, Unsure, or Yes to question 18. As the bar graph indicates, those who answered, 'Yes' to question 18 have a significantly higher mean Education & Training Index score than those who answered 'No' or 'Unsure' (the p-value is < 0.0001).

5.21 RADAR PLOTS OF DOMAINS

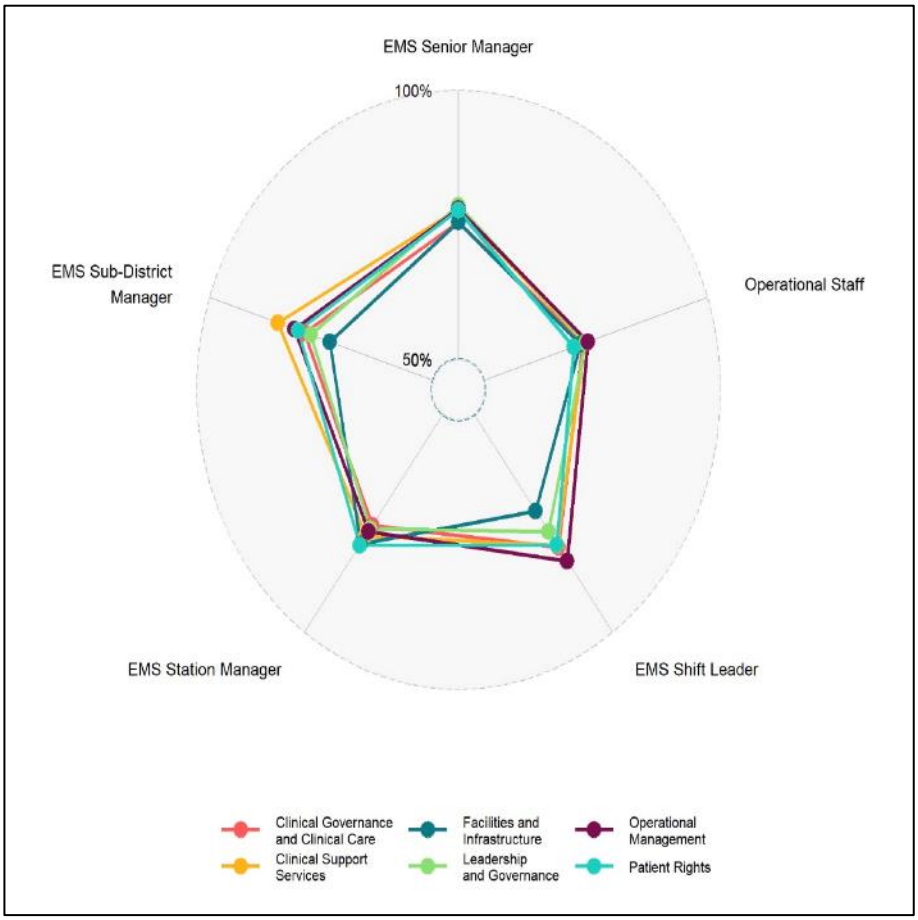
Figure 5.37: Radar Plot Domain Likert Score and province



Source: Researcher's own compilation

The radar plot in Figure 5.37 indicate that the EMS managers in the Western Cape rated for the six domains the highest of the nine provinces. Apart from Mpumalanga province Facilities and Infrastructure was rated low in other provinces in comparison to the other domains.

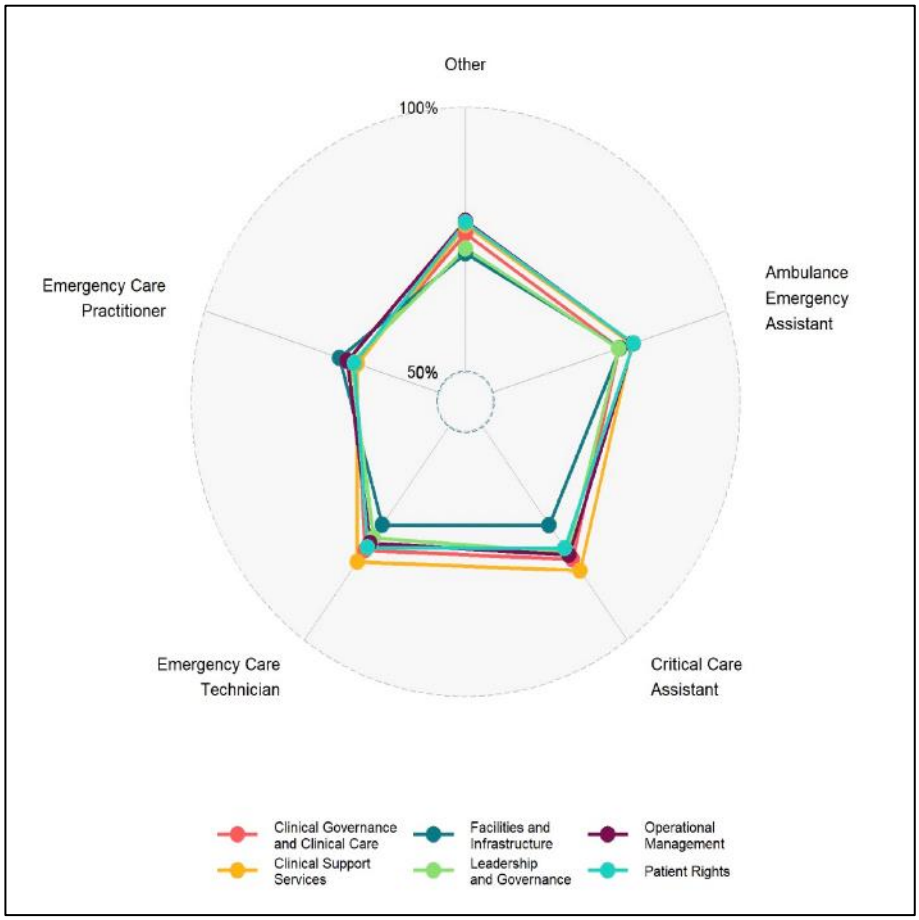
Figure 5.38: Radar Plot Domain Likert Score and Job Title



Source: Researcher's own compilation

The radar plots indicate that the EMS managers Likert rating for the six domains were similar. Facilities and Infrastructure was rated low by the EMS Shift Leaders and Sub-District Managers.

Figure 5.39: Radar Plot of Domain Likert Score and Qualification



Source: Researcher's own compilation

The radar plots revealed that the Emergency Care Practitioners qualified managers Likert rating for the six domains were lower. The Critical Care Assistant and Emergency Care Technicians rated Facilities and Infrastructure lower.

5.22 SUMMARY OF THIS CHAPTER

The quantitative survey was administered to 352 public EMS managers in all nine provinces. The purpose of the survey was to obtain biographic data, evaluate the KAP of EMS managers in relation to quality improvement, and evaluate their KAP in relation to the standards for EMS as stipulated in the Regulation Relating to Standards for EMS. The biographic findings revealed that the mean age of the EMS manager was 46 years, that 74.7% (n = 263) were male and 67.5% (n = 237) had an AEA qualification. Only 17% (n = 128) indicated that they had been trained to manage quality and 85% (n = 300) indicated that they lacked the resources to implement quality improvement.

The survey revealed that the mean Education and Training Index was lower in the rural provinces Mpumalanga and Limpopo, with the more tenured staff having higher Education and Training Scores. The Operational Managers had consistently higher Education & Training Index scores. The EMS managers in the Western Cape rated the domains higher than other provinces. EMS managers holding Critical Care Assistant qualifications rated the domains higher than those managers qualified as Emergency Care Practitioners.

The deeper meaning of the quantitative findings will be explored further in the chapters that follow.

CHAPTER SIX
QUALITATIVE DATA ANALYSIS

6.1 INTRODUCTION

The previous chapter presented the quantitative survey data on the knowledge, attitudes, and practices of EMS managers in relation to the regulations relating to EMS standards. Consistent with the sequential explanatory mixed methods design, this chapter will delve deeper into contextual meanings of the qualitative data. The data was collected during the non-participant observations of the EMS workshop[56] participants and interviews with key stakeholders, such as the directors and deputy directors from the National Department of Health, provincial government, and the Office for Health Standards Compliance. The analysis was done through a thematic analysis of the researcher's notes and transcriptions, non-participant (workshop) observations and interviews with key informants.

The aim of this study was to potentiate eligibility and compliance with the Office for Health Standards Compliance (OHSC) quality standards for Emergency Medical Services (EMS). This chapter contributes to the intention to recontextualise the quality improvement discourse through the construction of a quality improvement framework. This framework should strengthen the public service EMS manager's response to the OHSC quality standards for EMS.

Each of the themes that emerged from the thematic analysis of the qualitative data is discussed to answer the second objective which was to observe, investigate and document the quality champions perspectives on the application of the OHSC standards and implications of non-compliance. The secondary questions that follow from the objective were:

1. What are the knowledge, attitudes and practices of EMS managers who are quality champions, in the public EMS organisations in relation to quality improvement?

[56] The workshops were held to engage and share information on the Regulations Relating to Standards for EMS.

2. How do EMS managers perceive, interpret, and understand the regulations relating to standards for EMS?
3. What are the factors that motivate and foster quality improvement amongst EMS managers within EMS organisations?
4. What are the benefits, and impediments and opportunity costs to implementing quality improvement in EMS?

6.1.1 Overview of the qualitative analysis

The previous section introduced the chapter. This section will discuss the qualitative analysis that led to the emergence of the themes and sub-themes. The themes and sub-themes are listed for reference in Table 6.2. The next paragraphs will discuss coding and thematic analysis.

6.1.2 Coding

The researcher's notes and transcriptions of the recordings from the non-participant workshops and interviews were entered into ATLAS.ti® 23 (version 23.2.0) software. The transcriptions were read and re-read several times to provide meaning to the data. Using ATLAS.ti® 23 (version 23.2.0), 295 code words and phrases (Appendix I) were symbolically assigned to capture the essence of the data.

6.1.3 Thematic analysis

Thematic analysis was used in the analysis of qualitative data to identify patterns and themes. The literature review and survey data provided the initial a priori themes that guided the thematic analysis. Braun & Clarke (2014) suggest that unlike other qualitative methodologies, thematic analysis is flexible and not tied to an epistemology. Braun & Clarke's (2006) 6-step framework in Table 6.1 is used to identify patterns in the data that are of interest. These codes are synthesised to form themes that could be interpreted and having meaning. The framework distinguishes between semantic themes, where the analysis is not looking beyond what the participant said, and latent themes where the analysis looks for *underlying* ideas, assumptions, and concepts. The '#P' refers to the interview participant and the '#W' refers to the workshop where the non-participant observation occurred. The qualitative analysis details are presented in Chapter Four.

Table 6.1: 6-Stage thematic analysis framework

Step 1:	Become familiar with your data, by transcribing, reading, and making notes
Step 2:	Generate initial codes in a systematic fashion
Step 3:	Search for themes by gathering data
Step 4:	Review themes by checking if they work in relation to the extracts
Step 5:	Define and name themes
Step 6:	Write-up provides opportunity for analysis related to the research question

Source: Braun & Clarke (2006)

There are six major themes that emerged from the thematic analysis of the qualitative data. The first theme discusses the complex historical influences that shaped public EMS in South Africa. The second major theme relates to the impact of the human resource challenges on EMS quality. The third theme unpacks governance and leadership impact on quality. The fourth theme discusses the bundle of services covered by EMS operations. The next theme focuses on infrastructure, financial resources, and fleet management. Lastly a theme emerges that exemplifies the opportunities to strengthen EMS that come with collaboration between provinces, with communities and other stakeholders. These themes and their sub-themes are listed in Table 6.2.

Table 6.2: Summary of Themes and Sub-Themes

Theme	Sub-theme
1. Historical influences on EMS	1.1. Apartheid's pervasive effects on the quality of EMS systems 1.2. The dominance of white-male managers 1.3. Quality by dictate: the dominance of the Ambulance Chiefs

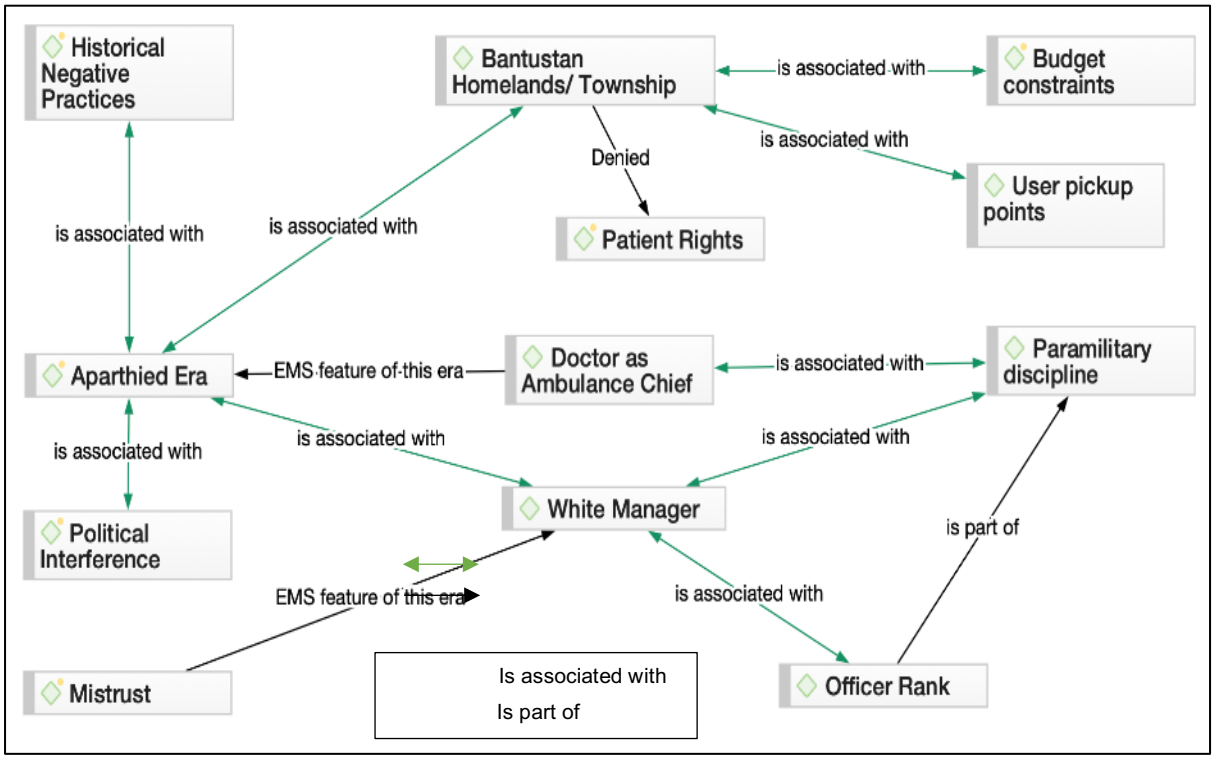
Theme	Sub-theme
	1.4. Perceptions of loss of pre-1994 EMS good 'quality' practices
2. EMS human capital factors that impact on quality improvement	2.1. Gaps in EMS manager's quality improvement education 2.2. Vacant but crucial EMS management posts 2.3. EMS quality improvement stifled by unprofessionalism and poor work ethic
3. Governance and leadership	3.1. Impact of the District Health System versus Provincial Health model on EMS quality 3.2. EMS marginalisation within the health system 3.3. Political and organised- labour interference in EMS management
4. EMS operations related to quality improvement	4.1. Emergency Communications Centre (ECC) and Computer-Aided Dispatch (CAD) impact on EMS quality 4.2. CAD as a health information system 4.3. ECC functioning without CAD 4.4. Staffing in the ECC 4.5. EMS response times as a quality indicator 4.6. Outsourcing to private EMS companies 4.7. The quality of the EMS component related to planned patient transport and interfacility transfers.
5. Infrastructure, fleet and financial management related to quality improvement	5.1. Infrastructure challenges impact on EMS quality 5.2. EMS resource and fleet management constraints 5.3. Impact of financial constraints on EMS quality
6. Collaboration and knowledge sharing	

Source: Researcher's own compilation

6.2 THEME 1: HISTORICAL INFLUENCES ON EMS IN SOUTH AFRICA

An understanding of the recent history of EMS in SA helps to contextualise the present EMS systems. The history relates to the secondary research question: What are the knowledge, attitudes and practices of EMS managers who are quality champions, in the public EMS organisations in relation to quality improvement? During the non-participant workshop observations, differences between the EMS organisations in each province became apparent suggesting that there are historical reasons that shaped the EMS current state of operations in each of the provinces. The participants selected to be interviewed had experience of EMS systems across the country. During the interview they were asked to reflect on their own work history and contextualise their experiences in relation to quality in EMS. The average years of work experience of the 11 interviewees was 31.4 years. It was a pre-1994 apartheid era design that the EMS manager be white and male. At that time, in some provinces, the public EMS organisations were headed by an Ambulance Chief who would most likely be a white male medical doctor. In other parts of the country, the ambulance services were a component of the Fire Brigade service and similarly would have a white male as the Fire Chief. The code network in Figure 6.1 below shows the associations between the codes that emerged from the thematic analysis. A key feature of this era was the systematic neglect of the Bantustan homelands, black townships, and black self-governing territories. EMS was run in a paramilitary fashion, dominated by white officers, who themselves would have been subject to mandatory military conscription.

Figure 6.1: Code Network: Historical Influences on EMS



Source: Researcher's own compilation

6.2.1 Sub theme 1.1. Apartheid's pervasive effects on the quality of EMS systems

Prior to 1994 South Africa was subjected to the discriminatory apartheid health policies that deprived black South Africans access to equitable healthcare. The apartheid policies resulted in the forced relocation of black South Africans into the apartheid created areas known as townships such as Soweto, self-governing territories such as KwaZulu, and separate Bantustan homeland states such as the Transkei. These townships, self-governing territories and homelands received a disproportionate allocation of central government funding (Surender, 2017). The result was the historic underspending on healthcare and health resources that disadvantaged the majority black population. The effects of this practice is evidenced by the difference in life expectancy which in 1980 was 55 years for blacks and 70 years for the white population (Kon & Lackan, 2008).

Despite the post 1994 constitutional reforms, policy revision and the passing of the National Health Act, discrepancies in healthcare persist between race groups, urban and rural populations, and social classes (Solomon et al., 2020). The public EMS system is not immune to these discrepancies as EMS resources are unequally

distributed between provinces, and between health districts across South Africa (Rapanyane, 2022). The prevailing attitudes and practices amongst EMS managers are shaped by recent history and contrasted with the current reality as perceived by the participants that were interviewed.

In Chapter Five, Figure 5.2, the mean age of the respondents surveyed was 46 years with the mean tenure in EMS reported as 21 years. Many of the EMS managers who participated in the survey started their EMS careers in the 1980's and 1990's and therefore would have been exposed to apartheid era policies and practices. The personal experiences of the interviewees are captured in the interview extracts below. They describe their traumatic experiences of the EMS at that time as an organisation that was run like the paramilitary unit with white males commanding the management positions from which they dominated the junior non-white staff.

> *"So, coming into EMS, I found it very sort of awkward because you couldn't work with a white person, you couldn't drive a white ambulance, you couldn't go and pick up a white patient." #P9*

> *"At the start was very difficult, in terms of us working within the EMS, because it was during the apartheid time". "…it was run very strict on a like a military type of operation, and everything was according to protocol." "Everything was very closely monitored, and everything ran like clockwork at that time because discipline was 100%." #P3*

There was relatively a lower volume of calls because the geographical area to which the provincial EMS rendered services excluded the former self-governing territories and Bantustan homelands. When the Bantustan homelands and self-governing territories were incorporated into the nine provinces post-1994, those provinces, such as the Eastern Cape, that incorporated self-governing territories and Bantustan homelands, had to focus on redressing decades of the underfunding and inequality of healthcare service delivery in those disadvantaged areas (Kon & Lackan, 2008).

> *"…politically the Eastern Cape for an example, inherited two homelands which is the former Ciskei in the former Transkei." #P10*

During that apartheid period EMS stations were located in white areas whereas most injuries occurred in the black townships (Goosen et al., 2003). EMS did not respond to the user's home addresses in the black townships but had predetermined pickup points such as the local police station. The patient, with assistance from family and friends, had to either walk, be carried, or get a lift to the pick-up point. It is not uncommon for users, who were too weak to walk or stand, to be transported in a wheelbarrow to the pick-up point where they would wait to meet the ambulance.

> *"The number of patients that we dealt with was very few in comparison to the number of patients we have now, because during those days, you know we had pick up points for the rural areas and you know the townships and things like that. So, we never went into these area, as it was just pick up points at the entrance or at the SAP station, and sometimes they got there in wheelbarrows." #P3*

Kon & Lackan (2008) report that during the period of legal racial discrimination, an environment was created which fostered abuses such as the denial of emergency care treatment to non-white citizens. Access to EMS was restricted by the political boundaries that demarcated which areas received services. The poor and rural communities still suffer this indignation of having to be transported in a wheel-barrow to pick up points because of poor access to transport and road infrastructure.

6.2.2 Sub theme 1.2. The dominance of white male managers

A two-year military service conscription was compulsory for all white males pre-1994. Army medics that completed their military training in the SA military health services and obtained military medical qualifications were recruited by EMS in some provinces. The military management culture of managing by strict discipline, protocols, intimidation, and fear influenced the EMS management culture at the time (Goosen et al., 2003).

> *"The white people were supervising you and found problems with every little thing that you did. So, it was very it was a very difficult situation, you had to always be on your toes, and you know, try your best not to make a mistake." #P3*

The non-white staff would fear losing their job if they made a mistake. Labour union activity and worker rights was limited during this period as the unions were seen as part of the communist, terrorist threat to the apartheid government (Coovadia et al., 2009).

> *"…due to the conditions that we worked under and the fear that we had about losing our jobs. Not like we had labour organisations like the way we do today." #P3*

The EMS management (officer) positions were mostly reserved for white employees despite them holding lower medical qualifications. Like the military, junior staff were expected to stand when an EMS officer entered a room, and the officers would be addressed as either 'Sir' or 'Mam'. Whereas the suffix used in rank structure today refers to 'manager', it was previously known as 'officer'. Notably, today the EMS managers still wear shoulder epaulettes with their rank insignia (Susser & Cherry, 1982).

> *"…all the positions like the officer positions and all of those went to the white staff themselves, you know, and even if they were lesser qualified medically than the non-whites". "…dealing with management was really a horrific experience." #P3*

> *"We also worked on the very difficult circumstances, people that were very oppressive in their behaviour and their attitude towards us." #P7*

White male dominance in healthcare management is not unique to SA, the lack of diversity is a concern in the USA where in most healthcare organisations the management is not representative of the rest of society (Lee et al., 2021).

6.2.3 Sub theme 1.3. Quality by authority: the era of the ambulance chief's dominance

In the past, the head of the provincial EMS was a medical doctor who held the rank of Chief and was the Director in charge of EMS. During this era, EMS personnel were

recruited and underwent internal short course training at the training college division of the EMS. All new recruits started with what was a two-week Basic Ambulance Assistant (BAA) course. After a few years of experience, the BAA would be nominated to write the entrance exam for the 16-week Ambulance Emergency Assistant (AEA) course. After working as an AEA for a few years, a select few AEA's with experience were selected to write the entrance exam to be selected by the Chief for the highly prestigious 6–9-month Critical Care Assistant (CCA) course. The main examiner of the final CCA practical examination course was also sometimes the Chief of the service. The account below amplifies the harm caused the racial prejudice in the selection process for the CCA course as well as the autocratic leadership style of the chief.

> *"So, when we go for a course, even though how good you are, they need to be only a certain percentage of you, the rest would be white. There was a time when I was on the paramedic course, I qualified [to enter] and my name went up on the Friday and I was all excited. And then Monday morning and doctor [Chief] decided to take my name off and put another white guy. That broke me down terribly for the next two years, I couldn't believe that I was deprived of an opportunity." #P9*

There was no independent registration with the HPCSA, staff qualified with these internal courses at the training college practised under the license of the medical doctor who was also the chief of the service. The medical doctor held a powerful position within the organisation as the Director, Chief and medical practitioner solely responsible for clinical oversight and governance. The decisions the Chief took were not questioned.

The EMS Chief in each province determined the scope of practice and protocols under which the staff would practice (MacFarlane et al., 2005). Staff that were found to be in breach of these protocols or not competent to practice at that level would have their short course qualification (and badges) taken away. They were not allowed to practice at that level until they underwent additional training and retook a practical simulation examination. This would have implications for salary and promotion as well harm the professional reputation of the person receiving this sanction.

> *"Your treatment had to be according to the protocols. Otherwise, you lost your badge [qualification to practice]." #P3*

These statements by the key informants are supported in other research. Shung-King et al. (2018) describes the triumvirate of social identities of being a white male, medical doctor and senior manager as dominating the senior management positions in healthcare. The civil service, including the health sector, during the apartheid era in SA favoured white male grouping of medical doctors for senior management posts across all spheres of government (Coovadia et al., 2009).

Although in terms of Appendix A (viii) of the 2017 EMS regulations (Department of Health South Africa, 2017), at least one supervising medical practitioner with suitable emergency medical qualifications and experience must be appointed by the service in a clinical supervisory capacity for each health district, none of the EMS managers who participated in the survey were qualified as medical doctors. The next section delves into some of the positive aspects of EMS in the pre-1994 era.

6.2.4 Sub theme 1.4. Perceptions of pre-1994 good 'quality' practices in EMS lost

Not all the pre-1994 era practices at the time are viewed negatively by the interviewees. There was the perception that staff were more disciplined, that with the doctors in charge, staff were held to account and there were consequences for poor performance.

> *"…there was more focus on quality when I started there, I worked there from 1988 till about 1993, they had clinical governance. They even had a doctor that used to do clinical governance." #P2*

> *"… it's discipline from the crews themselves that worked on the ambulances or the response units. It was the discipline when it came to cleanliness, infection control, you know everything that we did at that time together with the crews that I supervised, you know, there was 100% discipline." "…the patient was always first." #P3*

Because of the obedience, the job of the manager was made easier. The perception of the time was that the quality of the EMS was better, and patients benefitted.

> *"…if we were eating and we got a call and because it was a priority one, you know, we washed up and left within 30 seconds, we were in the vehicle and we are mobile.… so, that kind of discipline was really to the benefit of our patients." #P3*

This view is not shared by #P1 whose recollection was that there wasn't quality oversight. The differing views are to be expected as practices across different provinces varied.

> *"I think I can quite confidently say that quality oversight and quality management in the EMS environment was very much non-existent" #P1*

> *"The crews below us were very obedient at that time, so we didn't have problems. We didn't have the problems that we face today. So, you know they were on track. They came to work on time. They did what they supposed to do, and they left, you know. So, I think that made it easier for us to supervise the staff". #P3*

The racial disparity in relation to EMS qualifications of staff is still evident in the 2021 biographical data of the EMS personnel registered with the HPCSA. Tiwari, Naidoo, English & Chikte's (2021) study of the HPCSA registration data revealed that the white EMS population has a disproportionately higher representation in the ANT and ECP qualification band as illustrated in the Table 6.3. This suggests that there has been slow transformation of the EMS sector to address historical racial inequalities.

Table 6.3: Demographic Profile of EMS Personnel in South Africa

Population Group	South African Population Demographic Profile (%)	BAA Demographic Profile (%) (N=43045)	AEA Demographic Profile (%) (N=10545)	ECT Demographic Profile (%) (N=1123)	ANT Demographic Profile (%) (N=1476)	ECP Demographic Profile (%) (N=705)
Black	80.2%	90%	61%	75%	24%	24%
White	8.4%	5%	23%	7%	52%	55%
Coloured	8.8%	4%	11%	16%	14%	10%

Indian	2.5%	1%	5%	2%	10%	11%

Source: Tiwari, et al. (2021); Statistics South Africa (2021). BAA, Basic Ambulance Assistant; AEA, Ambulance Emergency Assistant; ECT, Emergency Care Technician; ANT, Paramedic; ECP, Emergency Care Practitioner

Race classification was not included in the survey as it may have impacted the participants willingness to participate in a survey that tested knowledge and associating knowledge with race. It was however observed that most of the attendees at the workshop were black and therefore representative of the racial demographic of the region and country. The HPCSA data would therefore suggest that most of the white graduates are employed by the private sector EMS companies.

Despite the transformation of the public EMS by the appointment of non-white persons to management positions post 1994, there was a lack of transformation in EMS tertiary education and training. Most of the managers employed in the public sector EMS do not hold tertiary EMS qualifications. The National Emergency Care Education and Training (NECET) policy aims to address this imbalance (Department of Health of South Africa, 2017). This will be discussed further in the next theme in this chapter that explores the EMS human resource related factors that influence quality improvement.

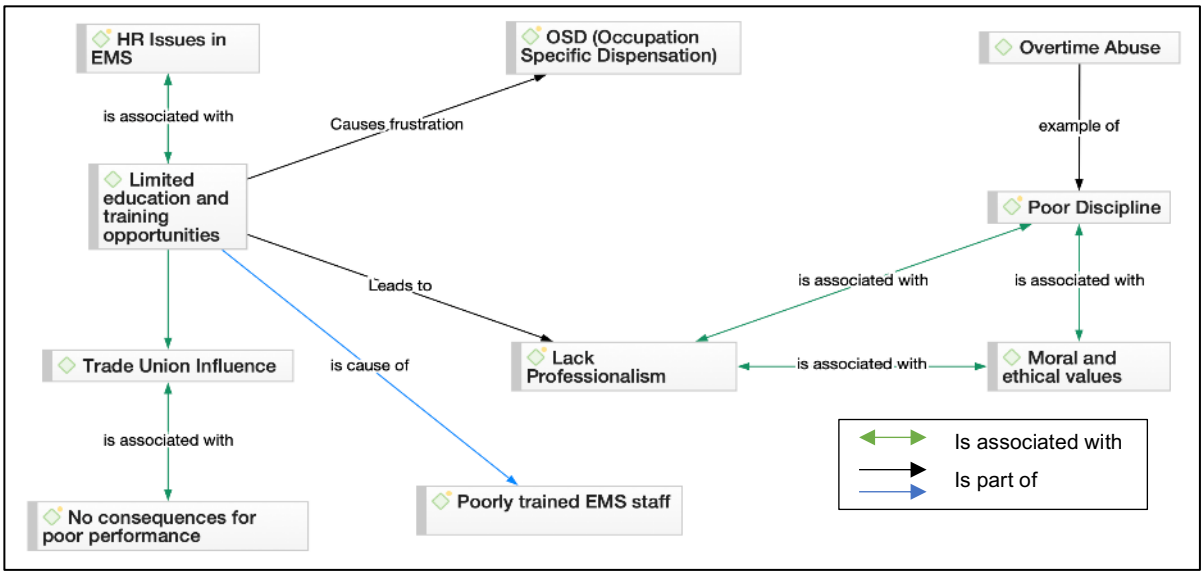
6.3 THEME 2: EMS HUMAN RESOURCE FACTORS THAT IMPACT ON QUALITY IMPROVEMENT

The 2030 Human Resources for Health describes the health workforce as the personification that enables an efficient and effective health system (Department of Health South Africa, 2020). The National Quality Improvement Plan (NQIP) acknowledges that healthcare services are impaired by critical staff shortages, poor staff attitudes, low staff morale and inadequate training. The NQIP also reports staff disciplinary procedures as being ineffective and that corruption was rife (Department of Health of South Africa, 2021).

In Figure 6.2, the code network links the factors that are associated with the EMS workforce. The limited education and training opportunities and the OSD restricts the

opportunities for promotion. The strong labour union movement in the public health sector is a challenge for the manager trying to enforce discipline amongst the staff.

Figure 6.2: Code Network Human Resource Issues



Source: Researcher's own compilation

This theme focuses on answering a secondary question of this study: What are the factors that motivate and foster quality improvement amongst EMS managers within EMS organisations? The next section will focus on the gaps in education and training amongst EMS managers.

6.3.1 Sub theme 2.1. Gaps in EMS manager's quality improvement education

The survey results in Figure 5.9 in Chapter Five reflects the EMS manager's quality management knowledge, attitude, and practices. In the survey, 17% (n = 128) of participants answered Yes, that they had received training to manage quality improvement projects; 21% (n = 74) indicated that they are familiar with performance improvement models (e.g., PDSA) and 12% (n = 43) are familiar with project improvement tools (e.g., Pareto charts).

The core functions of any manager includes: setting goals; then planning how to reach them; this requires organising people, materials and information resources with the aim to reach the organisations goals; leading by motivating other to achieve goals, and lastly performance measuring performance and monitoring progress to attain the goals (Pillay, 2008). Management development is aimed at preparing the manager to

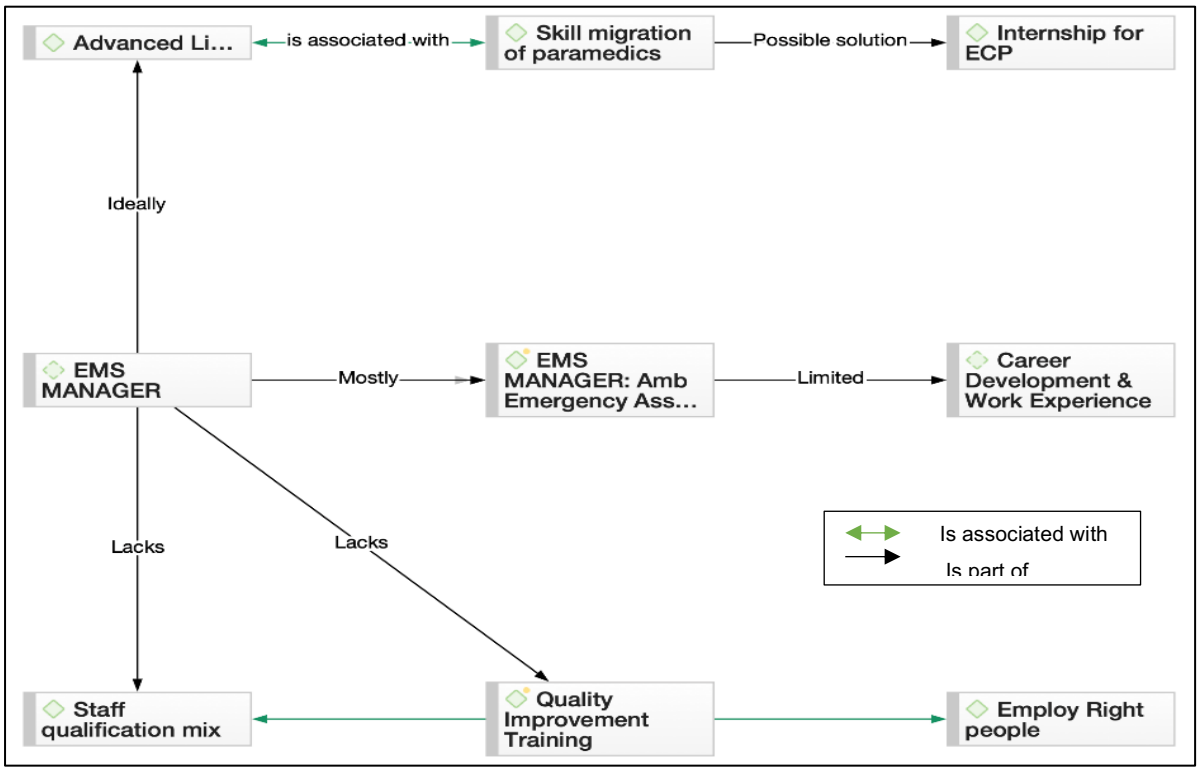
accomplish the organisational goals by equipping the manager will the skills to manage and lead within the organisation (Naidoo et al., 2014). The next paragraph will discuss the AEA manager in EMS.

In terms of Section 26 (1) Emergency Medical Service Regulation (2017) the Ambulance Emergency Assistant (AEA) short course qualification with an intermediate life support (ILS) scope of practice is the minimum prehospital emergency medical qualification required to become an EMS manager. A study conducted on the emergency care workforce in South Africa estimated that n = 43 045 (76%) are BAA qualified and n = 10 545 (18%) have an AEA qualification registered with the HPCSA. The remaining 6% are ECP's (1%), ECT (2%) and ANT Paramedic (3%). In 2019 approximately 23% were employed in the public service (Tiwari et al., 2021).

Chapter Five of this study reported that 237 (67.5%) of the EMS managers surveyed hold an AEA qualification while only 5.7% (n = 20) had completed a bachelor's degree in emergency medical care and registered with the HPCSA as ECP's. Naidoo, Lowies & Pillay (2014) found although there is a preference to appoint a manager with an ALS qualification, the practice of appointing AEA as the minimum qualification to be an EMS manager had become an unquestionable policy norm in EMS. The norm of appointing AEAs as managers was regulated with the publication of the Occupational Specific Dispensation[57] (OSD) published and Emergency Medical Service Regulations (Department of Health South Africa, 2017). The code network in Figure 6.3 illustrates those factors impacting on the EMS manager who has limited promotional opportunities by virtue of not having a tertiary qualification. The opinions of the participants regarding the manager's medical qualification are presented in the next section.

[57] The OSD is a unique occupation specific remuneration and career progression system applicable to some categories of public servants in South Africa.

Figure 6.3: Code Network: EMS Manager Education & Training



Source: Researcher's own compilation

The views of the participants on the AEA qualified person being a manager were conflicting. In the interview, P#1 suggested that AEA managers were at a disadvantage with implementing quality improvement and managing more highly qualified personnel with degrees.

> *"… people (AEA's) are moved up into positions of responsibility for oversight but, the clinicians reporting to them are very often more highly clinically trained and qualified. #P1*

> *"What currently exists with short course trained personnel managing people who are degree and master's level and at some places, even doctorate level personnel reporting to these short course qualified personnel, there is a definite disjuncture in understanding and meeting each other's minds on the quality side." #P1*

#P2 and #P7 acknowledge that AEA's were appointed as managers based on their years of experience and not because of their management abilities.

> *"…we haven't really focused on the quality of our managers. We've just taken somebody who's got a AEA qualification, and I've still got a lot of those old AEA that are station managers in my province who don't really have an understanding of what management is about." #P2*

> *"… if a person had an AEA for so many years, they automatically became an officer, but there's nothing wrong with having a baseline medical qualification, but the officers work is about administration, looking after the vehicles, looking after the staff, looking at improvement of the systems and so on. And none of that is embedded in our medical qualification training." #P7*

This is however not unique to EMS, #P5 experience was that a similar issue occurred in public hospitals:

> *" In the hospitals, most of the people that were appointed as CEO or were acting CEO, most of them didn't have the right, qualifications. Other will tell you that they were appointed in the position of the CEO because of their leadership qualities, or they were, shop steward." #P5*

There was also recognition that there are excellent AEA qualified leaders and managers. There was also acknowledgement that some AEA managers have studied further and attained management qualifications.

The AEA short course training ceased to be offered with the implementation of the NECET policy in 2019 (Department of Health of South Africa, 2017). Although the AEA is no longer, it is still the most common qualification held by EMS managers. As the average age of the EMS manager is 45 years it will take many years before the AEA manager is replaced by graduates with ALS diplomas and degrees (Tiwari et al., 2021). There were mixed opinions on the role of the ALS diploma and degree graduates as managers.

#P1 and #P4 are of the view that because there are so few ALS practitioners in SA, the prehospital health users would benefit from the ALS practitioners being placed in operations[58] to render emergency care rather than being in an office as the manager.

> *"You know, there's this one paramedic there, you cannot make that paramedic manager. Who's going to go to the patient? #P1*

> *"…your ALS is not supposed to be in the office, my opinion they must be out in the road treating patients." #P4*

> *"…you don't need to be an ECP or have a degree in emergency services. If I put it that way to run a station to run a district, because as much as it said is losing its skill. You didn't study there to be a manager, you rather let them do the job. #P4*

#P4 and #P2 are also critical of the higher education programmes that graduate ECTs and ECPs arguing that the curriculum does not equip the graduate with the appropriate leadership competencies.

> *"There is an aspect of management in the in the degree, but my personal feeling is it doesn't really cover (the detail). It doesn't give you the skill to go back to your station and manage, so it's just giving you a short thing on management and it's not specific to the EMS industry you know. I feel there's a huge gap in that (course)." #P4*

> *"ECT's or ECP's, we don't put a module in it where we focus on the actual management of the service." #P2*

#P4 adds that the young degree graduate is at a disadvantage as a manager. They would have not gained the experience of someone who started working in EMS from

[58] Operations is a term used in EMS in some provinces to describe the frontline prehospital emergency medical services.

the bottom as a BAA and would not identify and relate to personnel with EMS short course qualifications.

> *"So you know there was a lack of managerial skills or people's skills and especially also trying to integrate higher qualified personnel into the public sector for them to understand the short course type of personnel." #P4*

There is also the view that the graduate paramedics are better managers. #P10 found that the provincial partnership with the university helped strengthen the management structure in the province.

> *"We also had a good working relationship with (the university name) which actually assisted us… making sure that we provided professionalized the services in terms of the education." #P10*

The view expressed by #P2 is also expressed that graduates are more self-motivated and keener to want to improve themselves.

> *"The managers that have got higher qualifications like this from the ECT as opposed to the AEA also have a tendency to want to study themselves." #P2*

> *"I find that people who are self-motivated to want to help themselves study and not waiting and just sitting back and say the government is doing nothing for me, have a tendency to perform better." #P2*

Amongst medical doctors in one study, there was acknowledgement that clinical experience alone does not lead to leadership competencies (Loh, 2015). Although nurses have access to a post-graduate diploma in management, there is no such qualification in EMS. Naidoo et al. (2014) recommended that given the uniqueness of EMS in SA, a management qualification tailored for the EMS is needed.

6.3.2 Sub theme 2.2. Vacant but crucial EMS management posts

In the survey the mean time that the EMS managers were in tenure was 8 years. The most frequent period of tenure (22.1%; n = 78) was between 0-2 years. A matter that was raised during the workshops was that of staff being appointed to acting manager positions.

> *"We are understaffed, and a lot of people are in acting positions." #W1*

> *"You'd have a youngster coming (who) went to do the degree or so, coming to the public sector, but has never worked as BAA, and never worked as an AEA." #P4*

Despite the policy of the DPSA guiding the duration of acting appointments, in some instances that staff were acting in different management positions for several years. This practice is against the policy that limits the acting period to six months (Republic of South Africa, 2019a).

> *"They should not be anybody acting longer than a certain time… the DPSA is quite clear about those things." #W1*

The reasons posts are not permanently filled are due to budget constraints leading to a moratorium on the filling of vacant posts, no one applying who meets the criteria in terms of qualifications and experience, the post establishment has been transferred to another district or department or the management has not applied for permission to fill the vacancy.

> *"There are sometimes no posts so you get asked to act in that place or to serve this role and then you must realize it's voluntary, but we may have to create an establishment and so on and that has but major financial implications because of constraints." #W1*

The manager who is acting in a management position does not have the same influence and authority over the personnel according to #P8

> *"…people acting in those positions who cannot actually give them instructions" #P8*

Finlayson (2017) study into the EMS response times in KwaZulu-Natal recommended that managers should be appointed into vacant posts as the staff that are in acting positions do not take their job seriously. Similarly, the South African Law Reform Commission report emphasised the importance of implementing the Human Resource Health strategy 2030 by filling all critical vacant posts (South African Law Reform Commission, 2021). The next section will present the findings and discussion on how poor work ethics stifles quality improvement.

6.3.3 Sub theme 2.3. EMS quality improvement stifled by unprofessionalism and poor work ethic

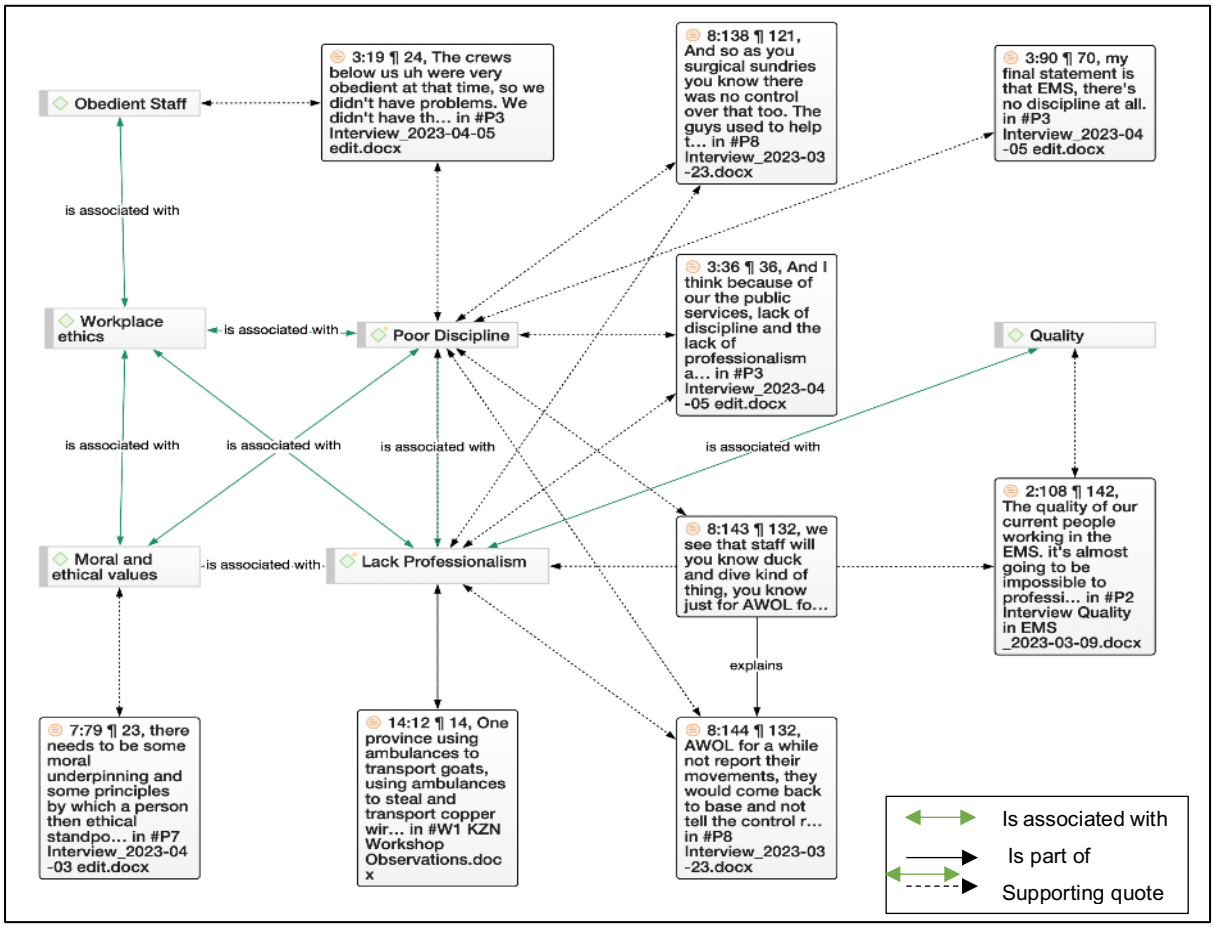
This sub-theme continues to speak to the research question: what are the factors that motivate and foster quality Improvement amongst EMS managers within EMS organisations? A key factor to implement quality improvement is professional work that is motivated to implement changes.

Question 26 in the survey enquired about factors that hinder implementing quality improvement in the workplace. When asked the question if employees do not follow quality policies and standards, 60% (n = 212) of the EMS managers answered 'Yes'. 51% (n = 179) responded 'Yes' that there is low employee morale. In response to the question that they do not get support from the operational staff 46% (n = 160) said 'Yes' and 76% (n = 269) answered 'No' to Question 27 that asked if staff are motivated to improve quality in the survey. During the participant observations and interviews participants reflected on the low levels of professionalism amongst the EMS workforce that the EMS managers experienced.

Ethical work behaviour which can be described as the values and attitudes reflecting the value of work, is fundamental to providing high quality healthcare (Sakr et al., 2022). Professionalism is the outward manifestation of the organisational work ethic (Mosca & Kruger, 2022a). The outward appearance of professionalism will be reflected in the discipline, punctuality, respect, and maintaining professional competence. In

Figure 6.4 the code network links the lack of professionalism, poor discipline, disobedience, and missing ethical values to poor quality healthcare services. The supporting extracts in the code network create a pattern from which this theme emerges.

Figure 6.4: Code Network: EMS Work Ethic



Source: Researcher's own compilation

The following extracts expand on the discipline in pre-1994 era and give examples of some of the more serious transgressions. #P3 has more than 30 years of EMS experience and can recall that the EMS operational crews pre-1994 used to be 'obedient', punctual and follow instructions issued by the line manager. Obedience may be indicative of a lack of agency and authoritarianism.

> *"The crews below us were very obedient at that time, so we didn't have problems. We didn't have the problems that we faced with today. So, you know they were on track. They came to work on time. They did what they supposed to do, and they left, you know. So, I think that made it easier for us to supervise the staff." #P3*

#P3 also recalls that the EMS employees were disciplined and maintained cleanliness of the equipment and followed infection control Standard Operating Procedures (SOPs).

> *"It was the discipline when he came to cleanliness, infection control, you know everything that we did at that time together with the crews that I supervised, you know, there was 100% discipline." #P3*

#P3 suggests that the ill-discipline is endemic in the public service across the country and EMS is not spared.

> *" …my final statement is that EMS, there's no discipline at all. I think it's gonna be very difficult. It's like the country… you know it just filtered right to the lowest level where everybody thought that they could be on their own mission, you know. But and it's the same with the EMS." #P3*

There were serious examples of ill-discipline amongst EMS personnel described where ambulances are used as taxis or used to transport stolen goods and animals.

> *"… it's alleged, you know, and the smaller provinces that are bringing patients into Gauteng, you know, are taking passengers back, you know, and paid basis, you know." #P3*

> *"One province they were using ambulances to transport goats, using ambulances to steal and transport copper wire." #W1*

Previously in this chapter the challenges faced by the manager in instituting disciplinary action against employees that are guilty of misconduct is discussed. The

manager's failure to discipline staff contributes to poor quality. Notably no mention was made of reporting staff for misconduct to the Health Professions Council of South Africa (HPCSA) although the ethical rules requires the manager as a registered practitioner to report such cases (Health Professions Council of South Africa, 2006).

The next theme that emerged relates to governance and leadership issues related to EMS.

6.4 THEME 3: GOVERNANCE AND LEADERSHIP

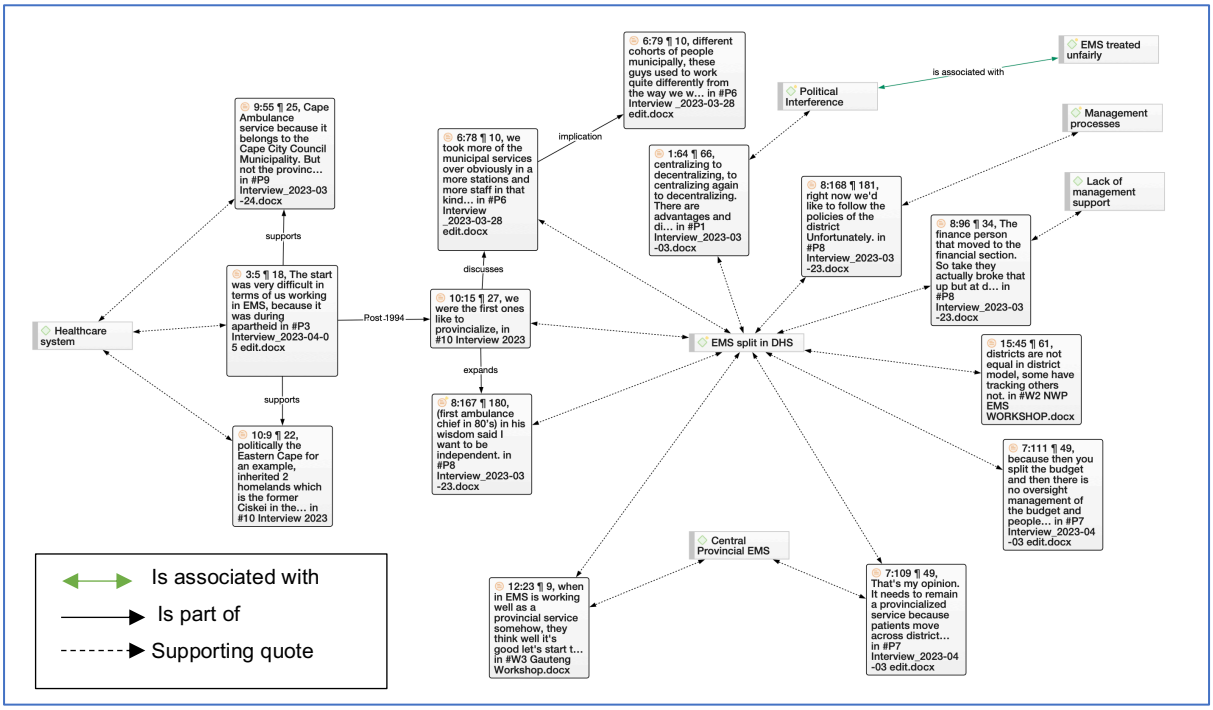
The public EMS does not operate in a lacuna with the province, the policy direction and senior oversight takes place within the provincial department of health. The 2030 Human Resource for Health considers leadership and governance to be critical to the success of any human resource strategy in SA (Department of Health South Africa, 2020).

In responding to the research question four: what are the factors that motivate and foster Quality Improvement amongst EMS managers within EMS organisations? Domain 4 in the Regulations Relating Standards for EMS focuses on leadership and governance. In the survey statement "Where I work, the Provincial Department of Health or parent company oversees and supports the EMS" 47% (n = 164) selected Agree and 9% (n = 23) said Strongly Agree. The response to the statement "My place of work has a functional governance structure in place", was 44% (n = 153) saying they Agree and 7% (n = 18) Strongly Agree.

During the participant observation at the workshop and during the interviews there was strong opposition to EMS changing from a provincial entity to falling under the management of the district as part of the District Health System (DHS).

6.4.1 Sub theme 3.1. Impact of the District Health System versus Provincial Health model on EMS quality

Figure 6.5: Code Network: Governance DHS model



Source: Author's construction

Prior to 1970, the provision of ambulance services was the mandate of the local government municipalities. Most municipalities combined the ambulance services with the Fire Services (Vincent-Lambert, 2015). The SA constitution made the provision of EMS the responsibility of the provincial government which resulted in the establishment of provincial EMS in most provinces. The National Health Bill, 2001 made provision for the establishment of the District Health System (DHS), with 53 health districts established as the vehicle through which the delivery of Primary Healthcare would take place (Barron & Asia, 2001).

It emerged during the workshops that provinces like the Western Cape province operate a provincial model where EMS functions in the districts independently and report to the provincial director, other provinces like the North-West Provinces opted for many years to transfer the responsibility of providing EMS to the district director responsible for health services within the district. The third model is one that operates in KwaZulu-Natal which is a combination where some reporting is to the director in the district office and others to the EMS director in the provincial office.

The EMS managers are opposed to the decentralised model where the EMS District Manager and staff report to the district director as in the decentralised DHS model. In this model EMS is given low priority within the district and therefore impacts on the quality of EMS.

> *"EMS manages in my province of frustrated because the managers that they were reporting to don't understand the EMS. And so, the managers that they report to don't have an interest in EMS because most of those managers are nurses or whatever and they are more interested in what's happening in the clinic and what's happening in the sub district hospitals and those type of things." #P2*

> *"There are advantages and disadvantages to both the decentralizing. Decentralization. I think it has had a huge negative impact on quality." #P1*

The political leadership and management within the provinces switch between the central and decentralised model for EMS.

> *"That provinces that are (left) behind they immediately jump into it (DHS) because they think it was going to be helping and it's not helping them because the health district managers have got no clue about EMS." #P10*

> *"When in EMS is working well as a provincial service somehow, they think well it's good let's start talking district and it's one of the worst things that can happen to EMS in the province." #W3*

The consequences of the decentralised DHS model for EMS because the health districts were not prepared to incorporate EMS.

> *"…they were not ready to integrate us into the health structure and at district level." #P8*

> *"Need capacitance in EMS provincial and district offices. Move from DHS to provincial service then EMS are not given the budget or HR to function." #W2*

> *"Equipment for repairs, replacement and then if needed writing off. That needs to be put on your plan for the following year, so those things are delayed now that it has been taken over by the district finance section. #P8*

> *"The finance person was moved to the financial section, so take they actually broke that up….I think they were not ready to integrate us into the health structure at district level." #P8*

> *"I think the province when they looked at integrating us into the district, they didn't do much or a lot of homework in that respect. So, we're sitting with a lot of these HR problems as well where the HR problems. A simple overtime claim, for example, we cannot go directly and query the claim immediately. We have to, you know, wait to see somebody and then also you know the claim has to be pre-approved. In other words, you have to plan for the for the month and there's no emergency overtime where if someone on the shift is off sick at short notice, we cannot replace that person if we didn't budget for it, for those kinds of things, you know, coming together has really hurt our operations at EMS." #P8*

The administrative support, finance and HR in some provinces was decentralised to the district office and this has impacted EMS personnel.

Where services were split into districts, ambulances from one district would not cross over to assist with emergencies in the neighbouring district. This was an inefficient use of scarce resources within the province.

> *"… we've seen it in this province which is good example where patients get left because whose jurisdiction is who covers that particular area?" #W3*

> *"…district manager take charge of EMS as part of the District. So, we back to boundaries, so for an example, when you look at planned patient transport, you cannot have boundaries because you need to identify where you need services. And now if we have boundaries, we will actually have the same problem like to fire department and the traffic department where you are actually have a certain area that you can travel, especially if there is a major accident, you would actually use all the resources that you have. Umm, with the decentralization this doesn't happen, I didn't think the Western Cape has actually has anything like that." #P10*

The view that decentralisation of healthcare services has increased the disparity amongst vulnerable populations, especially in rural areas in SA is supported by several studies (Surender, 2017; Whittaker et al., 2000). There is acknowledgement that there is insufficient management capacity at district level which impacts on the decentralised model of healthcare delivery (Maphumulo & Bhengu, 2019). This research supports the concerns of the EMS managers regarding the decentralised EMS following under the management of the districts. The next section discusses the findings in relation to the perception that EMS is a low priority and ignored by the department of health.

6.4.2 Sub theme 3.2. EMS marginalisation within the health system

This sub-theme contributes to answering the research question, what are the benefits, and impediments and opportunity costs to implementing quality improvement in EMS? There is an opportunity to turn this perception around as the image of EMS can be enhanced by improving the quality of the services delivered.

Participant #P10 and #P4 said that the perception amongst the EMS managers is that they are treated like ambulance drivers by the rest of the department of health in some districts and provinces.

> *"…you were looked at as being ambulance drivers." #P4*

> *"…when you go to the other provinces, you could see that EMS was not taken seriously. We were looking at us, as ambulance drivers. So, you would they would not even involve in ambulance personnel in management meetings or whatever. I don't think they have the management support in the other provinces, and I can tell you some of them are still experiencing that problem as we speak now." #P10*

Despite being a part of the department of health, the EMS managers perception was that they are the stepchild of the department of health. The implied meaning is that EMS is not afforded the same recognition as the rest of the department of health. Because of this #P5 suggests that EMS has been doing things their own way.

> *"In reality we are the stepchild of DOH." "…they can understand EMS, treat EMS as part of Department of Health not as a destitute child." #W1*

> *"EMS, you know, services, has been ignored for quite a long time. And they have been doing things their own way." #P5*

EMS managers expressed their frustration at not being allowed access to the facilities at the clinic where the ambulance is stationed.

> *"…there's two rooms with a proper facility, proper toilet facilities for staff but there's the clinic manager who does not want to let them use it." #W1*

> *"EMS personnel are dumped in one side of the hospital." #P4*

This perception that EMS is undervalued was found in a study conducted in Gauteng province where specialist EMS crews undertaking critical care transfers felt undervalued by the rest of the healthcare team. In the study the doctors and nurses did not have an understanding of the capabilities and scope of practice of the EMS crews (Senekal & Vincent-Lambert, 2022).

Although there are an estimated 15000 EMS workers employed in the public health sector, the EMS workers insignificance is illustrated in the non-reporting in HR statistics report in the SA health review. The report provides statistics for every other cadre of healthcare workers in the public sector (Department of Health South Africa, 2021b). The next section discusses how the politicians and labour union officials interfere with the role and function of the EMS manager.

6.4.3 Sub theme 3.3. Political and organised labour interference in EMS management

This sub-theme relates to the question, what are the factors that motivate and foster quality improvement amongst EMS managers within EMS organisations? Rispel (2016) confirms that to achieve transformation in the health sector, the government has introduced several policies that focus on equity; however, the lack of accountability, ineptitude and government and leadership failures have compromised the transformation agenda.

In response to the question on the factors that impede the EMS manager's in fulfilling their management role, political and union interference was mentioned. The term of office for the member of the executive council (MEC), who is the political head of health in the province, is 5 years. The incoming MEC often would bring with them their own senior officials. This constant change in senior management results in shifts in policy direction which impacts on EMS.

> *"…we have lots of political interference in how the services run. So, there's no real separation between politics and administration." #P2*

The tripartite alliance between the African National Congress, the South African Communist Party and the Congress of South African Trade Unions has resulted in the EMS union shop stewards in one province, marginalising the provincial director and having direct access to the MEC. The manager within the province reports that these employees are informed of changes before the management.

> *"The unions have got more power than the managers. Unions have got better access to the top management than the managers themselves." #P2*

EMS is an essential service and therefore EMS employees do not have the right to strike. #P10 recounts an instance where all the employees at a station in a town went on an illegal strike and would not allow any ambulances in to transport users.

> *"…there was a case where the whole area, like the town that was like on strike, they are not working. Now there are no ambulances in those areas, because the staff would not allow any ambulance to come there." #P10*

In another province, there are reports of nepotism where the family members of the politically connected are employed in EMS.

> *"I can tell you lots of my staff are related to lots of politicians, which then makes it difficult to manage as well. We are like a dumping ground for children that don't have tertiary qualifications." #P2*

The managers are frustrated as their authority is limited by political interference and bureaucracy in some provinces. There are instances when employees commit serious offences, placed on suspension but occupying a post and still earning a salary.

> *"I mean like, guys there have been suspended for six years, seven years with serious stuff (charges) and their earning a salary. Umm. And some of them, even after they were found guilty when they appeal another two years goes by, but nobody actually cares. So even the managers are saying, listen, our hands are tired because we can't discipline anybody, because every time we want to discipline. Do you have to follow the whole red tape (bureaucracy) which at the end of the day, I mean a case when a manager was assaulted by staff members and laid a case (charge) but those staff members are still working." #P10*

The political influence is not always negative. There was also an example cited in one province where the MEC's support political and influence benefitted EMS.

> *"…the then Minister there, he made EMS point of his priority, which then was trying to build EMS service. Fortunately, the minister that took over from him also continue with that. So, we built more than 18 ambulance*

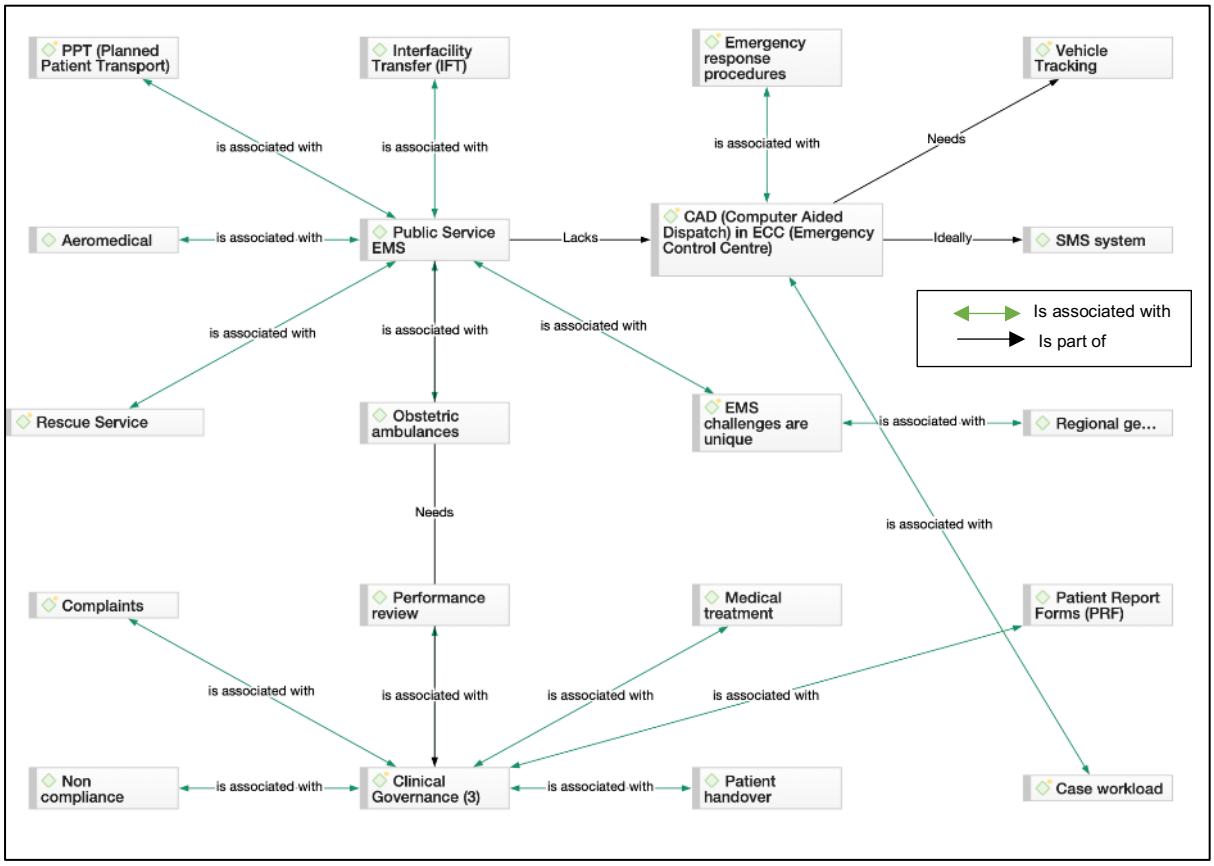
EMS is not immune to the challenges such as the lack of transparency and nepotism in the public sector recruitment process (Department of Health South Africa, 2020). The HPCSA 2022 annual report highlights the impact of political and ideological contests in the state on the achieving targets set in the National Development Plan 2030 (Health Professions Council of South Africa, 2013). The next section will discuss the theme related to EMS operations.

6.5 THEME 4: EMS OPERATIONS RELATED TO QUALITY IMPROVEMENT

This theme provides insights that aim to answer the research question two, how do EMS managers perceive, interpret, and understand the OHSC quality standards for EMS? EMS provides a basket of interconnected services that includes emergency control centre, ambulance, rescue services, planned patient transport, interfacility transport, medical event management, disaster management, and training. The EMS sub-district, district and operations managers will be responsible for the management, coordination, and oversight of multiple areas of the organisation. The regulations relating to the standards for EMS covers each of these service areas.

The code network in Figure 6.6 below illustrates the interconnectedness of the service areas as discussed by the participants and how they relate to each other in relation to quality improvement.

Figure 6.6: Code Network EMS Operations



Source: Researcher's own compilation

6.5.1 Sub theme 4.1. Emergency Communications Centre (ECC) and Computer-Aided Dispatch (CAD) impact on EMS quality

This section links to the Domain Clinical Governance and Clinical Care in the Regulations Relating Standards for EMS. In response to the survey question "Where I work the communications systems facilitate the provision of effective and appropriate emergency care", 44% (n = 156) of the respondents selected Agree and 9% (n = 28) Strongly Agree option. In response to the survey question "We have an efficient vehicle dispatch system in place to ensure patients' rapid and safe access to services", 32% (n = 111) selected Agree and 8% (n = 55) Strongly Agree.

An EMS response is typically activated by a call to the ECC using a universal access number. In South Africa the free universal access number for EMS for many years was

10177 which was routed through a Telkom (SA) [59] exchange to the closest ECC. The introduction of cellular telephone digital network brought about the change to 112 number becoming the new universal access number for public EMS in 2016 as was discussed at one workshop:

> *"In terms of emergency communication centre, we're moving towards 112. 112 was legislated in 2016 it will now be the national number in the country and then 10177 will be phased out." #W4*

In the ECC staff are assigned to the role as either a call taker or dispatcher. The call taker receives the caller's details that would typically include: the caller and user's name, contact information, user location, description of the incident and presenting signs and symptoms related to the user/s condition. Using this information, the call taker assigns a triage code to the incident to determine the level of priority.

The ECC's use a two-tier triage ranking with Priority 1 (or Red Code) being that for users that need immediate care and Priority 2 (or Yellow Code) for all other non-life threatening emergencies (Alshehri et al., 2020). This information is then transferred to the dispatcher who would locate the closest or next available appropriate ambulance and/or response vehicle in relation to the type and location of the incident. The crew would then be dispatched to the incident. The dispatcher would record the dispatch times, incident type, and communicate with the crew and update the user triage, and track the vehicle from dispatch location to time at incident, to time at the receiving hospital (Turner et al., 2019). The operational control of the movement of the fleet of ambulance, response vehicles and other resources is undertaken at the ECC. Alshehri, Pigoga & Wallis (2020) note that over triage of incoming calls by the ECC is likely reducing the functionality of EMS.

The next sections will discuss the use of technology in the ECC. The computer aided dispatch is a key management tool for EMS.

[59] Telkom (SA) is a majority state owned wireline and wireless telecommunications company that has the wireline monopoly in South Africa. https://en.wikipedia.org/wiki/Telkom_(South_Africa)

6.5.2 Sub theme 4.2. CAD as a health information system

Section 10 (2a) in the regulations relating to standards for EMS require an EMS to have computer aided dispatch (CAD) or a paper-based system that facilitates vehicle allocation, routing, and tracking. In developed EMS systems, the ECC will have a computer aided dispatch (CAD) communication system that is capable of identifying waiting incoming calls, digitally recording calls, electronically capturing user information, and guide the triage decision using criteria-based dispatch. The CAD system will be linked to real time satellite tracking that allows dispatchers to strategically dispatch the closest available resource to the highest priority calls (Alshehri et al., 2020).

The obvious advantage is that it allows the manager to effectively control the fleet and to ensure the efficient use of resources. There were several advantages of having a CAD and significant disadvantages of not having a CAD that were discussed in the workshops and during the interviews.

> *"If you don't have proper monitoring of where your vehicles are and what they're doing and that you, just you're never going to manage your resources properly." #W1*

> *"…the system is so high advanced in technology that we could pull out this code in the system and we could relate to where this ambulance is. Where the time when you call." #P9*

There is no standardised CAD system used across the country. There are challenges such as those identified by #P8 and #P4 as CAD is viewed as an optional, low priority investment by senior provincial management. As the cost runs into millions of rands, corruption is hindering the implementation of CAD in some provinces.

> *"We now need to go digital as far as I'm concerned, and that hasn't opened the eyes of anybody yet." #P8*

> *"…there's a lot of corruption in terms of computer aided dispatching systems, your ECC's, some provinces are spending now for the third time trying to get emergency control centres up and running." #P4*

6.5.3 Sub theme 4.3. ECC functioning without CAD

Despite the advances in communications technology, many of the ECC's across the country are using paper-based systems. This requires the call taker to answer the phone and to fill out by hand a form and then walk over and hand the form to the dispatcher. The dispatcher will que the form on a desk depending on the priority of the call. When an ambulance or response vehicle became available the dispatcher would then dispatch the call to the crew using a two-way radio. The dispatcher would update the response times details on the form and after the call is complete, place the paper form in a box. These forms are collected at the end of the shift and filed (Finlayson, 2017).

Although Section 10 (2a) of the regulations makes provision for a paper-based system, the participants expressed their frustration with this archaic paper-based system in the ECC.

> *"Provinces have to use this as an opportunity, you know to improve …there's no way at this point in time that we should be operating on a paper basis." #P3*

> *"In one province the contract for the CAD system expired five years ago and has not been replaced. fully functional five years later the contract expired so when you got back to paper based system it's ridiculous in this day and age we have a paper based system." #W1*

> *"You know not having a proper communications tracking monitoring system that alone you know for me is the biggest gap in EMS, the biggest gap is that not having a CAD system." #P3*

There is also acknowledgement that quality improvements are not only dependent on technology but would require initiatives from the EMS manager as described by #P9.

> *"But it's our duty and responsibility to phone the caller back, so this is how we operate with a little resource we have compared to the rest of the world." #P9*

Having a CAD system in the ECC is key to monitoring the effectiveness, efficiency and quality improvement as suggested by #P7 and #P8.

> *"From the time the call comes in, to the time the call goes out in the communication centre, there must be certain quality improvement systems that are built in there to show that you improving all the time." #P7*

> *"… we see that staff will you know duck and dive kind of thing; you know just for AWOL for a while not report their movements, they would come back to base and not tell the control room that they are back at base umm. So, you have this case now that the controller sitting with that is outstanding, but the ambulance engaged in a call." #P8*

The significant advantage that the CAD system offers is in the data that allows for statistical analysis to identify trends and implement quality improvement measures to improve the access, effectiveness, and efficiency of the EMS operation.

> *"…we put in a computer aided dispatch system into our Control Centre which we are developing it and that will then collate data and statistics for us automatically so that you can verify the information that comes from the station against the computerized system." #P2*

In some provinces the CAD system is linked to the use of live vehicle satellite tracking, others just have vehicle tracking alone that has its limitations.

> *"…vehicle tracking works, well in the same respect there are dead spots everywhere. Some vehicles would be, you know, we won't have a control of the vehicle and can't check on them where they are, and they would then reappear like 2 hours 3 hours later." #P8*

There were also instances where crews disabled the vehicle tracking system so that their movements would not be tracked.

> *"In some places staff actually breaks this tracking systems and then we know that you know that not right." #W1*

Two provinces have linked the CAD system to the electronic patient report form. Although this technology has been used for many years by the larger private services in SA, its adoption and implementation in the public service has been slow.

> *"But to get a service provider to integrate CAD, with the electronic patient report form and their tablet is where we're sitting with right now." #P6*

At a provincial workshop participants shared how they were effectively using Short Message Service (SMS) to provide a reference number and update the caller on the status of the ambulance responding to their location. This cellular technology has been available for many years, yet there has been slow adoption by the public EMS in SA.

> *"We also introduced a SMS to our call system where the caller will get an SMS with a reference number that the incident has been registered. We also looking at a second SMS, that will tell the caller when the ambulance is dispatched, so this also helps with the user waiting at the pick-up point for 4 hours." #W4*

Another innovative practice was getting callers to use 'what3names' application to locate to users in areas where there are no streets or street addresses. The application has divided earth into a 3 metre square grid that can be identified by three common English words. Finlayson (2017) suggests that the adoption of this technology could significantly reduce the response times in SA.

> *"We also using what3names for location, so that we can have an exact location of the incident especially in the informal settlements where there are no addresses." #W4*

There is acknowledgement that emergency medical dispatch systems are a foundational component of any EMS system and need to be timely, safe, reliable and appropriate to the setting (Mould-Millman et al., 2015). In the next section the EMS staff employed in the ECC are discussed.

6.5.4 Sub theme 4.4. Staff in the ECC

These staff in some provinces are employed specifically for this function and in other provinces, operational staff are placed in the ECC when for whatever reason (e.g., pregnancy) they are unable to work in operations. Staff that are employed specifically in the ECC in some provinces are referred to as Emergency Medical Dispatcher (EMD)

> *"CAD system however from a human resource point of view in the communications centre when are we taking a decision to say that we need to have specialized staff in the communication centre" #W1*

> *"…in the communication centre in terms of EMD's because one of the challenges we have and this is from a national point of view is poor outcomes in the call centre is because we've got staff they don't want to be in the centre, that they forced to be …in a call centre, a highly specialized area" #W1*

Mould-Millman et al. (2015) emphasised the need for proper training of EMD's especially when CAD technology was not available. The next section discusses EMS response times.

6.5.5 Sub theme 4.5. EMS response times as a quality indicator

In terms of the regulations relating to standards for EMS, there is a requirement to monitor response times for each stage of the call. EMS response times is a commonly used process measure that is usually measured and reported against a target, such as attending 85% of Priority 1 calls within 30 minutes and in rural areas in 60 minutes. In most provinces the waiting time for an ambulance exceeds the target because there

are insufficient resources. The focus in some districts is not when the ambulance will get to the user but if there will be one available.

> *"If we don't have an ambulance, we will send one as soon as we have one. But we cannot compete with the rest of the world." #P9*

> *"You can wait two hours for an ambulance and it's a norm." #P2*

> *"What the province is now more concerned about is how we need to get an ambulance to a patient as quick as possible. You know, within that golden hour of 1 hour, that is what we it's important." #P9*

There are a multitude of factors that contribute to poor response times. Some of these factors can be modified and improved with proper management and the use of CAD and vehicle tracking. A common problem is the delay in turnaround time with patient handover at hospitals or on scene.

> *"Without a CAD system you can't really record response times. I think the response time is not really a productive way of looking at EMS because you have to consider the road infrastructure, you have to take the distances, the conditions we live in now we've got load shedding added to this as well … in terms of that so the urban and the rural I know they increased the rural to 60 minutes and the urban to 30 minutes is long." #W5*

> *"Where our response time was 2 hours, we are now at 6 to 10 hours at times because ambulances are spending longer times at hospitals." #W4*

Rural towns and districts have unique challenges such as the inappropriate use of EMS in some rural districts where the population has no other way to access health services. Some towns are several hours drive away from the regional hospital and once the ambulance leaves there is no EMS available for several hours.

> *"we're running around for three hours in a hospital that's not our job yeah." #W1*

> *"But they have to transport patients for 10 hours. You take an ambulance out of a particular district there's no other ambulance service there, no other EMS there." #W1*

> *"We have changed our strategy in the rural towns. If the ambulance is taking a patient to hospital, then there is no ambulance there – if it's a non-priority call then they can wait a few hours but if it's a priority then we activate the standby crew. They get called in to do the priority call." #W6*

> *"…rural areas, people have been calling ambulances to go to a clinic because they have no other means of transport. There's no taxis, there's nothing." #P2*

In one province in a rural district the EMS district manager has found a solution to deal with emergencies when the ambulance leaves town. This solution requires planning and additional budget. It also does not provide a solution if there are multiple emergencies at the same time.

When there is no vehicle tracking, the EMS manager would not be able to track the position of the fleet. The manager and the ECC will be dependent on the crew to report their position.

> *"… the crews would go out, they would sit on scene for about another 15 to 20 minutes. To complete the patient report form and then mobilize the hospital and once they arrive at hospital, when they finished, they need to restock or they need to refuel or they need to read whatever. So which? Has a serious impact on the patients and the service we provide to them in terms of the waiting times." #P3*

The next section will discuss the outsourcing of EMS services to private EMS companies.

6.5.6 Sub theme 4.6. Outsourcing to private EMS companies

Although the public EMS sector is the "backbone", the lack of public services has seen a massive growth in the private EMS sector.

> *"… public health sector is the backbone of the EMS in this country." #P4*

> *"Board of Healthcare Funders and they said that it's a multibillion Rand industry, the private services, that's what they are dealing with, you know." #P3*

> *"We also have private services now popping up at the rescue because we created a gap because we don't provide those services here it's all part of the package." #W2*

Most provinces utilise the private services to assist with calls when they are unable to render the service. In some instances, the public EMS personnel would deliberately stand back at the scene of the motor vehicle accident and let the private service treat the users. The private sector EMS will claim and be paid for all Road Accident Fund (RAF) users.

> *"We build relationships with the private EMS. We recruit them during peak time and pay them and then they do all the transfers for us. In the comms centre when we have a call and don't have an ambulance available, then we dispatch them." #W6*

> *"We need the private sector for areas that we can't service, that's where we buy the services from the private sector." #W2*

> *"… if they would get to a scene of a motor vehicle collision, the public services will stand back and wait and watch the private services is stabilized and remove their patient to the hospital and then they collect funds from the RAF." #P3*

There were allegations of high-level corruption in the awarding of contracts to private EMS companies. Millions of rands from the EMS budget were re-directed to pay a private service provider in one province. The contract ceased when the province was placed under administration.

> *"…the service provider was brought into the province… we used to transport 300 patients a month before they came in. When they came in, they were transporting 800 patients a month and we were paying them for it… so, EMS money was siphoned off … to pay for a service that we didn't need… it was millions and millions of rands, we're talking about almost R40 million to R50 million a month." #P2*

> *"Some of the private EMS systems had adopted quality guidelines and quality oversight systems via a bigger group that they may have belonged to in the private sector, and they adopted those from the from the hospitals and clinics." #P1*

There are several private EMS companies across the country, the larger companies are owned by the larger private hospital groups. The larger private EMS usually provide better quality services but there are also private EMS companies that provide poor services (Vincent-Lambert & Jackson, 2016b). The private EMS companies operate largely in urban areas where the population density of the medically insured is higher.

> *"… the private sector struggles here because people are not working and they below the poverty line and also the medical coverages very low." #P11*

> *"… smaller ambulance operators that have found ways around these regulations and means by which to bypass compliance, perhaps being compliant for half a day and then not being compliant for the rest of the year." #P1*

Having access to accurate real time data is a key management tool for the EMS manager. Finlayson (2017) recommended implementing a CAD system with a standardised method for screening and triaging calls which would ensure the optimal

response and reduce incidences of inappropriate responses. A further recommendation was the use of CAD to determine demand pattern analysis and dynamic location/relocation models linked to satellite tracking to ensure the effective use of resources. The addition of resources without improving management systems, such as CAD, would limit the improvement in service delivery as systems, processes and procedures that guide the effective use of resources, would result in improved response times of ambulances.

The next section discusses the EMS services related to planned patient transport and interfacility transfers.

6.5.7 Sub theme 4.7. The quality of the EMS component related to planned patient transport and interfacility transfers

In the survey response to Questions 40, 67% (n = 211) of respondents Agreed (n = 174; 53%) or Strongly Agreed (n = 37; 14%) that planned patient transport (PPT) services or inter-facility transfer (IFT) are managed in a manner which maximises patient safety. In response to Question 41, if the PPT and IFT services are managed in a manner that maximises efficiency, 48% (n = 156) Agreed and 14% (n = 27) Strongly Agreed.

The inter-facility transfer (IFT) is the urgent transportation by ambulance of users that usually require a higher level of care. These users would require care and monitoring during transportation. It is a significant portion of the workload done by EMS. Many health districts in SA lack appropriate referral systems that ensure that users are admitted to the most appropriate health facility therefore reducing the need to later transfer the user by ambulance (Hardcastle et al., 2013).

Planned patient transport (PPT) is the scheduled transportation of non-urgent users to healthcare facilities. These users would not require any emergency care during transportation and would be transported with several other users either seated or on a stretcher in a bus or mini-bus configured to transport non-urgent users (Ashokcoomar & Naidoo, 2016). #P2 describes PPT as a taxi service.

> *"…patient transport section a taxi service, basically." #P2 "…main aim is really to move the patients then you know they plan you a patient transport services and you know the procedures for doing the interfacility transfers and things like that." #P11*

The demand for IFT and PPT has increased as services are cut back at some healthcare facilities necessitating the transport of users to other facilities to receive the service. In some provinces PPT there is no additional funds provided for these PPT.

> *"Then challenge with PPT, the demand is ever increasing. Whenever there are services that are cut at institutions throughout the province all that pressure comes back to us that we to transport these patients." #W4 "PPT is still funded under EMS programme 3.1 in some provinces – so there is no additional funds for PPT in some provinces" #W5*

The effective planning and scheduling of PPT can make a significant difference in the lives of the users that are dependent on this mode of transport. #P10 provides an account of a user that required 2-hour weekly dialysis treatment. Because the user lives in a rural village and relies on PPT she was spending six days travelling to and from the regional hospital until the PPT schedule was adjusted.

> *"…she lived in a rural village outside Port St Johns. She spent six days travelling because of the planned patient transport schedule. She only slept at home on Saturdays, the rest of the time she slept on a bench. The hospital doesn't provide her with meals, it's a 2-hour treatment. Just by having a vehicle pick her up at home meant she could sleep at home every night." #P10*

One of the measures implemented to reduce maternal and infant mortality was the introduction of dedicated obstetric ambulances. Marcus & Clow (2009) reported a mean ambulance response time of 106.67 minutes to calls from midwife obstetric units in Cape Town. The introduction of dedicated obstetric ambulances in the Free State province resulted in a reduction in deaths with the monthly mean dispatch interval curve closely following the maternal mortality curve (Schoon, 2013). As a result of this finding, several provinces introduced dedicated obstetric ambulances. In some

provinces there was no additional staff or budget for the service as a result ambulances were taken out of operational service and stationed at clinics to transport obstetric patients.

> *"The introduction of the obstetric ambulances they were introduced as obstetric ambulances but there wasn't staff and there wasn't additional funding for them." #W7*

> *"The Northern Cape has moved away from dedicated obstetric ambulances The ambulance is there to cater for all emergencies. Every province is taken a different approach to these vehicles. #W5*

The theme that was discussed in all the workshops related to the lack of resources related to building of EMS stations, availability of the fleet and budget constraints. This theme will be unpacked in the next section.

6.6 THEME 5: INFRASTRUCTURE, FLEET, AND FINANCIAL MANAGEMENT RELATED TO QUALITY IMPROVEMENT

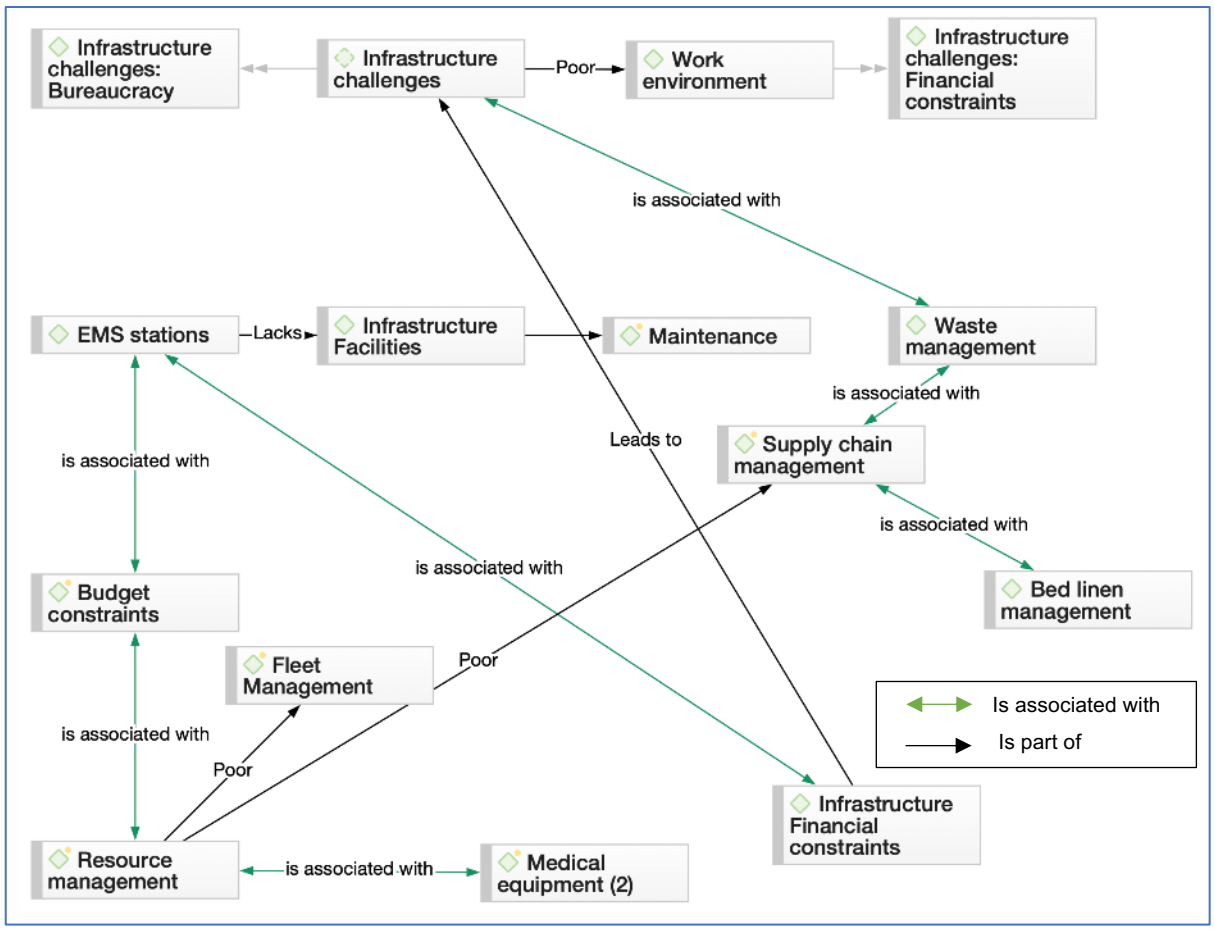
This theme contributes to answering the research question, what are the factors that motivate and foster quality improvement amongst EMS managers within EMS organisations? In considering the EMS licensing regulations specifications that every EMS station must comply with as part of the licensing inspection it became apparent during the workshops that many public EMS stations do not meet these requirements. The EMS station would require facilities such as a wash bay to wash the patient compartment of the ambulance and a sluice facility for cleaning of equipment. The next section will discuss the infrastructure challenges facing EMS.

6.6.1 Sub Theme 5.1. Infrastructure challenges impact on EMS quality

Appendix A (2) Requirements for Emergency Medical Services, of the Emergency Medical Service Regulations, 2017 specifies the minimum requirements for an ambulance station/base (Department of Health South Africa, 2017). Domain Six of the Regulations Relating Standards for EMS requires the facility management to be functional and enable the safe and uninterrupted delivery of EMS (Republic of South

Africa, 2022b). The code network below illustrates the associations between infrastructure, maintenance and waste management. Finance and management are a common factor that link infrastructure, building and fleet maintenance.

Figure 6.7: Code Network Infrastructure, Fleet & Finance



Source: Researcher's own compilation

> *"…the biggest problem that we have in before we do anything else, before we buy the vehicles, before we buy the equipment, is our infrastructure, the infrastructure for EMS has been in such a poor state for such a long time that we are mainly failing the inspections based on infrastructure, how our bases are built, where they are situated, access, egress routes, the type of wash bays that we have, that's where we failing not mainly on the other things but that that's our main failure." #P2*

In the Chapter Five survey results, 66% (n = 228) of those surveyed selected either Neutral (n = 65; 19%) Disagree (n = 84; 24%) and Strongly Disagree (n = 79; 23%) options in response to the statement, "The building occupied by my service meets the

requirements of the building regulations". In response to the statement: "The building maintenance services are functional and enable safe and uninterrupted delivery of emergency medical services", 69% (n = 235) of those survey indicated either Neutral (n = 80; 26%), Disagree (n = 87; 25%) and Strongly Disagree (n = 68; 18%). The dissatisfaction with EMS infrastructure and maintenance of infrastructure was also a common theme that emerged during the workshops in the provinces and interviews.

> *"Show me how many wash bays you can get for R12 million, and that project is been ongoing, you know, they sent the designer, they sent the planner, they sent public works, but nothing solid has gotten off the ground. So right now, for the last three years, none of my bases has been a licensed." #P8*

The WHO calls for an action plan for water, sanitation and hygiene (WASH) at all healthcare facilities, by 2030 (Potgieter et al., 2021). The EMS regulations for licensing of the ambulance station requires the station to have a vehicle wash bay and sluice facilities. Several public EMS stations around the country are not licenced because they do not have these facilities.

The National Department of Public Works and Infrastructure (DPWI) is responsible for all the construction and maintenance of all buildings occupied by any government department. Despite there being budget provision for building infrastructure and maintenance, participants' utterances in the workshops and interviews suggest that EMS infrastructure and maintenance is a low priority and projects take years to complete.

> *"We don't have sluice facility; we don't have a wash bay. And also, we don't have proper storage for oxygen, medical gases and you know, surgical sundries and that. Even refuse, our medical refuse is lying outside in a closed bin." #P8*

> *"…some stations that I've seen that are deplorable, it's disgusting." #P7*

> *"Public works is a problem throughout the country." #W1*

> *"Infrastructure budget is with national, there are billions of rands, but EMS stations are not included in the plan." #W3*

> *"I can tell you now if you don't give me the money to fix my station and so on, there's no point in me even doing this checklist." #P7*

> *"No purpose-built stations, there needs to be standardization! They have been trying to build a base for the last two years and they have spent R10 million just analysing the soil." #W3*

Routine maintenance and repairs as well as the provision of a budget for maintenance by the DPWI has also been identified as a problem.

> *"…we need a proper maintenance budget." #W1*

> *"So, I'm sitting without an air conditioner repair now for the last 232 days or so sure that's not been attended." #P8*

At the one station there is no storeroom and medical stock is left in the open in the crew room and missing stock cannot be accounted for as everyone has access.

> *"…we've got storage space to put the equipment into the equipment just stays in the crew room or stays in a shower. There's no storage room." #P8*

Despite there being facilities available at clinics and hospitals, EMS are not given access to these facilities in some districts. As an example, in the rural Northern Cape, there are no ambulance stations in some towns and the crews are forced to sit in the ambulance in the extreme weather conditions in-between calls.

> *"There are facilities that are vacant, but they don't allow us to work from there." #W1*

> *"The EMS personnel in Northern Cape they have to sit outside in their ambulances and the peak hot sun during the day in summer temperatures that up to 45 sometimes close to 50 degrees Celsius and in winter go to negative temperatures. There is a room that's available for them to sit in and use as a crew room, but they're not allowed to use it. When the clinic is closed after hours where do they use the toilet? Why must they be treated like this?" #W3*

The national directorate for emergency medical services has recognised the need to prioritise infrastructure and has been engaging with DPWI to focus on EMS infrastructure development.

> *"So, the in terms of the infrastructure. We've got a project at the moment that's under underway with our infrastructure team and we are assessing each and every EMS station in the country." #P7*

> *"Only 16% of the EMS stations are purpose built. This is what motivated the infrastructure department to step in and focus on EMS." #W5*

> *"… if you want EMS to be what it should be, this is what we need, we need ring fence funding for this and be able to do that. So, you can create a working environment that is very reasonable." #P7*

In some districts, EMS has partnered with private industry, such as mining companies that have constructed EMS stations as these industries would benefit from having a functional EMS station near the mining operation where the risk of injury and death is high.

> *"…public-private relationships as well you know, you have the mining companies in some provinces that have engaged with EMS and said look we will build you your station." #W2*

> *"We not looking after the infrastructure." #P2*

6.6.2 Theme 5.2. EMS resource and fleet management constraints

Section 25 lists fleet management as a sub-domain of the domain Operational Management in the Regulations Regulating Standards for EMS. Section 25 (1) of the regulation requires the vehicles used to transport user and personnel to be safe and well maintained. Section 25 (2) (d) requires EMS to implement an effective fleet management system (South Africa, 2022). In response to the survey question: "The vehicles used to transport patients are safe and well maintained", 49% (n = 172) choose Agree and 16% (n = 56) choose Strongly Agree, 20% (n = 70) were Neutral, 10% (n = 34) choose Disagree and 5% (n = 18) Strongly Disagree.

During the non-participant workshop observations and interviews the shortage of operational vehicles was raised as a concern in some provinces. Managers use the ideal norm of 1 ambulance per 10 000 population to determine the number of ambulances per district. For the ambulance to be fully operational it must be road worthy, meet the EMS licensing regulation requirements and have two crew. There is acknowledgement that the demand for EMS far exceeds the supply. The shortage of vehicles impacts directly on the users having timely access to emergency medical care.

> *"If we don't have an ambulance, we will send one as soon as we have one. But we cannot compete with the rest of the world." "So, if we have 300 calls in a day. And everybody wants an ambulance within the next five 10-15 minutes. Then we gotta have 300 ambulances standing and waiting for a call,*

> *"…in the province we targeting to run 174 ambulances and present at 148" #W4 "…there should be 82 ambulances in Mangaung, there have on their register 52 ambulances, but they are able to roster 24. They have a shortfall of 58 ambulances and 464 staff members. So, we are rostering for 6% of the*

Managers spoke about staff having to report for duty but are unable to work because there are insufficient vehicles available at the EMS station.

> *"You speak about use of resources, and we have spare staff, because we don't have vehicles." "Some provinces have so many staff and no vehicles, so they*

Participants expressed their frustration of having to account for the number of operational ambulances when the non-availability of ambulances is outside their sphere of control.

> *"We as managers need to account for something for which we are not directly in control. We need to highlight how service providers have a negative impact on what is happening, yet we as managers are held to account." #W1*

The fleet manager is responsible for the fleet, but this person in some provinces is centrally located and does not have the experience, training, or qualifications to manage a large fleet.

> *"…you only have one fleet manager that is in head office, and you don't have fleet managers in the district, whereas they've got 60 vehicles, and there's no fleet manager. They just take a BLS or an ILS and put them there and you find that these ambulances, sometimes they lose their warranty because there is no one that is properly trained to take care of them." #P11*

The similar concern is shared by #P4, #P8 and #P11.

> *"…fleet as well is a huge issue. You know, you just appoint anyone as a fleet manager, he takes the ambulance to his specific workshop for specific things and you'd go in with a broken headlamp and come out without the engine kind of thing. You know. So that's the reality of what the EMS industry, the public sector has been facing." #P4*

“We don't have control over who repairs the vehicle.” #P8

“…these ambulances, sometimes they lose their warranty because there is no one that is properly trained to take care of them.” #P11

There was suspicion amongst some managers that there was theft and corruption associated with vehicle maintenance and repairs.

“…every year, the service buys tyres for the vehicles. You will find that 90% of the vehicles they don't even have spare tyres. They don't even have jacks. Then you ask yourself the question where, where do they go to? Is there somebody who's accountable?” #P10

“Someone is getting rich; we have 7 ambulances standing at one service centre for repairs.” #W2

“…people don’t attend (meetings with service agents) because they are getting kickbacks from the local vehicles maintenance companies.” #W2

“…like a (vehicle) service will take you anything up to three days. You know you send it to a merchant, the merchant, does the assessment, send this quotation to WesBank which then stands in the queue. There's no special section at Wesbank looking to EMS only. There goes in the queue and when they process it and award you the work, that's another day gone.” #P8

The delays in turnaround times with authorisation, maintenance, repair, and servicing of the vehicles was a common concern in many of the provinces.

Rural provinces have their own unique challenges regarding fleet maintenance. The vehicles have high mileage because of the vast distances they travel. The manufacturer’s service agents are in the main cities. The vehicle to be repaired and another vehicle to bring back the driver must drive several hundred kilometres to have the vehicle serviced or repaired.

> *"So, you waiting the line like everybody else or ambulance could stand for two weeks before it gets repaired." #P2*

> *"We have vehicles running at over 500 000km, because they are travelling to deep rural areas." #W6*

> *"Ambulances in the small towns need to be taken to the main cities to have service maintenance, repairs done with the authorised agencies." #W2*

> *"For EMS we need speed bays, we can't be sitting with a vehicle sitting with an agent waiting for authorization. Some provinces have vehicles waiting for a tyre for up to six months or a cracked windscreen waiting for 3 months, waiting 6 months just for a battery. Things like this shouldn't happen." #W5*

There was acknowledgement that in some provinces the fleet is being properly managed. This is being done by the province using the more expensive leasing option.

> *"In any fleet, you are allowed 10% of the vehicles to be down for repairs, servicing, etc. the only province that reaches that target is the Western Cape because they lease their vehicles." #W2*

> *"Our ambulance turn-around for fleet time is excellent, 95-97% of our ambulances are available, unless it's an accident damage." #W6*

Other good fleet management practices that were making a difference in other provinces included driver training programme in KwaZulu-Natal and the effective use of vehicle tracking in North West Province.

> *"You've got one of the best driver training practices in the country we want to make the national we even have a program." #W1*

> *"Trackers have installed in the ambulances that have resulted in improved driving behaviour and reduced the number of accidents." #W2*

The next section discusses the impact of the financial budget constraints on EMS and how it constrains efforts to improve the quality of the service.

6.6.3 Sub theme 5.3. Impact of financial constraints on EMS quality

Although the national budget for Programme 3, Emergency Health Services increased from R4.6 billion in 2012 to R8.6 billion in 2021, it is up to each province to decide what percentage of the provincial health budget would be allocated to each component such as EMS (Tiwari et al., 2021).

The EMS budget in most provinces is almost entirely spent on the compensation of employees, leaving little or no budget for other expenses such as building infrastructure maintenance. In some provinces the 24-hour shift schedule results in employees exceeding the maximum working hours and therefore claiming overtime every month.

> *"EMS is under budgeted in terms of your COE, compensation of employees, we had an over expenditure of over a R100 million in the past financial year. Overtime budget is unsustainable, solely because of the working model, we are spending almost R38million a year on rostered overtime that is money down the drain." #W4*

#P2 claim is that historically EMS in some provinces received a bigger percentage of their provincial budget.

> *"Budget allocated is inadequate, everyone is fighting to their share." #W2*

> *"…the provincial budget with the Western Cape and the Free State being the most resourced. So they get almost 8% of the health budget, Northwest gets under 4%." #P2*

#P3 argues that despite the significant budget allocation some provinces and districts are not providing adequate emergency medical services.

> *"So how can we justify getting a budget and not providing a service?" "…it's not like they're not getting the budget to actually, you know, set up a system." #P3*

#P4 said that in those provinces that were decentralised to the district health system, the district director, who would often be a nurse, would use the EMS budget allocation inappropriately.

> *“So, you'll go when you look at where EMS budgets are being spent in you know on useless stuff in terms of it. When I say useless stuff, they allocated to buying substandard equipment, there’s deviation from tenders, there's deviation from RT4 procurement.” “You must understand also EMS was decentralised in a lot of provinces so that means the cash was being used as sub district level and normally who would be in charge of EMS, it would be primary healthcare nurses.” #P4*

#P7 suggests that the motivation to decentralise EMS to the districts is so district managers can use the budget as they wish.

> *“There's also other reasons why people like to decentralize, because then you split the budget and then there is no oversight management of the budget and people use the money as they wish.” #P7*

#P4 also adds that there is a lack of financial training for EMS managers and there is also no accountability when the incorrect procurement procedure is followed.

> *“There's also other reasons why people like to decentralize, because then you split the budget and then there is no oversight management of the budget and people use the money as they wish.” #P7*

As discussed previously, the budget constraints have implications for the EMS staff structure. Vacant posts are not filled, and EMS managers are appointed in acting posts.

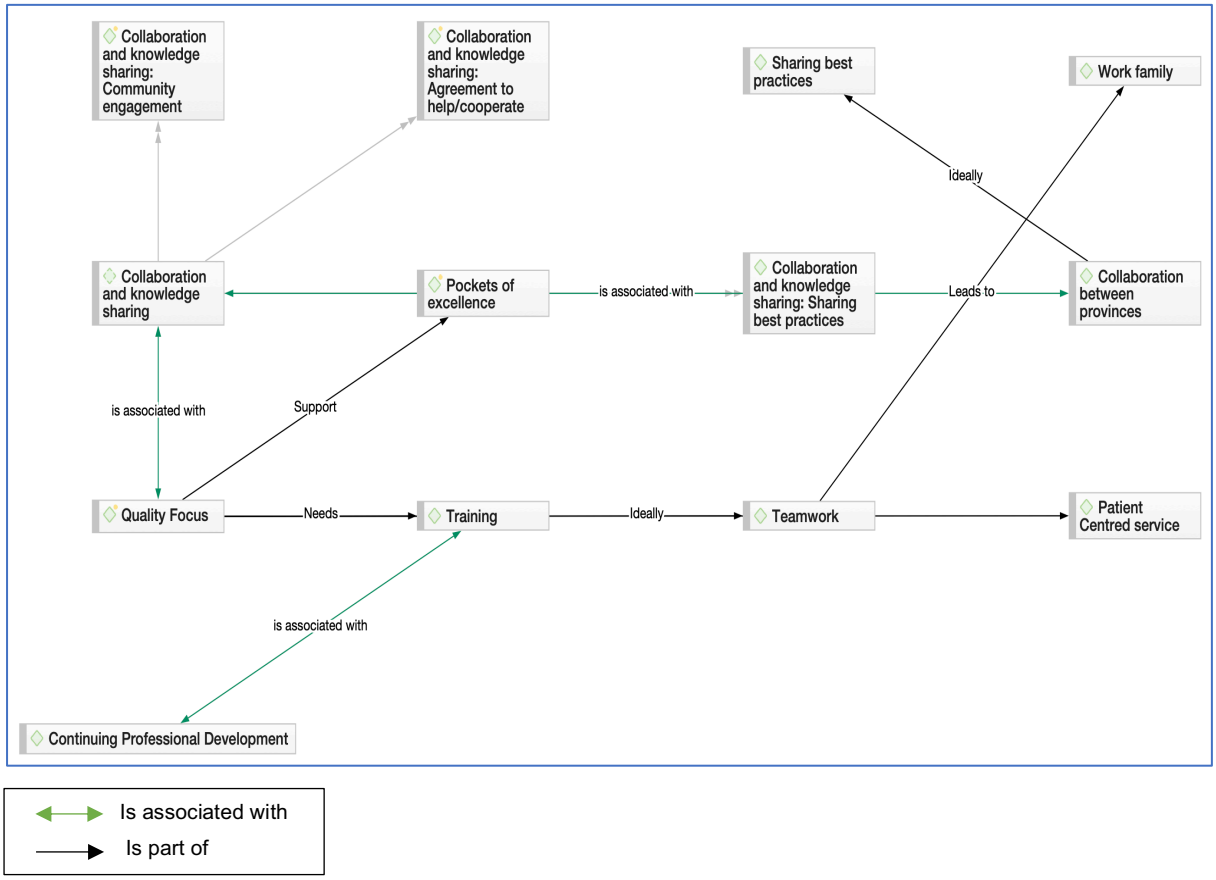
The last theme to emerge from the qualitative analysis relates to collaboration and knowledge sharing.

6.7 THEME 6: COLLABORATION AND KNOWLEDGE SHARING

This theme responds to two research questions. Firstly, what are the benefits, and impediments and opportunity costs to implementing quality improvement in EMS? Secondly, what are the factors that motivate and foster quality improvement amongst EMS managers within EMS organisations?

The code network in Figure 6.8 below shows the associations between EMS and the community, the sharing of best practices, collaboration between provinces, teamwork and recognising the pockets of excellence. Each will be discussed below.

Figure 6.8: Code Network Collaboration and knowledge sharing



Source: Researcher's own compilation

The sub-domain Occupational Health & Safety in the regulations relating to the standards for EMS requires EMS to facilitate a programme of community engagement that builds relationships between EMS personnel and the communities they serve. In the survey 37% (n = 129) of the respondents selected Agree and 4% (n = 27) Strongly

Agree that their EMS has a comprehensive safety programme that safety of the vehicle crew and ensures uninterrupted service to communities. There were examples of excellence in community partnerships to overcome the challenges of attacks on ambulances that had areas being classified as "Red Zones[60]".

> *"We have an issue with a red zone. We negotiated with the community to have the patients taken to the clinic and set up a green corridor for the ambulance to enter and exit the red zone area. We draw up the agreement with them and will pick up several patients at a time." #W6*

Educating the community on the role of EMS is also key to ensure the appropriate use of EMS and helps build trust.

> *"We do public education, the managers go out to the malls, go to the little towns, put up a stand and distribute flyers on how not to abuse the ambulance, when to call for an ambulance. Then they do BP tests and other minor things so people can understand what EMS is about." #W6*

> *"…there's a lot of people that are in the community that have a lot of regard for the ambulance. So, if for example, if one of my guys break down, have a flat tire, something like that, the community always steps up and help and get the vehicle back on the road and going again." #P8*

Providing other forms of support to communities also help build the partnership. In this example, the ambulance station is used as a venue to give school children extra lessons.

> *"We have a started a community programme at the EMS stations where the teachers come in and give the community extra maths and sciences lessons. We then recruit from these programs and give them bursaries." "Now the community leaders are supporting us because they can see how EMS is making a difference in the community, they join the team. Links with local hospitals, SAPS, community forums, farmers association, etc." #W6*

[60] "Red Zones" are designated areas where EMS crews are often attacked. EMS response to these areas are done under police escort.

There are examples of fostering collaboration with other healthcare facilities and emergency services to ensure delivery of services as well as close engagement with communities in some districts, so much so that they are referred to as “Green Angels” because the EMS uniform is green.

> *“With the communications, we have been building relationships. We got out to the hospitals and have meetings with the doctors, nurses. We don’t send an ambulance out every hour. We say to them keep the patients and when they are a few we’ll collect them. We can have 5-6 ambulance coming to one hospital, what about the rest of the district. We speak to our counsellors; we have established relationships with the hospitals and do presentations on what we do. They call us the “Green Angels” sometimes.” #W6*

Districts and provinces that have implemented successful community engagement projects are used to motivate other districts and provinces. There are also instances where there is no sharing of good practices.

> *“There is a well-structured partnership with fire department with joint rescue. Our focus now is about community engagement, not on response times. We don’t have the budget and resources to provide an ambulance for every street block.” #W6*

> *“…if one province starts to do it and we start to achieve, it creates a motivating point for other people and other provinces.” “…we're sharing that across the country.” #P7*

> *“…some of the provinces didn't share some of the good practices. And I think that they were just trying to hold the intelligence to themselves. And I think that was rather selfish. You know we we've picked up some of those things.” #P7*

> *“…It became the lighthouse of the other provinces.” #P10*

There are also examples where there could be closer collaboration and agreements between provinces especially where a town is located closer to a healthcare facility in

another province. Decisions taken regarding transporting patients to the closest healthcare facility appear to be ignored.

> *"The issue of the partnership with the other provinces, develop an MOU with the neighbouring provinces. Free State EMS station is 50km away from the provincial border, but the people live and work a few kilometres away. We just need to work with the district health service to get SLA signed by the two provinces." #W2*

> *"Garies there's only two ambulances in the area but think about it for the patient that is now in the back of the ambulance for 10 hours that's a long drive but two hours of across the border in western cape is a hospital that you can take patients to. The national health council around 2015 made a decision that patients will be taken to the nearest appropriate hospital regardless of political boundaries." #W3*

Benchmarking against other EMS systems allows for sharing of best practices and the quality improvement (Robert et al., 2002).

6.8 SUMMARY OF THIS CHAPTER

There are six major themes that emerged following the qualitative thematic analysis of the transcripts from the non-participant observation at the workshops and the interviews with the key informants. The first major theme of this chapter discussed the complex historical influences that shaped public EMS in South Africa. The sub themes include the apartheid era practices, the influence of the white managers, the role of the ambulance chief and the participants perceptions of historically better-quality EMS systems.

The next major theme that emerged relates to the impact of the human resource challenges on EMS quality in relation to the managers experience, education and training, unfilled vacant posts, and the unprofessional work ethic of employees.

The theme governance and leadership specifically unpack the impact on quality of the devolution of the EMS component within the provinces to the health districts as part of the district health system, the perception that EMS is marginalised within the provincial

health department and impact of political and labour union influences on the EMS quality.

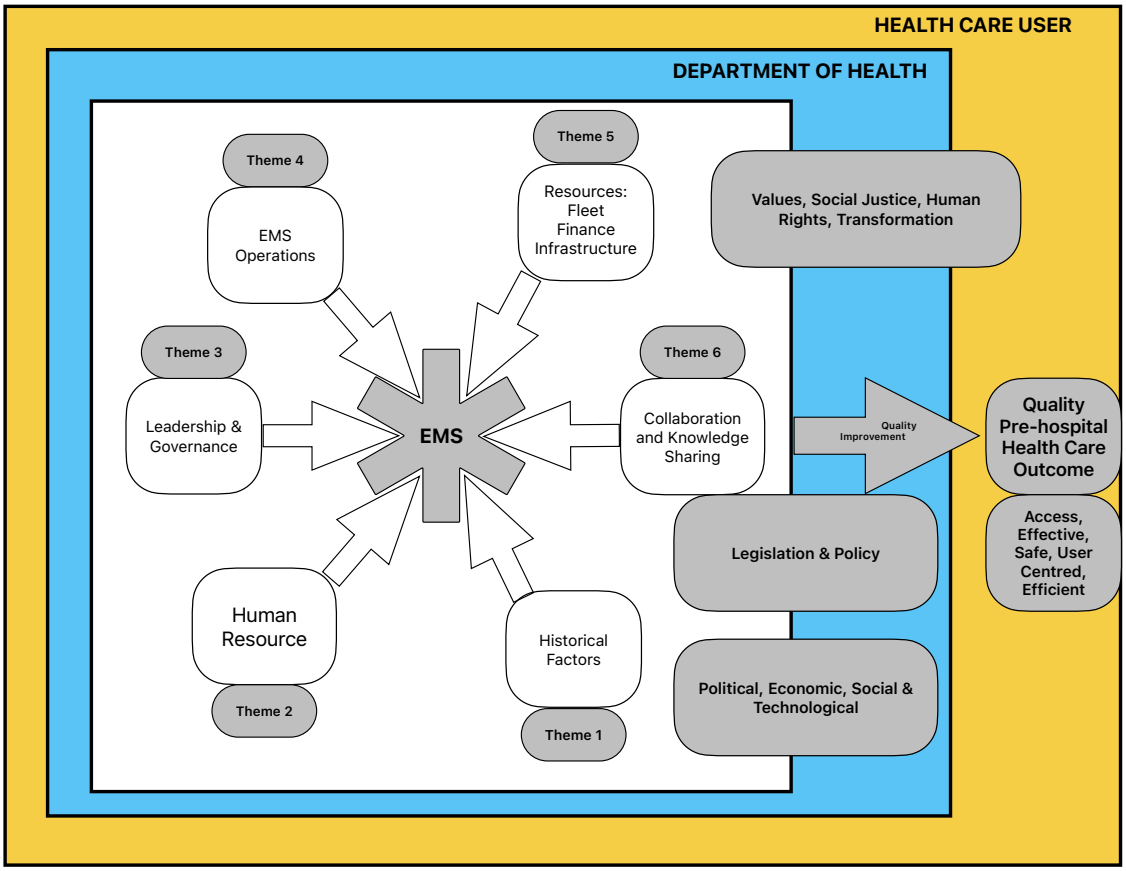
The next theme, EMS operational management unpacks the quality issues related to the Emergency Communication Centre, which is at the heart of operations, the use of computer-aided dispatch to ensure a safe, effective, and efficient EMS, the EMS response times impact on access and the outsourcing to the private EMS. The quality challenges around Planned Patient Transport (PPT) and Interfacility Transfers (IFT) are also unpacked under EMS operational management.

Infrastructure, financial resources, and fleet management was a major theme that have repercussions for quality. EMS cannot function without finance to cover expenses, purpose-built EMS stations and a fleet of vehicles that adhere to the EMS licensing regulations.

The last theme exemplifies the opportunities to strengthen EMS that come with collaboration between provinces, with communities and other stakeholders.

Figure 6.9 illustrates that EMS as a system does not exist in isolation outside of the Department of Health. The Department of Health has an ethical, legal, and moral obligation to render quality health services to the community. There are shared values of social justice, human rights and transformation are these are encapsulated in the various policy documents and legislation. The health ecosystem is impacted by the dynamic political, social, economic, and technological factors. Each of the themes reflect the focus areas within EMS that are vying for attention. It is within this context that the public EMS system finds itself and an EMS quality improvement framework would need to consider these focus areas in relation to the dimensions of quality. The next chapter will discuss the findings of Chapters Five and Six.

Figure 6.9: EMS as an ecosystem



Source: Researcher's own compilation

CHAPTER SEVEN
DISCUSSION

7.1 INTRODUCTION

Chapter Five presented phase one quantitative survey data and analysis. In Chapter Six the findings and analysis of the phase two qualitative data from the non-participant observations and interviews were presented. This Chapter will mix the quantitative and qualitative findings and focus on exploring the meaning and interpretation of the research findings. The purpose of this chapter is to evaluate, explain and critically discuss the significance and implications of the research findings in relation to the research aim, objectives, and questions and in so doing develop a quality improvement framework for EMS.

The research findings will consider the findings in relation to previous studies that would have been discussed in the chapter two literature review. Additional literature and the theories that may either confirm or contrast with any new findings will be referenced throughout the chapter. The relevance and significance of the findings will be presented in the conclusions that will be drawn from the analysis.

The research aim, objective, research questions and propositions are restated here for ease of reference. The aim of the study was to potentiate eligibility and compliance with the Office for Health Standards Compliance (OHSC) quality standards in Emergency Medical Services (EMS). This study intends to recontextualise the quality improvement discourse through the construction of a quality improvement framework that strengthens the public service EMS manager's response to the OHSC quality standards for EMS in South Africa.

The objectives were:

1) To facilitate a quality self-audit including the critical appraisal of the knowledge, attitude and practice of EMS managers who are the power brokers in relation to EMS quality improvement.

2) To investigate, observe and document the quality champions perspectives on the application of the OHSC standards and implications of non-compliance.
3) To develop a framework that explicates how change in EMS policy and praxis may lead to quality improvement in public EMS systems, in the interest of patient safety and organisational sustainability.

The main research question of this study was:

How can a healthcare quality improvement framework transform the knowledge, attitude, and practices of EMS managers so that EMS organisations may develop the capacity to comply with the regulations relating to the standards for EMS.

The secondary questions that follow were:

1) What are the knowledge, attitudes and practices of EMS managers who are quality champions, in the public EMS organisations in relation to Quality Improvement?
2) How do EMS managers perceive, interpret, and understand the OHSC quality standards for EMS?
3) What are the factors that motivate and foster Quality Improvement amongst EMS managers within EMS organisations?
4) What are the benefits, and impediments and opportunity costs to implementing Quality Improvement in EMS?

The following propositions were formulated in Chapter One:

Proposition 1: Quality systems assess and maintain standards of quality and patient safety in EMS in South Africa are perceived to be underdeveloped and poor due in part to ineffective leadership.

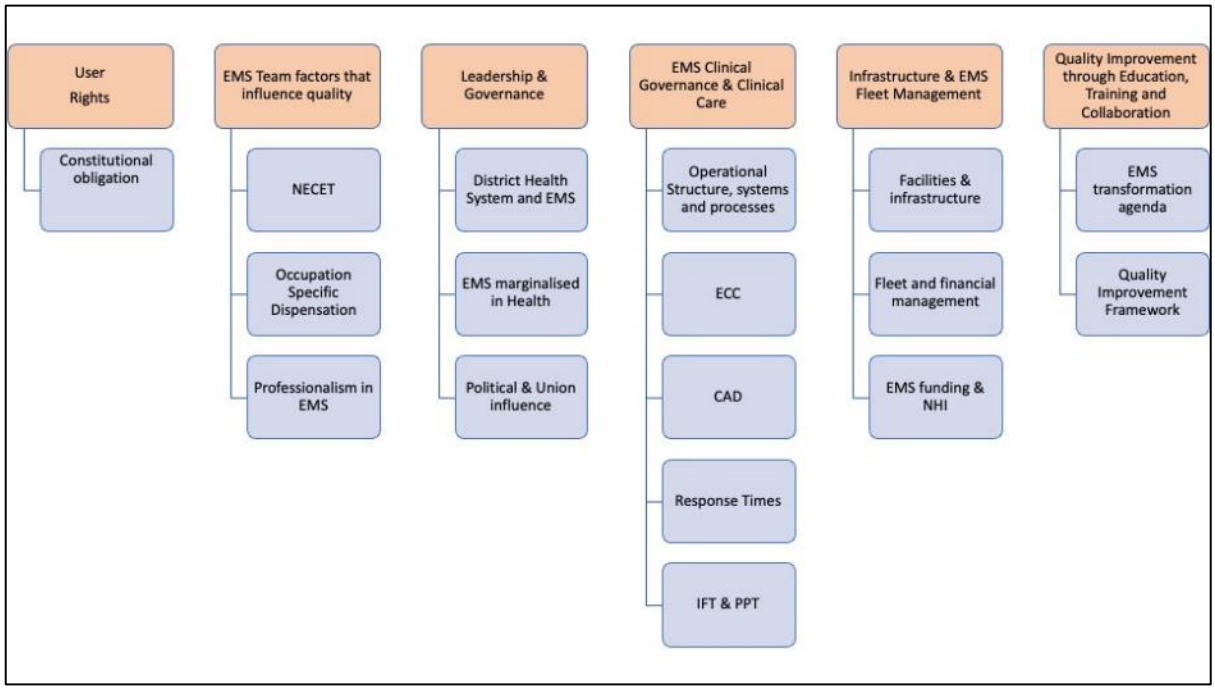
Proposition 2: Emergency medical services are a nuanced and complex organisation that require bespoke quality improvement systems to be developed, maintain, and

evaluate quality and patient safety. Assessing and maintaining training will contribute to improving the knowledge, attitude, and practices of EMS managers and therefore the quality of EMS.

Proposition 3: Quality improvement training will contribute to developing the knowledge, attitude, and practices of EMS managers thereby improving compliance with the quality standards for EMS.

Figure 7.1 provides a schematic overview of the themes and sub-themes that will be discussed in this chapter. The themes, and sub-themes are considered as the pillars on which the framework will be constructed supported by existing theories and established theoretical quality frameworks. Table 7.1 in the next section is a summary that presents the key findings from Chapters Five and Six, and emergent themes in the discussion that align to answer the research aim and questions.

Figure7.1 Overview of Discussion



Source: Researcher's own compilation

Table 7.1: Emergent Themes

Associated Research Questions	Phase 1 Key Findings	Phase 2 Themes & Sub-Themes	Domains[61] in EMS Regulations	Discussion Chapter Headings	Models\Theories\ Frameworks
What are the knowledge, attitudes and practices of EMS managers who are quality champions, in the public EMS organisations in relation to Quality Improvement?	The mean age of the public service EMS managers was 45 years. The mean tenure in EMS reported as 21 years. 74.7% (n = 263) were male. 67.5% (n = 237) hold an AEA qualification. 32.7% (n = 115) held the position of Station Manager, followed by 29.8% (n = 105) who were Shift Leaders. 52.9% (n = 183) reported between 10-50 staffing reporting to them.	1.1. Apartheid's pervasive effects on the quality of EMS systems 1.2. The dominance of the white male manager 1.3. Quality by dictate: the dominance of the Ambulance Chiefs 1.4. Perceptions of loss of pre-1994 EMS good 'quality' practices	**User Rights**	**User Rights: Is EMS meeting their constitutional obligations**	Historical Trauma Model
What are the knowledge, attitudes and practices of EMS managers who are	The aggregate Education and Training index calculated a mean score of 0.48 and median	2.1. Gaps in EMS manager's quality improvement education 2.2. Vacant but crucial EMS management posts	**Operational Management**	**EMS Team factors that influence quality**	Harvard HRM Model

[61] Domain is an aspect of service delivery where quality or safety can be at risk (Department of Health South Africa, 2012c).

Associated Research Questions	Phase 1 Key Findings	Phase 2 Themes & Sub-Themes	Domains[61] in EMS Regulations	Discussion Chapter Headings	Models\Theories\ Frameworks
quality champions, in the public EMS organisations in relation to Quality Improvement? How do EMS managers perceive, interpret, and understand the OHSC quality standards for EMS?	of 0.5 which identifies the need to QI training The mean Education and Training Index was lower in the rural provinces Mpumalanga and Limpopo. In the analysis of experience and Education and Training, The was a significant relationship (p-value: 0.036). Thus, more tenured staff had higher Education and Training Scores.	2.3. EMS quality improvement is stifled by unprofessional work ethic		The National Emergency Care Education & Training Policy The outdated occupation specific dispensation (OSD) for EMS personnel EMS Professionalism impact quality HR Transformation Agenda	
What are the factors that motivate and foster Quality Improvement amongst EMS managers within EMS organisations?	51% (n = 178) Agree or Strongly Agree that my place of work has a functional governance structure.	3.1. Impact of the District Health System versus Provincial Health model on EMS quality 3.2. EMS marginalisation within the health system 3.3. Political and organised- labour interference in EMS management	**Leadership & Governance**	**Leadership and Governance in the EMS context** EMS fragmented under District Health System EMS is marginalised within the health system. Political and Labour Union Interference in EMS Management	Deming's Theory of Profound Knowledge
What are the factors that motivate and foster Quality Improvement	40% (n = 140) said they Agree or Strongly Agree that their	4.1 Emergency Communications Centre and Computer Aided Dispatch impact on EMS quality	**Clinical Governance & Clinical Care**	**EMS clinical governance and clinical care**	Theory of Constraints

Associated Research Questions	Phase 1 Key Findings	Phase 2 Themes & Sub-Themes	Domains[61] in EMS Regulations	Discussion Chapter Headings	Models\Theories\ Frameworks
amongst EMS managers within EMS organisations?	organisation has an efficient vehicle dispatch system	4.2. CAD as a health information system 4.3. ECC functioning without CAD 4.4. Staffing in the ECC 4.4. EMS response times as a quality indicator. 4.5. Outsourcing to private EMS companies 4.6. The quality of the EMS component related to planned patient transport and interfacility transfers	**Clinical Support Services**	Focus on the EMS operational structure systems and processes. Emergency Control Centre (ECC) Computer-Aided Dispatch (CAD) EMS Response Times Planned Patient Transport and Interfacility Transfers	Activity Theory Donabedian Framework
What are the factors that motivate and foster Quality Improvement amongst EMS managers within EMS organisations?	34% (n = 122) said they Agree or Strongly Agree that the building occupied by my service meets the requirements of the building regulation and 33%(n = 114) said they Agree or Strongly Agree with the statement that building maintenance services are functional and enable safe and uninterrupted delivery of EMS	5.1. Infrastructure challenges impact of EMS quality 5.2. EMS resource and fleet management constraints 5.3. Impact on financial constraints on EMS quality.	**Facilities & Infrastructure**	**Infrastructure, EMS Fleet Management** EMS facilities and infrastructure Fleet and Financial Management related t EMS funding and the National Health Insurance (NHI) Quality Improvement	Transformative Change
What are the benefits, and impediments and opportunity costs to implementing Quality Improvement in EMS?	Operational Managers have consistently high Education & Training Index scores suggesting the need to prioritise the lower ranked EMS managers	6.1. Communities of practice 6.2. Pockets of excellence		**Quality improvement through education, training & collaboration** Quality improvement framework	Situated Learning Theory Andragogy Expansive Learning Cycle

Associated Research Questions	Phase 1 Key Findings	Phase 2 Themes & Sub-Themes	Domains[61] in EMS Regulations	Discussion Chapter Headings	Models\Theories\ Frameworks
	The EMS Assessment Index was constructed using the Likert responses to 35 standards. The mean assessment score was 0.58 and the median 0.6. The index identifies the need to QI to meet the OHSC quality standards for EMS.			Collaboration and knowledge sharing	HRO's Health Leadership Competency Model

Source: Researcher's own compilation

7.1.1 Main findings emanating from Chapter Five (Survey Data):

1. The EMS management structure is male dominated (n = 263; 74.7%). The average age of the manager is 46 years which indicates that many will retire in the next 14 years.
2. Of 237 (n), 67.5% are AEA qualified with limited opportunities to attain formal qualifications in emergency care.
3. Only 17% (n = 60) of those surveyed have been trained to manage quality.
4. Eighty five percent (n = 213) indicated that they lack the resources to implement quality improvement projects.
5. Sixty percent (n = 212) of the managers indicated the employees do not follow policies and standards.
6. Forty percent (n = 140) said they Agree or Strongly Agree that their organisation has an efficient vehicle dispatch system.
7. Thirty four percent (n = 119) said they Agree or Strongly Agree that the building occupied by my service meets the requirements of the building regulation and 33% (n=116) said they Agree or Strongly Agree with the statement that building maintenance services are functional and enable safe and uninterrupted delivery of EMS.
8. The aggregate Education and Training index calculated a mean score of 0.48 and median of 0.5 which identifies the need for QI training.
9. The mean Education and Training Index was lower in the rural provinces such as Mpumalanga and Limpopo.
10. In the analysis of experience and Education and Training, there was a significant relationship (p-value: 0.036). Thus, more tenured staff had higher Education and Training scores.
11. Operational Managers have consistently high Education & Training Index scores suggesting the need to prioritise the lower ranked EMS managers.
12. The EMS Assessment Index was constructed using the Likert responses to 35 standards. The mean assessment score was 0.58 and the median 0.6. The index identifies the need for QI training to meet the OHSC quality standards for EMS.

7.1.2 Main findings emanating from Chapter Six (Qualitative findings from non-participant observations and interviews):

1. The historical vestiges of apartheid have shaped the public EMS organisations and contribute to poor quality. EMS managers from the pre-1994 era still remember the racial oppression. The rural provinces and former Bantustan regions have never recovered from the decades of underfunding during apartheid.
2. Management education and training courses for EMS have not been developed. There is a need for quality improvement training. The NECET policy has capped the professional career development for EMS personnel with short course qualifications.
3. Crucial vacant posts are unfilled and the level of professionalism amongst operational EMS personnel is low. The political and union interference in EMS was viewed as a threat to quality improvement.
4. There were strong sentiments expressed that EMS is marginalised and seen as a priority in many provinces when budgets are allocated. The move by the provinces to fragment EMS under the District Health System was strongly opposed by EMS managers as it impacted negatively on the overall quality of the EMS in the province.
5. The ECC not having computer-based dispatch systems, properly trained staff compromised the quality of data to improve the access, effectiveness, and efficiency of EMS.
6. The reduced capacity of hospitals and clinics places and ever-increasing burden on EMS to redirect resources to meet the PPT and IFT need.
7. EMS infrastructure and building maintenance is a concern in most provinces as many EMS stations do not meet the basic infrastructure licensing requirements.
8. Poor fleet management impacts on the availability of ambulances to meet the need.
9. There are pockets of excellence, but good practices are not shared implying no community of practice.

The discussion on the patient rights in EMS contributes to answering the second research objective which was to observe and document the quality champions perspectives on the application of the OHSC standards and implications of non-compliance. The next section will discuss on User Rights within the EMS context.

7.2 USER RIGHTS: AN EMS ORGANISATION'S CONSTITUTIONAL OBLIGATIONS

The first domain in the National Core Standards (NCS) is User Rights and establishes the rights of the patient. Given SA's history of human rights abuses, these rights are non-negotiable in the Batho Pele (meaning people first) principles and the Patient Rights Charter. The user has the right to access care, in a manner that is respectful of the user's dignity and in an environment that is safe (Department of Health South Africa, 2011b).

This discussion aids in answering the research question: what are the factors that motivate and foster quality improvement amongst EMS managers within EMS organisations? The next paragraph will present the key survey data results from chapter four in response to the domain: user rights in the Regulations relating to Standards for EMS (Republic of South Africa, 2022b).

The EMS managers on average rated themselves, their workplace and organisation highly in response to the questions under the domain: User Rights. When assessing the average response to all four survey questions in this domain, 41.75% (n = 146) of the managers selected the Agree or Strongly Agree option on the five-point Likert scale. The next section will discuss the meaning and interpretation of the findings that will contribute to answering the research questions, starting with what was observed during the workshops and what the key informants said during the interviews.

During the non-participant workshop observations, EMS managers spoke about past and present EMS practices. During the interviews, participants were asked: "Can you contextualise your experience of quality management in EMS?" The next paragraph will discuss how despite South Africa's progressive Constitution and the

accompanying liberating legislation and policies, equitable access to healthcare service, including EMS, is frequently denied.

Participants #P3, #P9, #P7 and #P10 recalled how during apartheid the black majority population was denied basic human rights, including the right to access emergency services. An example was provided by Participant #3 of how users residing in black townships suffered the indignity of being carried in a wheelbarrow to pick-up points.

> *"The number of patients that we dealt with was very few in comparison to the number of patients we have now, because during those days, you know we had pick up points for the rural areas and you know the townships and things like that. So, we never went into these area, as it was just pick up points at the entrance or at the SAP station, and sometimes they got there in wheelbarrows." #P3*

This was because state ambulances were not permitted to respond directly to users' homes in certain black townships because it was deemed unsafe for the ambulance crew. The next paragraph will discuss how this practice has not changed but for different reasons.

During #W4, EMS managers discussed how users in rural areas are expected to meet the ambulance at designated pick-up points because the EMS does not have ambulances with 4x4 capabilities. In 2020 during the COVID-19 pandemic politicians in the Eastern Cape boasted about rural access to the media when they introduced motorcycle ambulances (a motorcycle with a sidecar to transport the patient). These motorcycles were shortly thereafter withdrawn when questions were asked about corruption related to tender irregularities; the user safety and emergency care during motorcycle transport; and non-compliance with vehicle specifications in the EMS regulations (Head, 2022).

Pick-up points have also become a feature associated with residential areas that are designated as Red Zones. Red Zones are areas where there is a threat of violence that places the ambulance crew at risk of attack due to crime or service delivery protests. Gleby (2018) describes how the user waiting time for ambulances in Red

Zones, which are in mainly low-income areas, has increased as the ambulance must wait for a police escort before entering the area.

> *"We have an issue with a red zone. We negotiated with the community to have the patients taken to the clinic and set up a green corridor for the ambulance to enter and exit the red zone area. We draw up the agreement with them and will pick up several patients at a time." #W6*

Apartheid practices discriminated based on race but despite the democratic changes, poor service delivery still impacts on the vulnerable, poor, rural, majority black population. This population is dependent on EMS to provide care and transport to access the public health facilities as they do not have their own transport and there is no public transport available at night. In the view of the participants, users of the public EMS in many parts of SA are not treated with dignity as often they must wait hours for an ambulance (cf. Chapter Six). In the study conducted by Finlayson (2017), staff in the ECC shared their frustration of trying to manage the shortage of ambulances. Ambulances were either busy or the crews were not responding when the ECC tried to contact them to respond to the outstanding calls. The next paragraph will discuss how the denial of timely access to EMS infringes on the user's dignity.

To treat someone with dignity is to treat them as individuals that are respected and valued. It can be argued that the failures of the EMS system in providing timely, accessible emergency care is an abuse of the user's right to dignity. Similarly the South African Human Rights Commission in their report into the access to EMS in the Eastern Cape (South African Human Rights Council, 2015), state that the extent to which EMS is available has an impact on the quality of life and the dignity of persons. The SAHRC report emphasises that vulnerable groups in society need to be treated with dignity by EMS. The report concludes with the recommendation that the DOH reconsider the definition of "emergency care situation" to include persons requiring urgent and timely treatment who are not excluded from such services in line with the protection of and respect for the fundamental right to health and dignity (South African Human Rights Council, 2015). The SAHRC findings are supported by 2015 UNFPA funded study that investigated obstetric ambulances in the Eastern Cape and reported that more ambulances and suitably qualified staff would provide the immediate relief

sought (Department of Emergency Medical Sciences, 2015). Whilst acknowledging that there is no quick fix solution to the scarcity of EMS resources, fully equipped ambulances are expensive, and it takes time to train health professionals, there is no evidence that the SAHRC recommendations have been acted upon.

The Domain: User Rights in the Regulations Relating to Standards in EMS, refers to the systems being in place to ensure users are treated with dignity. It does not reflect the users or the frontline EMS personnel views on how the user's rights are either protected or abused during their interaction with EMS. From media reports the users and their families are traumatised by the experience of having to wait hours to receive urgent emergency care (Mkize, 2016). The frontline EMS personnel bear the brunt of the families and community anger and frustration, and as a result face the risk of assault (Rowland & Adefuye, 2022; Gleby, 2018).

The implications of these findings in relation to research questions: what are the quality champions perspectives on the application of the OHSC standards and implications of non-compliance? The findings point to the need for development of the leadership competencies of the EMS managers in relation to the Domain: User Rights. Garman & Johnson (2006) describes leadership competencies as outcomes related measures of knowledge, abilities and skills that make an effective leader especially in complex organisations that are evolving and need to be flexible and adapt to changing needs. In South Africa, Pillay (2010) conducted a survey that was used to develop a competency-based model that identified the core competencies for optimal nursing management. There is a need to contextualise the training of the core competencies. The next paragraph discusses andragogy theory in this context.

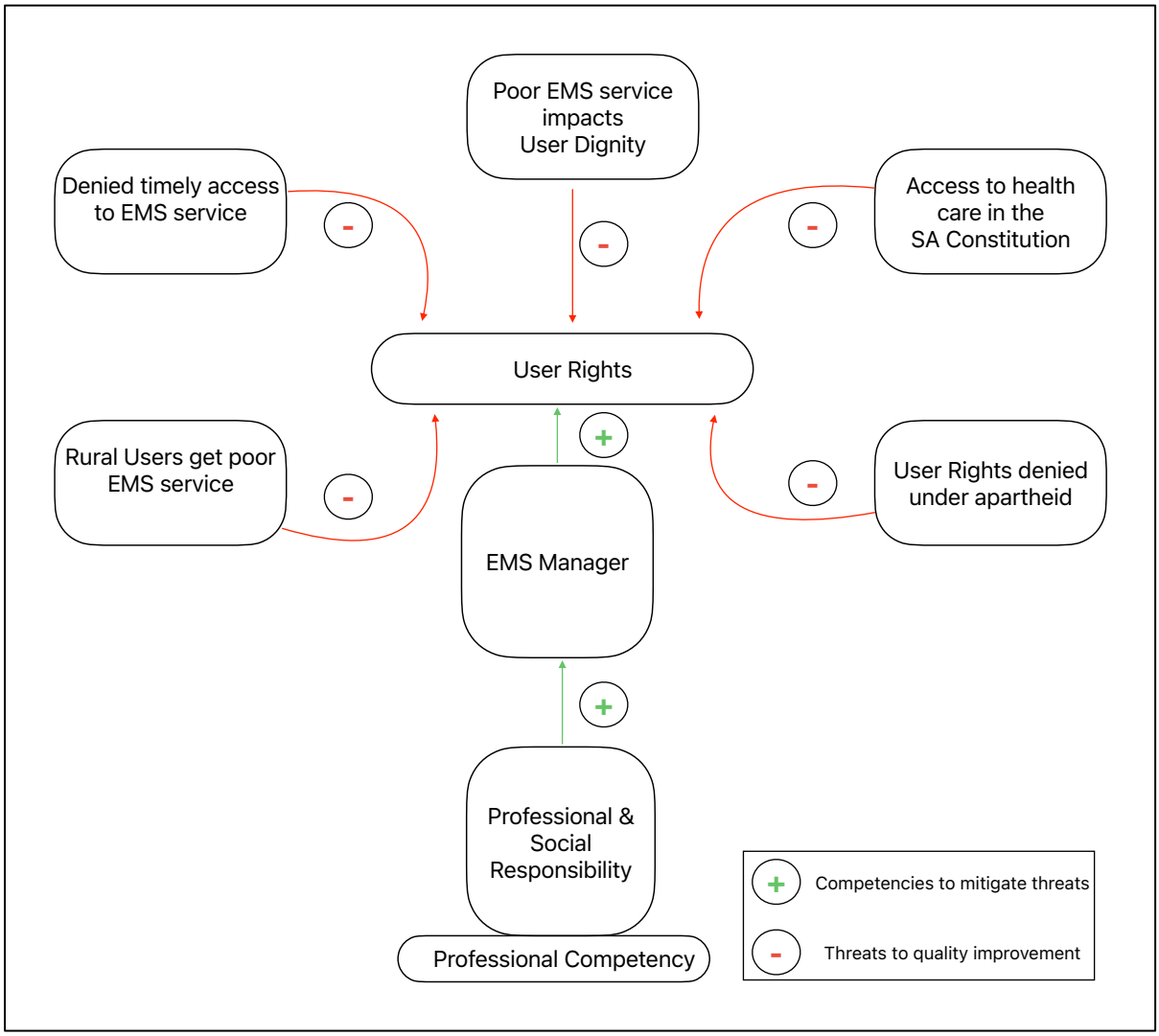
The training of in-service EMS personnel from historically disadvantaged backgrounds needs to consider the theory of Andragogy. The Andragogy theory is relevant to learning because it acknowledges that the adult learners construct meaning through experience of the world. Andragogy is based on the principles that learning involves interaction through interpretation, integration, and transformation of the learner's experiential world (Pratt, 1993). The theory favours human agency and the power of the individual to use education to break free from political and socioeconomic

oppression. As Freire notes there is no separating practice from philosophy: adult learning is a philosophical stance for the purpose of emancipating the individual which leads to societal change (Freire, 1970). The next paragraph will introduce a health leadership competency model.

The National Centre for Healthcare Leadership (NCHL) Health Leadership Competency Model version 3.0 is a validated competency model that can be used in EMS to identify what is missing and what success for the EMS organisation would look like (Garman et al., 2020). What meaning the competency: professional and social responsibility has for EMS will be discussed in the next paragraph.

Healthcare professionals are challenged to be socially responsible in the context of delivering equitable, sustainable quality healthcare to communities in need. EMS managers are held to account by society for not delivering on their mandate to serve as state employees and deliver quality services to those in need. Professional and social responsibility implies that not only is there a moral commitment and duty to serve but also a social contract in that the EMS employees receive financial reward in exchange for rendering a service to society (Dharamsi et al., 2011). The paid reward cannot be the primary reason for working in EMS. EMS is a vocational calling that must be motivated by values such as respect, competence, compassion as Figure 7.2 illustrates the leadership competency of professional and social responsibility is related to the user dignity domain. In the diagram, the negative factors (indicated by red arrows) that impact on the domain User Rights are the responsibility of the EMS manager. An EMS manager equipped with the professional leadership competencies that include professional and social responsibility, can positively influence (indicated by green arrow) this domain. The section that follows will discuss leadership and governance in EMS.

Figure 7.2: Factors influencing User Rights in EMS



Source: Researcher's own work

7.3 LEADERSHIP AND GOVERNANCE IN THE EMS CONTEXT

Leadership and governance answers in part the research objective which was to observe and document the quality champions perspectives on the application of the OHSC standards and implications of non-compliance. The research question related to leadership and governance were: what are the knowledge, attitudes and practices of EMS managers who are quality champions, in the public EMS organisations in relation to quality improvement? The second question is also relevant: How do EMS managers perceive, interpret, and understand the OHSC quality standards for EMS?

The National Department of Health's National Core Standards includes the domain: leadership and governance. The domain includes the strategic functions of effective

planning, risk management, oversight, accountability, quality management and leadership (South Africa. Department of Health, 2011b). The public EMS policy direction and senior oversight takes place within the policy framework of the provincial department of health. The 2030 Human Resource for Health considers leadership and governance to be critical to the success of any human resource strategy in SA (South Africa. Department of Health, 2020).

The Lancet Commission Report emphasised that “Leadership and governance are critical to ensure the inputs required for quality care and are essential for health service delivery” (National Department of Health, 2019:3). The WHO associates effective leadership and management to the effective use of resources to achieve measurable results; the key supporting factors are that of ensuring the appropriate number of managers with the appropriate competencies working in an enabling environment with functional support systems (World Health Organisation, 2007). Leadership and management are linked and complementary and although there are differences it is difficult to separate the two within an organisation (Sharma & Jain, 2013). The difference has been simplified to say you manage things and lead people but in different situations, different competencies are required. There is agreement that becoming a good leader and manager requires education, training, and experience (Sanford & Moore, 2015). To contextualise the results of the survey, the demographic profile of the 352 EMS managers that participated in the survey will be presented next.

In response to the demographic survey questions, 32.7% (n = 115) of the managers holding the post of Station Manager, 29.8% (n = 105) were Shift Leaders, 11.6% (n=41) Sub-District Managers, 9.4% (n = 33) District Managers, 1.7% (n = 6) Operational Managers, 0.6% (n = 2) Provincial Managers and the remaining 14.2% (n = 50) classified themselves based on their medical qualifications. Of those that participated, 74.7% (n = 263) were male and 25.3% (n = 89) female with none of the participants selecting any of the other gender options. 67.5% (n = 237) of the respondents had an AEA qualification. The median number of years of EMS experience was 20 years and the median number of years in the current management position was 8 years. 52.9% (n = 186) indicated that they have 10-50 staff reporting to them.

The EMS manager's responses relating to the Domain 4: Leadership and Governance was positive, with 47% (n = 164) indicating Agree and 9% (n = 32) Strongly Agree with the statement: where I work, the Provincial Department of Health or parent company oversees and supports the EMS. Similarly, 44% (n = 153) said they Agree and 7% (n = 25) Strongly Agree with the statement: my place of work has a functional governance structure in place. (cf. Chapter Five). The next paragraph outlines the public EMS management structure because it is indicative of the bureaucratic management style adopted in the public service.

Within EMS there is a hierarchical rank structure starting with the operational crews reporting to the Shift Leaders who would report to the Station Manager and so on, up to the post of Provincial EMS Manager. The Provincial Manager would then follow a senior management service reporting structure to the Director General of Health in the Province. This chain of command structure has the hallmark of a bureaucratic organisation where there is division of tasks, hierarchy of authority and rules that assign duties, responsibilities and procedures (Davidson & Peck, 2006). The proverbial chain is only as strong as its weakest link which was suggested in the workshop #W3 and a view shared on senior management:

> *"They know nothing, they do nothing, all they care about is how they dress #W3".*

This comment also suggests that quality is superficial. The following paragraph will discuss the impact of the *de facto* collapse of the management structure.

Although the Provincial EMS Manager is the head of EMS who would have previously been referred to as the Ambulance Chief, the real power and authority is vested in the senior management. During the interview #P2 shared how he was suspended for refusing to authorise what was later to be confirmed as corrupt payments to a private ambulance service. #P2 was later reinstated when the province was placed under administration. #P10 gave an account of how senior officials in one province would bypass the Provincial EMS Manager and make operational EMS decisions in favour

of union officials. So, whilst there is an organogram on display, the locus of control resides elsewhere. The next paragraph will discuss philosophical posture and organisational theories that are relevant to the discussion on social constructivism.

According to social constructivism, our interactions with the world shape and change it constantly. It makes the case that all our social structures, including our organisations, are products of local interactions among their constituents (Walker, 2014). As a result, the meanings we assign to organisations are diverse (since we all have our own), negotiated (because we try to come to an understanding with others), contested (because reaching an understanding can be challenging), and transient (because we frequently learn new meanings in these conversations and change old ones). According to social constructivism, these discussions can influence the organisation's culture and, in turn, the members' opinions (Davidson & Peck, 2006).

There are multiple theories that are considered in governance and leadership. Amongst the better known are those listed by Miner (2003) as Kurt Lewin's Social Psychological Views on Leadership and Change, Max Weber's Theory of Bureaucracy, Abraham Maslow's Need Hierarchy Theory, Edgar Schein's Theory of Organisational Culture and Leadership and Bernard Bass's Transformational and Transactional Leadership Theory. A discussion of these theories is beyond the scope of the study but is mentioned here as aspects of these theories will have implications for future research and management training.

In South Africa, the Human Resources for Health Plan identified the capacity building of managers as a key priority in improving the efficiency in delivery of health services (Department of Health South Africa, 2011a). Notwithstanding these policy statements, the NECET policy document states that EMS managers are largely ignored and have limited access to formal tertiary education opportunities (Department of Health of South Africa, 2017). It is unsurprising that there is limited capacity to advocate or demonstrate agency. While there are several post-graduate management programmes in health management, such as the Masters in Public Health, offered by universities in South Africa, these programmes mainly target hospital managers who have undergraduate medical or nursing degrees (Naidoo et al., 2017).

Despite EMS being acknowledged as a complex and dynamic organisation that require leadership skills, Leggio (2013) concluded that there is little to no formal training on the leadership competencies that EMS managers require. Although the manager's natural leadership abilities and the daily experience of dealing with emergencies as part of the job hone their management and leadership skills, Pillay (2008) correctly argues that there are some competencies that must be taught. The question of the qualification of healthcare managers is not unique to EMS with Pillay (2008) finding that one of the reasons for the poor performance of the public hospitals was the appointment of managers to senior positions based on their years of experience rather than their management abilities. #P11 and #P7 pointed out that although the governance and leadership problems are widespread in some provinces, provinces like the Western Cape have far fewer problems.

7.3.1 EMS fragmented under District Health System

It is important to appreciate the quality concerns with implementing the DHS model as an alternative to the provincial model. The views of the managers as captured in Chapter 5 will be discussed to answer the research question: what are the benefits, and impediments and opportunity costs to implementing Quality Improvement in EMS?

The decision on decentralising EMS by senior provincial management angered EMS managers. There was in strong opposition in the interviews by #W3, #W2, #P2, #P8, and #P10 to EMS being fragmented and placed under the control of the District Health System (DHS) management team that had no EMS knowledge.

> *"When EMS is working well as a provincial service somehow, they think well it's good let's start talking district and it's one of the worst things that can happen to EMS in the province." #W3*

The managers raised quality concerns related to this decision such as: there was no sharing of resources within and between districts; ambulances were not permitted to cross the district boundaries to render assistance; different work shift systems were

implemented in adjacent districts; EMS was not prioritised in the district budget allocation; and corruption and the abuse of funds was rife in some districts. The negative sentiment regarding the DHS is not unfounded; the next paragraph will pick up on the literature regarding the performance of the DHS in SA.

The DHS model is endorsed by the WHO as a health service model to deliver Primary Healthcare (Barron & Asia, 2001) however, there has been poor implementation in some districts. Rispel (2016) highlights the ineffective and incompetent leadership and governance at all levels of the health system as the primary reason for the DHS crisis. Malakoane et al. (2020) described how the fragmentation of the health services was a leading cause of the inefficiencies experienced by the health system.

The implications of the decision go far beyond what the EMS managers has mentioned. The DHS model was designed around delivery of primary healthcare. EMS is a mobile health resource that should respond to where there is a need, it should not be restrained by district boundaries. Whereas the EMS services in some districts may have improved, overall, the EMS DHS model has reduced the effectiveness and efficiency of the provincial EMS organisation. The failure of the EMS DHS model is due to a lack of planning, communication, and consultation of the provincial health management. It has decreased morale and demotivated EMS employees.

> *“EMS manages in my province are frustrated because the managers that they were reporting to don't understand the EMS. And so, the managers that they report to don't have an interest in EMS because most of those managers are nurses or whatever and they are more interested in what's happening in the clinic and what's happening in the sub-district hospitals and those type of things.” #P2*

The decision to decentralise EMS also points to the management weakness within the EMS organisation. It could be argued that if EMS management had quality data, they could have defended the provincial EMS model. The defragmentation was also a response to the complaints by the DHS clinics and hospitals about the delays they experienced when an ambulance was needed to transport patients for further care.

Following on from this discussion, the next paragraph will discuss the literature on the experiences of the EMS leadership regarding the health management in some provinces having little regard for EMS.

7.3.2 EMS is marginalised within the health system

This sub-theme contributes to answering the fourth research question, what are the benefits, and impediments and opportunity costs to implementing quality improvement in EMS? There is an opportunity to turn this perception around as the image of EMS can be enhanced by improving the quality of the services delivered.

At several of the workshops with EMS managers the comment was made that EMS is a 'stepchild[62]' of the department of health. The other departments and senior management viewed the EMS staff as ambulance drivers and not as health professionals. In one instance a clinic manager denied EMS personnel the use of a vacant room at the clinic to use as a temporary ambulance station but had them sit outside the clinic in the ambulance while they waited for the next call. In a study conducted by Senekal & Vincent-Lambert (2022) in the Gauteng province, the EMS personnel conducting critical care transfers said they felt undervalued by the nurses and doctors who did not understand their capabilities and scope of practice. The next section describes how an EMS district manager effectively engaged with district health facility managers which earned them the nickname "Green Angels". These relationships between stakeholders builds trust and mutual support.

Despite the negative perceptions, #P7 and #P10 emphasised how important it was for managers to have regular engagements with the different stakeholders and to build a relationship based on trust. #P7 describes how through a series of engagements the hospital staff and management came to affectionately regard the EMS as "Green Angels"[63].

[62] Stepchild is a derogatory reference in this context where the EMS holds a lesser position in the system.

[63] "Green Angels" is in reference to the green uniform that EMS personnel wear. This uniform branding has been standardized across SA for all public EMS and together with some vehicle markings has uncanny UK resemblance.

> *"…we have established relationships with the hospitals and do presentations on what we do. They call us the "Green Angels" sometimes." #W6*

To earn the "Green Angels" nickname was hard work. It required the commitment of the manager to set up meetings with hospital staff and management, to present their side of the story, to be willing to listen, to be willing to concede and to earn their respect and trust. This requires the manager to be equipped with the competencies to show initiative, to communicate effectively, and to collaborate. The next section will discuss the political and labour union impact on EMS quality.

7.3.3 Political and Labour Union Interference in EMS Management

This sub-theme relates to the question: What are the factors that motivate and foster quality improvement amongst EMS managers within EMS organisations? Transformation of the public sector to right the wrongs of the past was a top priority post-1994. To achieve this the SA government introduced several policies that focus on equity. Rispel (2016) argues that the transformation agenda has been compromised by the lack of accountability, ineptitude in government and leadership failures.

A key finding of this study was that political and union interference was mentioned as a reason managers are unable to fulfil their management responsibilities. According to #P2 the alliance between the ruling African National Congress, the SA Communist Party and the Congress of South African Trade Unions has resulted in EMS union members having direct access and influence over decisions taken by the provincial member of the executive council (MEC) for health in the province.

Even though EMS personnel as essential workers are not permitted by law to go on strike, #P10 gave an example of an entire EMS station in a town going on an illegal strike without any consequences. #P2 complained that nepotism was rife, and EMS had become the dumping ground for family members of the politically connected in some provinces. Despite the negative impact of political interference, having political

support has also benefited the Western Cape province where the MEC made EMS his priority and 18 ambulance stations were built during his tenure.

> *"The unions have got more power than the managers. Unions have got better access to the top management than the managers themselves." #P2*

Several studies report that the capacity of public health institutions within South Africa's healthcare system has been diminished as a result of systemic 'favouritism' within provincial and national government (Coovadia et al., 2009; Rispel, 2016; Maphumulo & Bhengu, 2019; Ndebele et al., 2021).

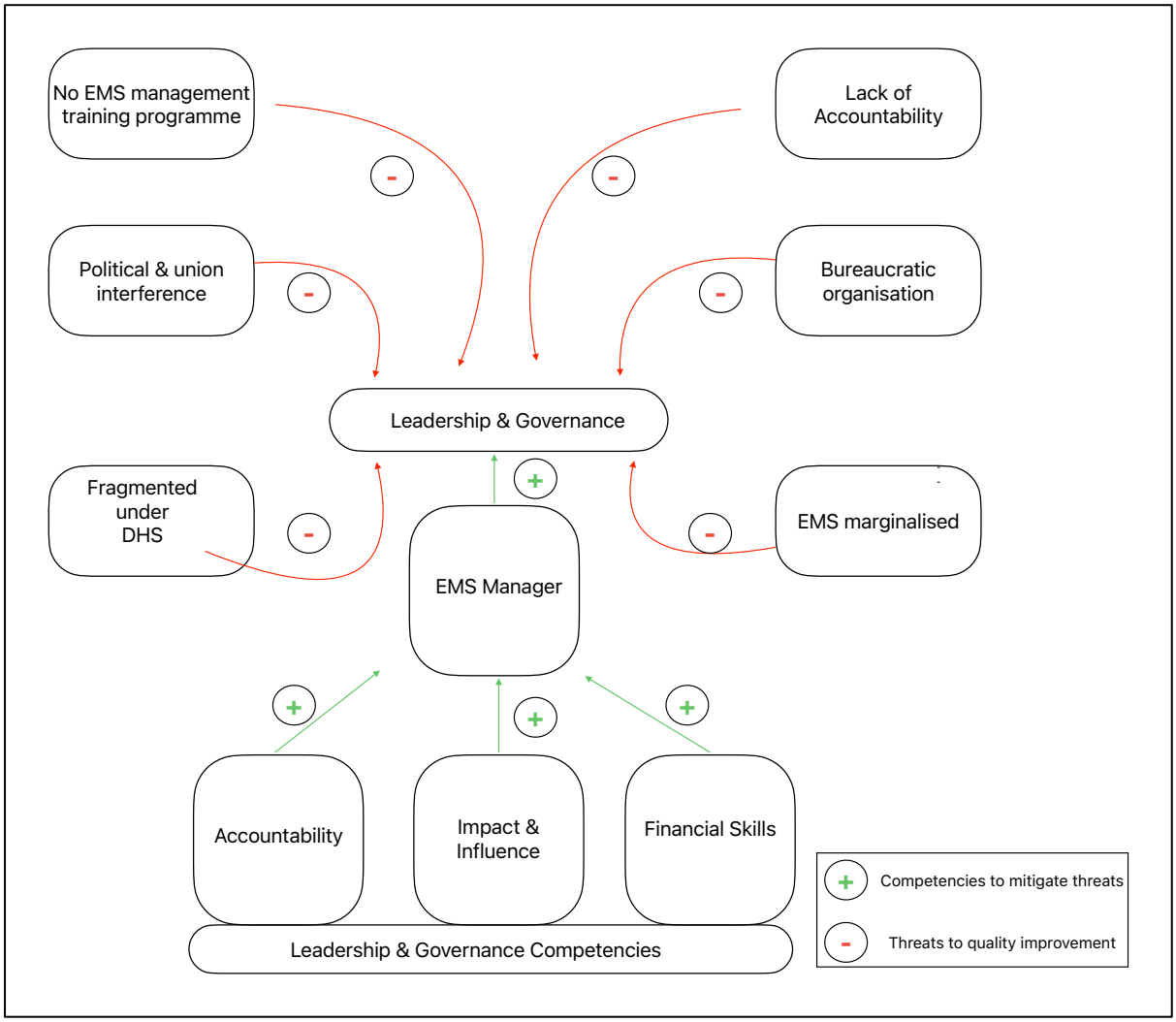
In considering how EMS can engage in QI in this context, Edward Deming's System of Profound Knowledge (SoPK) provides a framework of how organisations can achieve and sustain continuous improvement. Deming's SoPK framework encompasses four interrelated components, each contributing to the overall effectiveness of an organisation. These four components are: 1) Appreciation for a System (for EMS it includes recognising the interconnectedness in health and other internal and external stakeholders, with a weakness in one causing effects across the sector); 2) Knowledge of Variation (EMS needs to focus on variation within processes rather than on individual employees weaknesses); 3) Theory of Knowledge (EMS and the DoH need to rely on factual data to make decisions rather than assumptions); and Psychology , EMS managers are the most valuable asset and empowering EMS employees is key to quality improvement (Deming, 1993). The next paragraph discusses the implications of EMS status within the DoH.

7.3.4 Lack of accountability impact on EMS quality

The implications are that the EMS management team is side-lined when it comes to taking strategic decisions that are not always in the best interests of the organisation but yet are held accountable. Mukinda et al. (2020) describes accountability as an integral component of governance within the health system which is central to the meaningful relationships between the different agents and principals. It requires an obligation to explain decisions to others; it is a relational concept between the one making the decision and the one affected by the decision and lastly it is shaped by

power. In Figure 7.3, there are six factors that emerged that negatively impact (as depicted by red arrows) on the domain leadership and governance. Accountability, impact and influence and financial skills are leadership competencies that can help strengthen (depicted by green arrows) the EMS manager's leadership and governance abilities to overcome these challenges. The next section will discuss the human resources in EMS.

Figure 7.3: Factors influencing Leadership & Governance in EMS



Source: Researcher's own work

7.4 EMS TEAM FACTORS THAT INFLUENCE QUALITY

This theme answers in part the third objective which was how change in EMS policy and praxis may lead to quality improvement in public EMS systems, in the interest of patient safety and organisational sustainability. The research question that this theme

in part answers is: what are the benefits, and impediments and opportunity costs to implementing Quality Improvement in EMS?

A workforce is the most valuable asset of healthcare organisations and therefore fundamental to the quality of the health services rendered. This section aims to in part answer the main question: How can a healthcare quality improvement framework transform the knowledge, attitude, and practices of EMS managers so that EMS organisations may develop the capacity to comply with the regulations relating to the standards for EMS?

The key findings in response to the survey questions regarding the quality knowledge, and practices of EMS managers will be presented. Regarding the EMS managers knowledge of QI in the workplace, the following key responses were noted: 90% (n = 316) indicated that there were aware of the organisation's quality goals and objectives, and 84% (n = 295) said the organisation has a data collection plan, 80% (n =2 81) said that they collect quality indicators and performance measures to develop a quality improvement plan. The significant findings are that only 17% (n = 60) indicated that they had received training to manage a quality improvement project, 21% (n = 74) said that they are familiar with performance improvement models such as PDCA; and 12% (n = 42) are familiar with project improvement tools.

In response to the survey questions regarding factors that encourage implementation of quality improvement, 66% (n = 232) of the managers said it would result in less complaints, 63% (n = 221) said it is needed to comply with the NHQIP, and 55% (n = 193) said it will improve the organisational reputation. Only 32% (n = 112) of the managers said they get strong management support and 24% (n = 84) said staff are motivated to improve quality.

In identifying factors that hinder implementation of quality improvement, 61% (n = 214) said they lack the resources. Other findings include that 51% (n = 179) said they lack managerial skill and capacity, 37% (n = 130) said they get no support from management to implement quality improvement and only 19% (n = 66) said that they have insufficient time at work to implement quality improvement.

The approach to address public EMS management shortcomings has up until now focused on providing generic management short courses. In a survey of a health management programme in South Africa, Naidoo et al. (2017) found that public health managers had attended numerous management short courses offered by private training companies at substantial cost to the state. The 36% (n = 128) of EMS managers that had reported that they had undergone training to manage the efficient use of resources and the 17% (n = 60) that had undergone quality improvement training would most likely have done the same generic management short course training offered by external service providers.

During the interviews #P10 said that the Western Cape was the first province that had implemented a bespoke EMS management programme. Although managers in other provinces do attend generic management courses offered by the provincial government, as #P2 in the interviews said, the generic training did not change the way the managers did things after attending management courses. The opinion shared by #P2 during the interview was that higher education qualified graduates that become managers were more inclined and better prepared to engage in self-study and self-improvement. #P4 said that there is a lack of managerial skills needed to manage the public sector EMS personnel.

> *"So you know there was a lack of managerial skills or people's skills and especially also trying to integrate higher qualified personnel into the public sector for them to understand the short course type of personnel." #P4*

To professionalise EMS, the National Department of Health introduced the National Emergency Care Education and Training (NECET) policy which will be discussed next.

7.4.1 Emergency Care Education & Training Policy and Quality

This section provides the insights regarding the National Emergency Care Education and Training (NECET) policy as it relates to EMS quality. In part the discussion will address the secondary research question: what are the benefits, and impediments and opportunity costs to implementing Quality Improvement in EMS?

In workshops: #W1, #W2 and #W4 there was a discussion on the NECET policy and recent approval granted by the Council for Higher Education for the provincial EMS colleges of emergency care to offer higher education programmes in emergency care. The provincial emergency care colleges will expand the opportunities for in-service public EMS personnel to further their qualifications (Tiwari et al., 2021). Although this initiative was welcomed by EMS managers that attended the workshops, it was acknowledged that it will take several years before the impact of the colleges of emergency care will be seen. The next paragraph will discuss the shortcomings of the NECET policy.

Sobuwa & Christopher (2019) reported that the migration plan in the NECET policy had not catered for the migration of thousands of short-course qualified EMS personnel who are employed in public and private EMS. Although the NECET policy mentions RPL access and the awarding of credits towards the formal qualifications for short course qualified EMS personnel, the migration plan has not been implemented mainly for two reasons. Firstly, many EMS employees cannot access the formal emergency care qualifications either because they do not meet the entrance criteria to enter higher education, or secondly, they are not supported by their employee with bursaries and time-off to further their qualifications (Sobuwa & Christopher, 2019). The next paragraph will discuss the changes underway to increase the number of graduates with tertiary qualifications in EMS.

The 2021 HPCSA registration statistics highlighted the racial disparity, with the so called white race group[64] disproportionately represented in the higher qualification categories (ANT and ECP) (Tiwari et al., 2021). This data confirms the comments made in Workshops #W1, #W2 and #W4 that there has been slow transformation of the EMS sector to address historical racial and gender under-representation (cf. Chapter Six Table 6.2). Notwithstanding the gains made in the other registration categories, the offence is that these statistics reifies apartheid dogma that ‘Blacks cannot be part of the skilled labour force’. The next paragraph will critically discuss the

[64] The author categorically does not wish to reify apartheid racial categorisations but will use them only in terms of criticality and the potential for redress.

EMS managers dissatisfaction with the occupation specific dispensation (OSD) in relation to emergency care qualifications which could be linked with research objective which was to investigate, observe and document the quality champions perspectives on the application of the OHSC standards and implications of non-compliance. It will in part answer the third research question which was: what are the factors that motivate and foster quality improvement amongst EMS managers within EMS organisations?

7.4.2 The outdated occupation specific dispensation (OSD) for EMS personnel

The previous paragraphs discussed how the NECET policy has limited the academic progression of thousands of EMS personnel. During the non-participant observation workshops attended by the researcher, EMS managers grumbled about the OSD for EMS personnel. They complained that it has not been updated and the structure is outdated and that it refers to qualifications that no longer exist. The next paragraph will describe the intention of the OSD.

The OSD is a unique salary structure and career path that was implemented in 2007 for certain categories of public servants to improve recruitment and retention (South Africa. Department of Health, 2012a). The OSD rewards EMS employees with higher qualifications by placing them on higher salary grades. As the OSD provides EMS with a management structure by stipulating the criteria to be appointed as a manager and to be promoted, this section aims in part to answer the secondary research question. The question is: What are the benefits, and impediments and opportunity costs to implementing quality improvement in EMS? The next paragraph will situate the findings of this study with the literature on the OSD.

The literature supports the view of the EMS managers that the OSD is flawed and not having the intended benefit of recruiting and retaining skilled and experienced healthcare workers. Gangaram (2015) argues that although the OSD had lowered the risk of skill migration, its implementation was not evidenced based and therefore has not resulted in the retention of ALS practitioners. Similarly, Rispel (2016) reported that the implementation of the OSD across the health sector has been flawed and it has seen mixed results. A rural EMS manager complained in a study conducted by Howard

et al. (2020) that they were training staff only for them to leave for jobs in the city because the OSD does not include a rural allowance for rural EMS personnel. The positive impact of the OSD will be discussed next.

Despite the complaints by the managers, what was not mentioned during the workshops is how the OSD has benefitted EMS employees. A 2019 review of the average public EMS salaries reflects that EMS public servants are better paid than public service nurses who are the largest majority in the health department. Annually an Emergency Service related employee[65] earns on average R556 454 in comparison with a professional nurse that earns on average [South African Rand ZAR] R461 759, and an Ambulance related employee[66] earns on average R334 532 in comparison with a enrolled nurse that earns on average R297 428 (South Africa. Department of Health, 2020). The next paragraph will discuss the human resource implications for EMS.

The implications of these findings are that OSD financially advantages those who have attained higher qualifications in emergency care. Whereas previously both managers and the EMS frontline employees had opportunities to attain in-service short courses and progress, the OSD and the NECET policy have taken away their career path and earning potential. The next section will discuss concerns regarding professionalism in EMS and how it impacts on quality.

7.4.3 EMS Professionalism impact on quality

This sub-theme contributes to answering the research question, what are the benefits, and impediments and opportunity costs to implementing quality improvement in EMS? Professionalism reflects the work ethics of the organisation by the discipline of employees at work, their punctuality, respect, and continued professional competence (Mosca & Kruger, 2022b).

In response to the survey questions regarding the quality knowledge, and practices of EMS managers, the managers in relation to the employee factors that either hinder or

[65] Emergency service-related employees would have a formal tertiary qualification.

[66] Ambulance related employees would have either an BAA or AEA qualification.

encourage the implementation of QI in the workplace the following responses were received. Survey findings revealed that 60% (n = 211) of the EMS managers believed that employees did not follow quality policies and standards, 51% (n = 179) concluded that employee morale is low and 76% (n = 267) indicated that employees lack motivation to improve quality.

During the interviews with key stakeholders, #P3 said that the poor discipline and unethical behaviour of EMS personnel in some districts and provinces was a major obstacle that had to be overcome to improve the quality of services provided by EMS. #P10 complained about not being able to discipline staff, staff being suspended for long periods on full pay and not having the resources and tools to monitor the location and movements of the ambulance and crew. #W1 discussed how poor driving habits of EMS employees and high accident rates contributed to the reduction of the ambulance fleet due to maintenance and repairs.

> *"You've got one of the best driver training practices in the country we want to make the national we even have a program." #W1*

Maphumulo & Bhengu (2019) report that poor quality health services are exacerbated by tolerance for misconduct, lack of accountability and corruption. The public EMS employees as healthcare workers have a dual loyalty to the healthcare users and to their employer, which is the state. There can be tension in having to provide quality emergency care that benefits that patient within the resource constraints of the employer.

Ethical work behaviour which includes the values and attitudes is important to providing high quality healthcare (Sakr et al., 2022). Rapanyane (2022) argues that there is a lack of performance management with little or no accountability in cases of misconduct. Discipline problems, moonlighting, and absenteeism are commonplace in the SA public health department (Ndebele et al., 2021). According to Coovadia et al. (2009) the political will and leadership needed to manage underperformance in the public sector have not been present. In the public sector ineffective senior staff and leaders are kept in place and loyalty rather than the capacity to deliver, has been

rewarded without a culture of accountability. Suspensions take years to resolve while personnel are still receiving their full salaries (Ndebele et al., 2021).

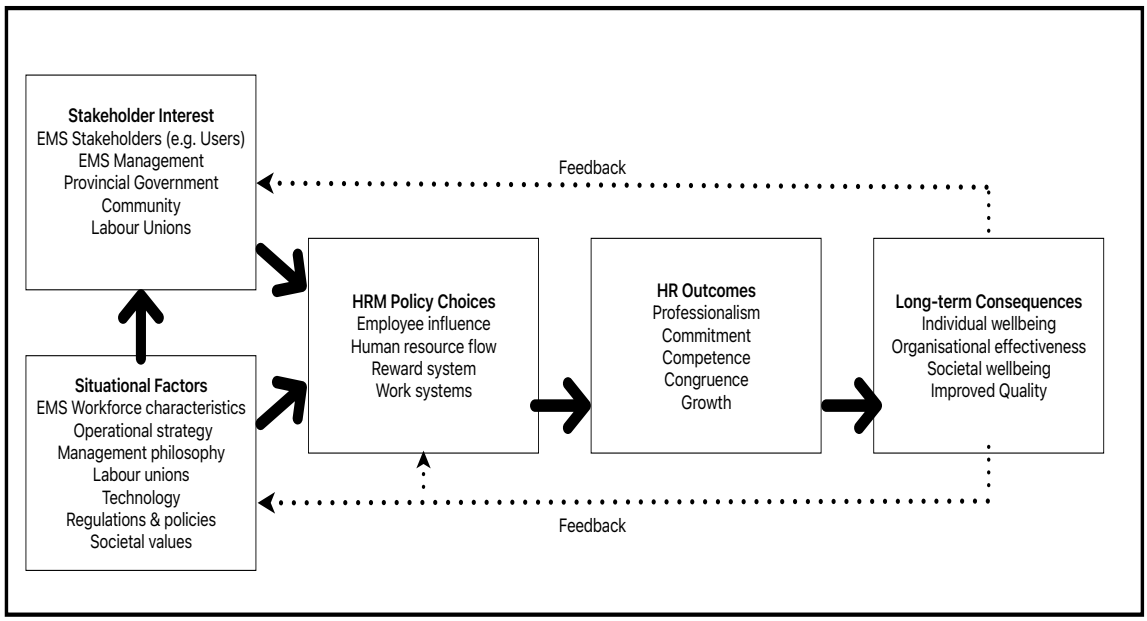
Although the survey results mentioned in the opening paragraph of this section suggest that some managers pointed the finger of blame towards the staff, Howard et al. (2019) found that there needs to be shift away from the blame-culture associated with quality towards having effective, engaged leadership that creates an organisational culture that supports staff and get staff buy-in to achieve quality improvement. Having participative decision making between EMS employees and managers will improve the performance and encourage employees to go beyond (Gangaram, 2015).

In considering the human resource theories and models, the Harvard Human Resource Management (HRM) model was found to be an appropriate theoretical model from which to conceptualise EMS HRM practices in relation to achieving quality improvement. Brunetto et al. (2011) successfully used the Harvard HRM model to examine changes in stakeholder interests coupled with changes in situational factors that led to HRM policy choices in the public sector that affected HRM outcomes amongst nurses and police officers. The Harvard HRM model links the organisation's strategy to HRM practices. The underlying assumption is that employees want to release their potential through work, and it recognises the value employees can bring to an organisation to enhance the quality of service delivery (Collings et al., 2019). The next paragraph will discuss how the model can be adapted for EMS. This aligns to the third research objective which was: To develop a framework that explicates how change in EMS policy and praxis may lead to quality improvement in public EMS systems, in the interest of patient safety and organisational sustainability. It also in part answers the fourth research question which was: what are the benefits, and impediments and opportunity costs to implementing Quality Improvement in EMS?

There are four key features of the model that were found to align to public EMS HRM where the focus of the strategy would be achieving the dimensions associated with quality improvement as seen in Figure 7.4. Firstly, the Harvard HRM model acknowledges the role of the various stakeholders including employees, management,

labour unions, community, and government. Secondly, the model recognises the influence and relevance of internal and external stakeholders, their social interactions and role in HRM policy. Thirdly, is the notion that organisations need to create value through organisational effectiveness, by contributing to individual well-being and societal well-being. Lastly, the model considers the situational factors that being the external elements such as societal values and laws; elements within the organisation such as employees, technology, labour unions; and elements related to the organisation but are not directly related to HRM (Beer et al., 2006).

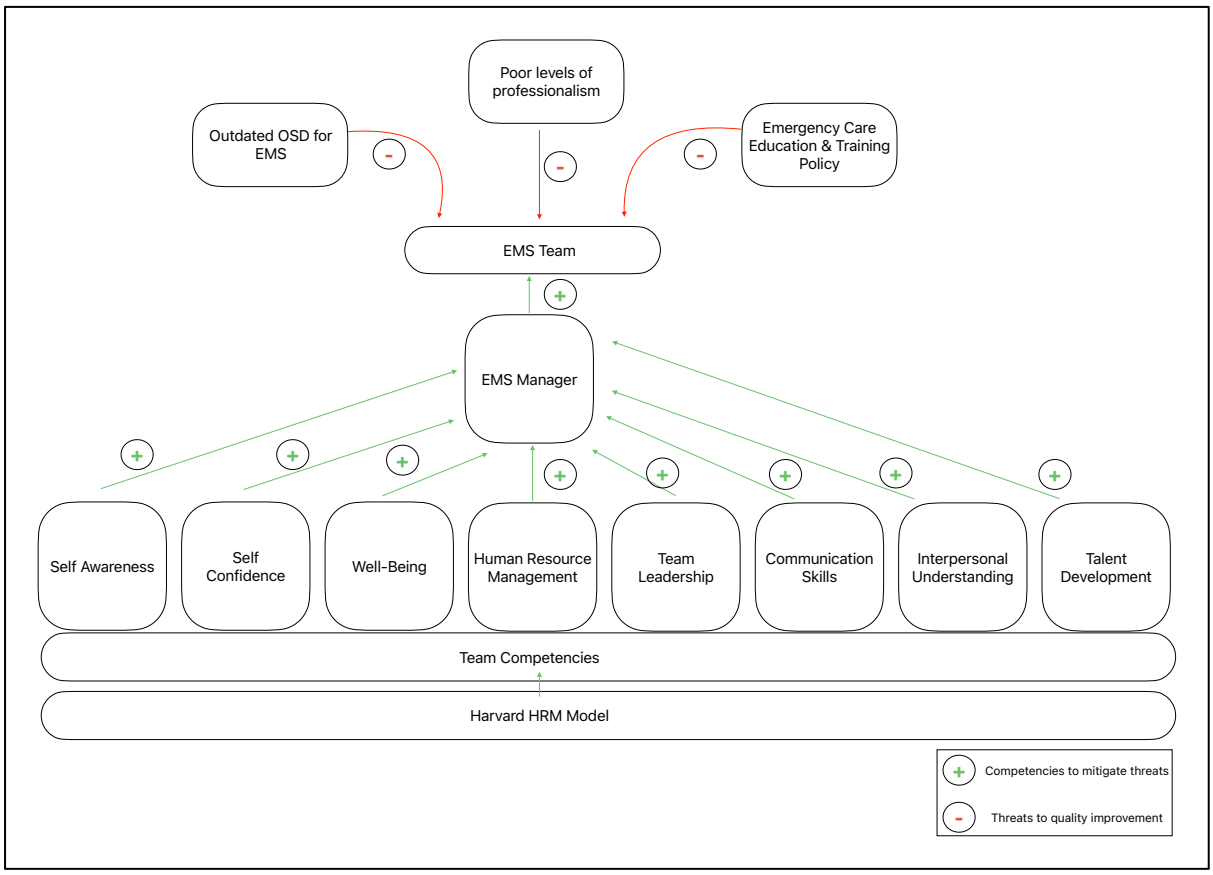
Figure 7.4: Adaptation of Harvard HRM Model for EMS



Source: Beer, 1984 in Collings, Wood and Szamosi (2019)

The functioning of the EMS team is impacted by internal factors such as poor levels of professionalism, and external factors such as the NECET policy that impacts on opportunities for professional development and an outdated OSD that prescribes criteria for promotional posts. In Figure 7.5 the red arrows indicate the negative factors impacting the team. The Harvard HRM Model and the team competencies are seen as opportunities for the EMS manager to strengthen the EMS team. Leadership competencies (green arrows) of self-awareness, self-confidence, well-being, HRM, team leadership, communication skills, interpersonal understanding and talent development all contribute to improving the EMS team. The next section discusses clinical governance and clinical care.

Figure 7.5: Factors influencing the EMS team



Source: Researcher's own work

7.5 EMS CLINICAL GOVERNANCE AND CLINICAL CARE

Clinical governance is defined by the department of health as a framework to help healthcare workers continually improve the quality of their services and safeguard standards of care by creating an environment in which excellence in patient care will flourish (Basu, 2019). This section will discuss EMS clinical governance and clinical care that contributes to answering the second research question: How do EMS managers perceive, interpret, and understand the OHSC quality standards for EMS? The next paragraph starts the discussion with an overview of the survey findings from Chapter Five.

The response to the survey Question 38 regarding the standard: where I work there are systems to ensure that patients are treated in accordance with current evidence-based guidelines to reduce the variation in care and improve patient outcomes, 61% (n = 190) indicated Strongly Agree, or Agree. The response to the survey Question 39

regarding the standard: We have systems implemented to support the provision of quality healthcare services and prevent patient safety incident, 6% (n = 22) indicated Strongly Agree, 43% (n = 152) Agree, 27% (n = 96) Neutral, 18% (n = 64) Disagree and 5% (n = 18) indicated Strongly Disagree. The next paragraph will discuss the Emergency Medical Services Regulations, 2017 that require EMS to have a medical practitioner to provide clinical oversight.

Appendix A, section 4 (viii) of the national EMS regulations requires EMS to appoint or contract a supervising medical practitioner with suitable emergency medical qualifications and experiences to assist with clinical governance, medical advice as well as supervision and training (Department of Health South Africa, 2017). Many provincial EMS organisations contract medical practitioners that have full-time positions elsewhere in the department of health as the supervising medical practitioner. Section 26 (3)(t) of the Emergency Medical Services Regulations, 2017 requires the EMS manager to "… ensure mechanisms in place for the management of complaints, consultation, clinical governance and quality assurance" (Department of Health South Africa, 2017). Given the number of EMS personnel and the provincial call volume it can be argued that provincial EMS should employ one full-time EMS medical practitioner per district to provide the oversight required in the Emergency Medical Services Regulations (2017).

All EMS practitioners in SA are required to register with the HPCSA to practise. It is a criminal offence for anyone to practise without being registered with the HPCSA (Health Professions Council of South Africa, 2018; McCaul et al., 2019). Complaints against practitioners may be lodged with the HPCSA by any person. The practitioner then may face a disciplinary hearing and if guilty the PBEC may impose sanctions that range from a warning for lesser offences to being removed from the register for serious offences (Health Professions Council of South Africa, 2006). A brief historical background in the paragraph that follows contextualises the current practices.

As EMS systems across SA began to split from the municipal authority and fire services, there was not a unified EMS service delivery model that was adopted across the country. The EMS clinical governance system in each province evolved differently.

During the interview #P2 referred to the period in EMS history during which the medical practitioner was responsible for clinical governance in one of the provinces, the experience of #P1 was quality oversight and quality management was non-existent in other provinces.

> *"…there was more focus on quality when I started there, I worked there from 1988 till about 1993, they had clinical governance. They even had a doctor that used to do clinical governance." #P2*

The view of #P2 was that when SA was divided into nine provinces, the newly formed rural provinces had to start from scratch. They did not have a clue about EMS as a result it is taking years to develop the EMS clinical governance systems. The next paragraph will discuss the authoritarian management approach to clinical oversight.

The EMS medical practitioner was not only responsible for clinical oversight but also would have been appointed as a senior manager or ambulance chief. The power and authority welded by the EMS chief who would most likely be a white male medical practitioner is also mentioned as a practice of this period in EMS history. #P3 cited examples of autocratic decisions taken by the EMS chief at the time and described how it was not uncommon to have your qualification "badge" taken away if you made a clinical error. The next paragraph will discuss the role of the medical practitioner in EMS in relation to the EMS regulations.

> *"Your treatment had to be according to the protocols. Otherwise, you lost your badge." #P3*

It is not uncommon in developed countries to find EMS headed by a medical practitioner that provides leadership and medical direction (Care et al., 2004). The WHO report: Prehospital trauma care systems, recommends the appointment of a capable medical director to oversee clinical operations and enforce clinical standards and protocols (Sasser et al., 2005). There needs to be caution when recommending the appointment of a medical practitioner as head as it may result in what Shung-King

et al. (2018) describe as triple discrimination, which was what nurses in one study reported by experiencing discrimination by race, profession, as well as gender in a hospital managed predominately by white, male, medical practitioners. The next paragraph will discuss the present role of the EMS quality assurance departments that have been established in some provinces as this in part answers the first research objective which was to critically appraise the knowledge, attitude and practice of EMS managers who are the power brokers in relation to EMS quality improvement. The discussion also in part answers the third research question: What are the factors that motivate and foster quality improvement amongst EMS managers within EMS organisations?

During the interview, #P6 explained that the focus of the EMS quality departments is mainly on quality assurance (QA) that is done through a series of internal inspections. In some provinces the EMS QA department has been established to ensure the fleet and stations comply with the EMS licensing regulations. In the interview #P6, who is a QA manager described the tasks quality departments as including random checks of the patient report forms, inspecting vehicles and stations, investigating complaints, collecting data, and providing reports to the EMS management. The next paragraph will discuss the consequences of poor clinical performance which relates in part to the research objective to critically appraise the practice of EMS managers in relation to quality improvement. It also in part answers the fourth research question: what are the benefits, and impediments and opportunity costs to implementing quality improvement in EMS?

Depending on the QA outcome, the practitioner may face disciplinary action if there was gross negligence or be required to undergo further training or occasionally put under supervised mentorship. For serious transgressions, the sanction of the disciplinary action may include suspension or dismissal. #P10 expressed the frustration of EMS managers face when no action is taken against practitioners that are reported to the provincial HR department or employees are suspended on full pay for years waiting for disciplinary hearings to take place. #P4 said that one of the challenges is the lack of accountability.

These findings challenge the EMS manager's work towards strengthening the structure and processes that support clinical practice. Each of the domains in the Regulations Relating to Standards for EMS has systems and processes that need to be in place. In considering the organisational culture, reflecting on Edgar Schein's model will provide a perspective on how employees identify with the cultures and sub-cultures within the EMS organisation. Understanding the EMS organisational culture will help identify how knowledge is created and shared and why there may be resistance to change (Schein, 1983; Shahzad et al., 2012). The next section discusses the key factors related to the EMS structure, systems, and processes.

7.5.1 Focus on the EMS operational structure systems and processes

This section will contribute to answering the main research question of this study which was: How can a healthcare quality improvement framework transform the knowledge, attitude, and practices of EMS managers so that EMS organisations may develop the capacity to comply with the regulations relating to the standards for EMS? The secondary research questions related to the knowledge, attitudes, and practices (KAP) of EMS managers in relation to quality improvement; and how do EMS managers perceive, interpret, and understand the OHSC quality standards for EMS?

In response to the survey Question 37 on the standard: We respond to emergencies in a coordinated and efficient manner, 10% (n = 36) indicated Strongly Agree, 46% (n = 163) Agree, 20% (n = 69) Neutral, 16% (n = 56) Disagree and 8% (n = 27) chose Strongly Disagree. This section will include a discussion on the emergency control centre and the use of computer aided dispatch and vehicle tracking; EMS response times, fleet management, planned patent transport and interfacility transfers. An understanding of the structure, systems, processes, in the regulations necessary to answer these questions. The brief overview that provides the context will be discussed in the next paragraph.

The next paragraph will summarize the key findings in relation to the Domains 2 and 5 in the survey results as these relate to effectiveness of EMS operational systems, processes, and procedures, starting with Domain: Clinical Governance and Clinical Care in the Emergency Control Centre.

7.5.2 Emergency Control Centre (ECC)

This section will in part address the research questions: What are the factors that motivate and foster Quality Improvement amongst EMS managers within EMS organisations? What are the benefits, and impediments and opportunity costs to implementing Quality Improvement in EMS?

In response to the survey assertion: “Where I work the communications systems facilitate the provision of effective and appropriate emergency care”, 9% (n = 33) of the respondents selected Strongly Agree option, 44% (n = 156) Agree, 19% (n = 68) Neutral, 19% (n = 67) Disagree and 8% (n = 28) Strongly Disagree. With overall 46% (n = 163) selecting Neutral, Disagree and Strongly Disagree, this was the second highest question rated negatively after building infrastructure. Considering that the ECC is the hub of the EMS organisation, that is intended to ensure the efficient and effective use of resources, these findings are alarming. The use of Information Communication Technology (ICT) and Computer-Aided Dispatch (CAD[67]) is essential in the ECC. The use of CAD will be discussed in the next paragraph.

During the interviews and non-participant observations this domain and its sub-domains were the main area of discussion. The dispatch of emergency vehicles was rated the lowest in the survey and unsurprisingly, the concerns about the dysfunctional emergency communications centre (ECC) come up on numerous occasions. The ECC manager can anticipate demand when given the fleet size and location and call volume with incident location to improve efficiency (Oosthuizen, 2017).

In #W1, managers complained because they are unable to monitor and track the physical location of the ambulances and the rest of the fleet, they cannot effectively manage and report on the resources. It is astounding to discover during an interview with #P3 that the eThekwini metropolitan district in KwaZulu-Natal has not had

[67] CAD is not to be taken as Computer-aided Design, its common understanding.

computer-aided dispatch system with vehicle tracking for three years because a contract expired[68].

> *"You know not having a proper communications tracking monitoring system that alone you know for me is the biggest gap in EMS, the biggest gap is that not having a CAD system." #P3*

Given how readily available vehicle tracking technology is, it surprisingly revealed during the non-participant observation workshops how many districts and provinces do not have this technology.

Considering that there are limited resources, EMS uses triage to determine which users are the priority, with the intention of maximising the number of lives saved (Alshehri et al., 2020). Triage can be defended on both utilitarian (i.e. best health outcome) and non-utilitarian (i.e. valuing life) ethical grounds (Moodley et al., 2021). It could be argued that if the EMS management systems and processes are poor then the decision of when, and who, gets what resources is flawed and will result in worse quality health outcomes for EMS users.

Applying the Pareto principle in the ECC, as suggested by Juran (1993) may improve ECC operations, in that if improvements were focused on 20 percent of the causes, it would fix 80 percent of the problems. Improvements may be seen in the way of what is referred to as the "Juran Trilogy": quality planning to meet customer expectations, quality control to ensure processes are working efficiently, and quality improvement to optimise results (Juran, 1993). In the survey only 12% (n = 43) of respondents indicated that they are familiar with quality improvement tools, including Pareto charts. The implication for this research would be the recommendation to include teaching and application of the Pareto principle to EMS. The next paragraph will discuss the use of information and ICT and CAD in response to the survey question four: what the

[68] For the researcher it was appalling to see ECC staff on the telephone taking callers details on writing pads and then walking over to the dispatcher who had a collection of these slips of paper on his desk. This is how it was 35 years ago! I observed that there were no computers in the ECC. I was later informed that the CAD contract had expired and had not been renewed.

benefits are, and impediments and opportunity costs to implementing quality improvement in EMS.

7.5.3 Computer-Aided Dispatch (CAD)

In considering the research questions: Firstly, what are the factors that motivate and foster Quality Improvement amongst EMS managers within EMS organisations? Secondly, what are the benefits, and impediments and opportunity costs to implementing Quality Improvement in EMS?

In response to the survey question “We have an efficient vehicle dispatch system in place to ensure patients’ rapid and safe access to services”, 8% (n = 29) of the respondents selected Strongly Agree option, 32% (n = 111) Agree, 15% (n = 53) Neutral, 30% (n = 104) Disagree and 16% (n = 55) Strongly Disagree.

Section 10 (2a) in the regulations relating to standards for EMS require EMS to have computer aided dispatch (CAD) or a paper-based system that facilitates vehicle allocation, routing and tracking. Even though the Regulation relating to Standards for EMS does allow for paper-based systems where CAD is not available, participant #P2 in the interview expressed the concern that they did not have data capturers posts in EMS. The patient report form gets matched with the ECC dispatch form and filed in the district office so that it can be retrieved if there is a complaint. This is not unique to EMS, with many public hospitals and clinics in SA relying on paper-based systems (Cline & Luiz, 2013).

There is no standardised CAD system used across the country. The Western Cape is the one of the few provinces that has a CAD that uses algorithms to determine the closest ambulance to the incident. During the interviews, #P8 and #P4 said CAD is viewed by senior provincial management as an optional extra, a low priority investment. As the cost of CAD runs into millions of rands, tender delays and corruption is hindering the implementation of CAD in some provinces.

> *"…there's a lot of corruption in terms of computer aided dispatching systems, your ECC's, some provinces are spending now for the third time trying to get emergency control centres up and running." #P4*

The findings that EMS data is not available and utilised as a management tool by EMS is supported by Howard et al. (2020) who reported similar findings in Limpopo province. The authors go on to add that public EMS organisations primarily capture and report on data related to response times, number of ambulances available and number of staff that have reported for duty, per shift, and per district. This finding supports the statement by Mehmood et al. (2018:2) that despite the research being undertaken on EMS, "the true capacity, performance and sustainability of prehospital EMS" in Africa, including SA is unknown.

CAD and ICT has the potential to improve access to care and improve operational efficiencies, yet the adoption of ICT healthcare systems has been slow across the public health sector in South Africa where the financial investment in ICT is considered against the opportunity costs of improving infrastructure, and employing more people (Cline & Luiz, 2013). Retrospective data such as the number of operational ambulances in relation to the call demand can be used for planning (Finlayson, 2017). However, without real-time data the EMS manager is powerless to manage the efficiency and effectiveness of the available resources by directing the right resources, to the right user, at the right time (Dror, 2011). This compromises the user's access to safe and efficient emergency care. In the interview #P9 described how a district managed the high call volumes by adjusting the shift roster to ensure that more resources were available during peak periods. In this case, the District Manager had real-time data to convince both the staff and the senior management of the benefit of adjusting the shift schedule. The link between CAD and vehicle tracking will be discussed in the next paragraph.

Monitoring vehicle movements is essential to be able to deploy resources where they are needed the most. Managers reported how staff would duck and dive and avoid reporting their exact location so that they would not be dispatched to the outstanding

calls. In #W1, managers reported how some crews had found a way to disable the vehicle tracking system so that their movements could not be tracked.

> *"In some places staff actually breaks this tracking systems and then we know that you know that not right." #W1*

In the studies by Newton et al. (2015) and Finlayson (2017) the high case load meant that once the ambulance left the EMS station for the first call at the start of the 12-hour, they would often not get a chance for a break between calls. To the frontline ambulance crews the vehicle tracking is perceived as a "big brother" watching their movements. The use of CAD and vehicle tracking can improve the efficiency and effectiveness and reduce the EMS workload by shortening the travel distances and ensuring the appropriate distribution of resources (Stein et al., 2015). The ambulance response times will be discussed in the next section.

The emergency care environment is hazardous, unpredictable, austere and prone to error (Vincent-Lambert, 2015). Where there is interaction between human actions and technology such as in the complex ECC environment, mistakes can be expected. The lessons learnt from Normal Accident Theory and High Reliability Organisations such as they are applied to the aviation and nuclear power industry can be applied to EMS (Van Stralen & Mercer, 2013). Weick & Sutcliffe (2015) codified five principles of HROs. They include 1) preoccupation with failure; 2) reluctance to simplify; 3) sensitivity to operations; 4) commitment to resilience, and 5) deference to expertise.

7.5.4 EMS Response Times

This section is aligned to the research questions: What are the factors that motivate and foster Quality Improvement amongst EMS managers within EMS organisations? Secondly, what are the benefits, and impediments and opportunity costs to implementing Quality Improvement in EMS?

Section 10 (2c) in the regulations relating to standards for EMS require an EMS to monitor response times for each stage of the call management and dispatch process. In response to the survey question: we mostly respond to emergencies in a

coordinated and efficient manner 10% (n = 36) of the managers said Strongly Agree, 46% (n = 163) Agree, 20% (n = 69) were Neutral, 16% (n = 56) Disagree, 8% (n = 127) Strongly Disagree.

In the interviews #P9 pointed out their approach is that we will send an ambulance when we have one available. Although #P9 said that the 'Golden Hour[69]' is important, #P2 said it is not unusual for a user to wait two hours for an ambulance.

> *"You can wait two hours for an ambulance and it's a norm." #P2*

The managers acknowledged that there are various reasons for the poor response times. While it may appear to the lay person that adding more ambulance is the solution, there just is not enough funding and resources to compete with the rest of the world according to #P9. The key factors identified as contributing to poor response times include the high call volume, availability of ambulance, and staff. Some other contributing factors that are associated include the inappropriate use of EMS by the public, delayed turn-around times at hospitals, fleet unavailable due to maintenance and repairs, HR capacity and long travel distances in rural areas.

EMS like any other system has critical paths which if lengthened will cause damage. The EMS response consists of a series of interrelated events that start when the incident is reported until ambulance arrives to when the patient is received at the health facility (Oosthuizen, 2017). A key factor in determining the efficiency of the EMS organisation is the response time. A study conducted by Finlayson (2017) using data from an urban ECC in KwaZulu-Natal, revealed that it took on average 41 minutes to process, locate and dispatch a vehicle to an emergency priority one call, and it took 84 minutes for the vehicle to arrive at the scene of the incident. In the study there were between 19 and 25 vehicles available to respond to between 191 and 246 calls per

[69] The 'Golden Hour' refers to the first hour following an incident within which definitive emergency treatment must be provided. The patient must be transported to a medical facility within the hour and receive definitive care at the facility to decrease the risk of death and disability (Vanderschuren & McKune, 2015).

24-hour shift. Although increasing the size of the fleet would improve the response time (Stein et al., 2015), using CAD and vehicle tracking would ensure the more efficient and effective use of these scarce resources. The next paragraph will discuss EMS fleet management.

There are multiple complex factors that contribute to poor response times. Applying the Theory of Constraints (TOC) will help identify the bottlenecks in the system that can be either addressed or removed. Constraints can be viewed as positive because they determine performance of a system and identifying and removing these bottlenecks will improve performance and quality of the system (Rahman, 1998). The next section will discuss EMS fleet management.

7.5.5 EMS Fleet Management

This section answers in part the research objective: to observe, investigate, and document the quality champions perspectives on the application of the OHSC standards and implications of non-compliance. When considering fleet management as a resource, the following research questions are relevant: What are the factors that motivate and foster quality improvement amongst EMS managers within EMS organisations? Secondly, what are the benefits, and impediments and opportunity costs to implementing Quality Improvement in EMS?

The EMS fleet is integral to delivering timely emergency care at the point of need and providing safe, efficient, and effective conveyance of users to the appropriate health facility. In the Regulations Regulating Standards for EMS Section 25 describes fleet management as a sub-domain of the domain Operational Management. Section 25 (1) of the regulation requires the vehicles used to transport users and personnel to be safe and well maintained. Section 25 (2) (d) requires EMS to implement an effective fleet management system (South Africa, 2022). In response to the survey question: “The vehicles used to transport patients are safe and well maintained”, 50% (n = 172) choose Agree, 17% (n = 56) choose Strongly Agree, 18% (n = 70) were Neutral, 10% (n = 34) choose Disagree, and 5% (n = 18) Strongly Disagree.

During the non-participant workshop observations and interviews, the shortage of operational vehicles was raised as a concern by managers from some provinces. EMS Managers use the ideal EMS norm of 1 ambulance per 10 000 population to determine the number of ambulances per district[70]. For the ambulance to be fully operational it must be road worthy, meet the EMS licensing regulation requirements and have two crew. There is acknowledgement that the demand for EMS far exceeds the supply. The shortage of vehicles impacts directly on the users having timely access to emergency medical care. Managers in #W1 described how staff reported for work and sat around doing nothing for the entire shift because there were no vehicles available. Managers also expressed their frustration when they were held accountable for low numbers of operational ambulances when it was due to factors outside their direct control.

> *"You speak about use of resources, and we have spare staff, because we don't have vehicles." "Some provinces have so many staff and no vehicles, so they sit or sleep at the station the whole night doing nothing." #W1*

The reasons given for the non-availability of the fleet included the appointment of incompetent fleet managers; delays in the turnaround times with authorisation, maintenance, repair, and servicing of the vehicles; suspicion amongst some managers that there was theft and corruption associated with vehicle maintenance and repairs; and ambulances from rural areas had to be taken hundreds of kilometres to service centres in the city. It was mentioned at #W6 that the recommended target was to have a maximum of 10% of the fleet unavailable at any one time. Only the Western Cape is meeting this target because they have opted for the more expensive vehicle leasing option.

There are numerous forecasting models that have been used to predict volume and location of ambulance calls. Stein et al. (2015) studied one such model in South Africa

[70] The 1 ambulance to 10 000 population norm is controversial. It was based on a report (since lost) done years by an external consult in once province and was set as a national target. The norm does not factor population density, travelling distances to hospital and therefore is not useful.

that concluded that adding additional vehicles during peak periods improves response times but is unlikely to meet the national response time targets. There is extensive literature on the topic of modelling and forecasting the number and placement of ambulances to meet demand. Many of these models are integrated into the CAD software and a detailed discussion on this topic is beyond the scope of this study.

Despite the commercial availability of CAD software solutions, some of which are being used in South Africa, senior provincial management it would seem would prefer to develop their own CAD solutions. Although there are pros and cons to having one CAD solution for all provinces, CAD is a fundamental building block for quality improvement in EMS. The next section will shift the focus of the discussion to planned patient transport and interfacility transfers.

7.5.6 Planned Patient Transport (PPT) and Interfacility Transfers (IFT)

In considering PPT and IFT the following research questions are relevant: What are the factors that motivate and foster Quality Improvement amongst EMS managers within EMS organisations? Secondly, what are the benefits, and impediments and opportunity costs to implementing Quality Improvement in EMS?

Planned patient transport (PPT) and interfacility transfers (IFT) is a core function of the public EMS. Poor delivery of these services impact on the health outcomes of the users. PPT is the scheduled transportation of non-urgent users to healthcare facilities. These users would not require any emergency care during transportation and need to be transported. The transportation is done using buses and minibuses that are configured to transport non-urgent users that are either seated or lying down on a stretcher. The key difference is that the patient does not require emergency care during transport (Ashokcoomar & Naidoo, 2016).

The inter-facility transfer (IFT) is the urgent transportation by ambulance of users that usually require a higher level of care. These users would require emergency care and monitoring during transportation. IFT accounts for a significant portion of the workload done by EMS (Finlayson, 2017). Many health districts lack appropriate referral systems that ensure that users are admitted to the most appropriate health facility

therefore reducing the need to later transfer the user by ambulance (Hardcastle et al., 2013).

In the survey response to Question 40, 44% (n = 174) of respondents Agreed or Strongly Agreed (n = 37; 10%) that planned patient transport (PPT) services or inter-facility transfer (IFT) are managed in a manner which maximises patient safety, 23% (n = 70) were Neutral, 15% (n = 44) Disagreed and 8% (n = 27) Strongly Disagreed. In response to Question 41, if the services are managed in a manner that maximises efficiency, 49% (n = 156) Agreed and 10% (n = 36) Strongly Agreed.

During the interview, #P2 describes PPT as a taxi service with the aim to move users that are well enough to take public transport but either cannot afford it or none is available. In #W4 and #W5 managers complained that the reduction of certain health services at health facilities impacted on EMS as more patients had to be moved to receive those services at other facilities.

> *"Then challenge with PPT, the demand is ever increasing. Whenever there are services that are cut at institutions throughout the province all that pressure comes back to us that we to transport these patients." #W4*

#P10 provided an account of how the effective planning and scheduling of PPT can make a significant difference in the lives of the users that are dependent on this mode of transport. In his account, a user that lives in a rural village who required 2-hour weekly dialysis treatment was spending six days travelling to and from the regional hospital until the PPT schedule was adjusted to accommodate her.

Managers also complained that there has been a steady increase in demand for IFT that translates to fewer ambulances being available to respond to emergency calls because of no additional funds. Managers also complained that just before the clinics close at 4pm they receive a sudden influx of requests to move the patients to the district hospital. The next paragraph will discuss the introduction of obstetric ambulances.

> *"Then challenge with PPT, the demand is ever increasing. Whenever there are services that are cut at institutions throughout the province all that pressure comes back to us that we to transport these patients" #W5.*

Like IFT, obstetric ambulances were implemented at the request of the national department of health to reduce maternal and infant mortality. However, as discussed at #W7, in some provinces, no additional ambulances and staff were provided to meet additional requirements. As a result, ambulances were taken out of operational service and dedicated as obstetric ambulances.

> *"The introduction of the obstetric ambulances they were introduced as obstetric ambulances but there wasn't staff and there wasn't additional funding for them" #W4.*

The implication was that a fully equipped ambulance with staff would be stationed outside the clinic waiting to transfer an obstetric user to hospital. These ambulances were not permitted to leave the clinic and respond to other emergencies, effectively it was a case of as the saying goes of "*Robbing Peter to pay Paul*". Every province has taken a different approach, with the Northern Cape deciding that they could no longer afford to have dedicated ambulances for this purpose #W5.

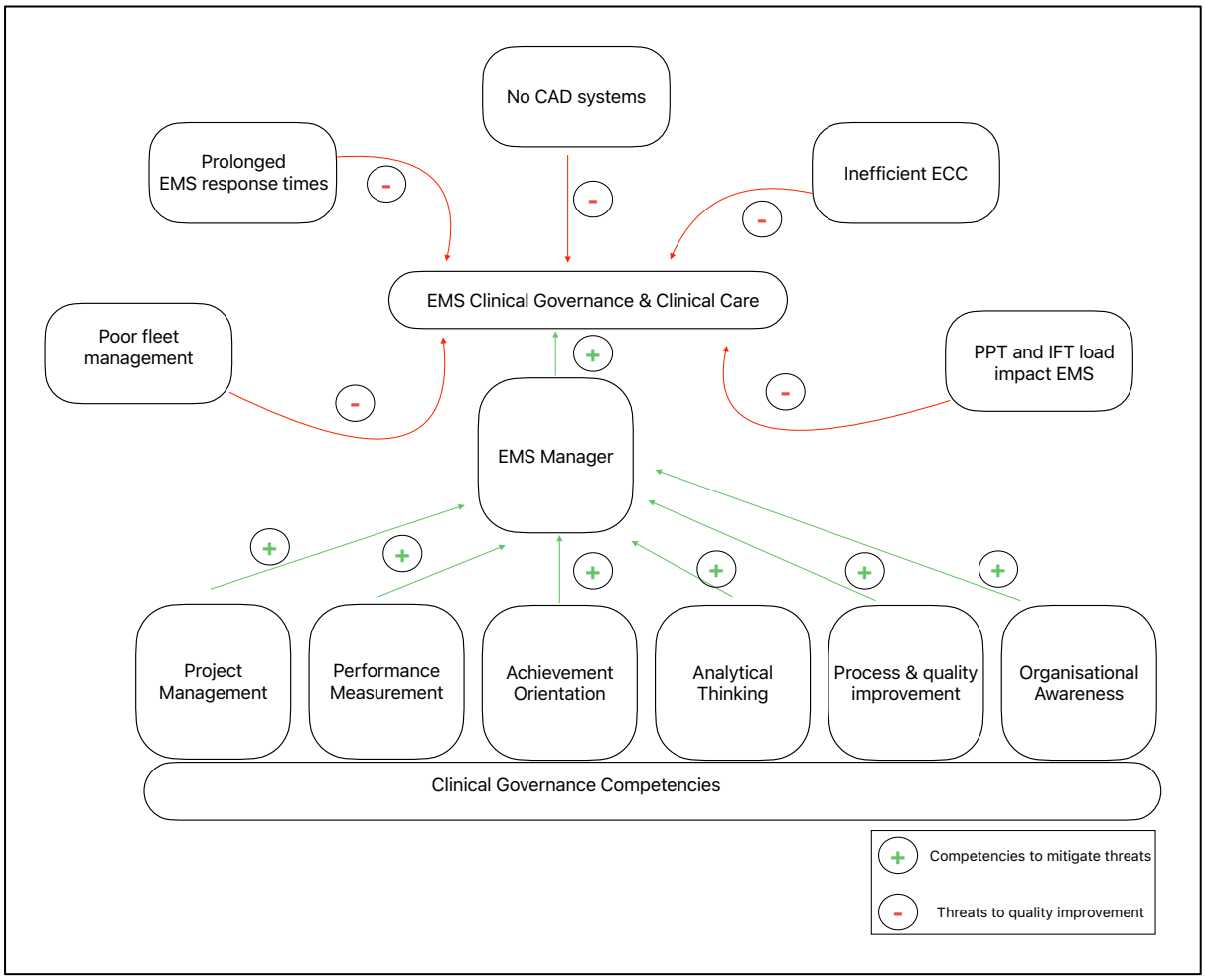
Although this policy was introduced with good intentions, there has been a difference with reduced maternal and infant mortality in some provinces. The management failure to support EMS with the resources has compromised the quality of the overall services provided by EMS. This is an example of high-level health policy decisions being taken without adequate EMS consultation in some districts and provinces.

The findings of this study regarding PPT and IFT are not new. Previous local studies by Finlayson (2017); Newton, Naidoo & Brysiewicz (2015); Ashokcoomar & Naidoo (2016) had similar findings on the challenges facing PPT and IFT in EMS. Regardless of the differences between the provincial EMS systems, there are common issues related to PPT and IFT. Some provinces have implemented solutions that could be adapted to fit the local context in other provinces. Collaboration between provinces

and sharing best practices will help improve PPT and IFT systems and processes and the quality of EMS.

In Figure 7.6 the factors negatively impacting (depicted by red arrows) on EMS clinical governance and clinical care including poor fleet management, prolonged response time, no computer aided dispatch that contributes to an inefficient ECC, and the growing demand for IFT and PPT takes resources away from primary emergency response. Equipping the EMS manager with the leadership competencies (depicted by green arrows) of project management, performance measurement, achievement orientation, analytical thinking, process and quality improvement and organisational awareness can counter the negative impact on EMS clinical governance and clinical care.

Figure 7.6: Factors influencing EMS Clinical Governance & Clinical Care



Source: Researcher's own work

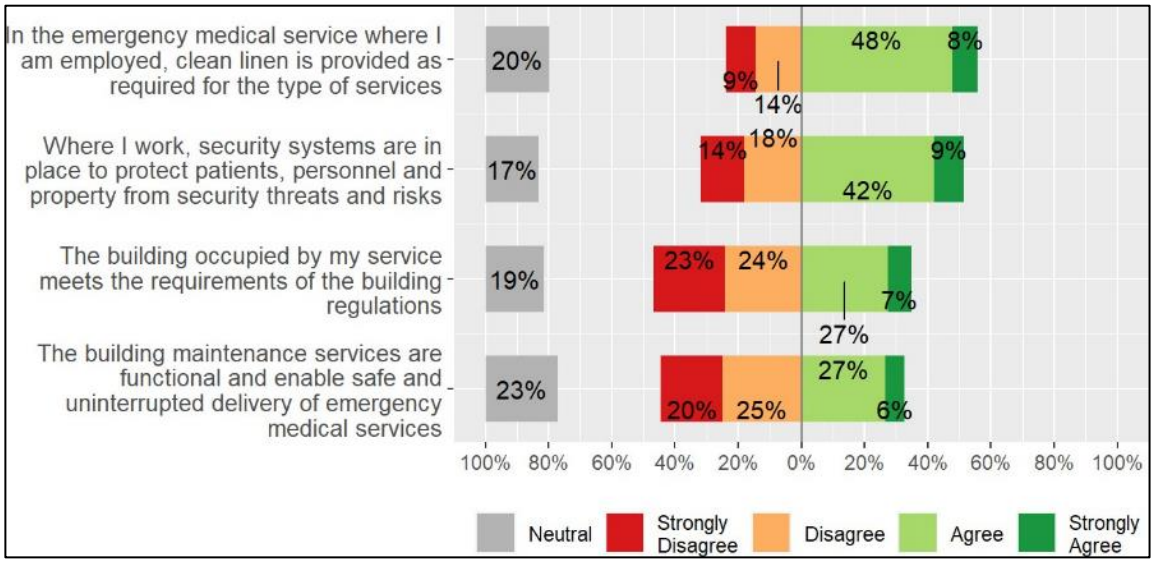
7.6 EMS FACILITIES AND INFRASTRUCTURE

The poor facilities and infrastructure in EMS relate to the research questions: What are the factors that motivate and foster Quality Improvement amongst EMS managers within EMS organisations? Secondly, what are the benefits, and impediments and opportunity costs to implementing Quality Improvement in EMS?

The standards for management of buildings and grounds, facility management services, security and linen services are detailed under Domain six of the Regulations relating to Standards for Emergency Medical Service, 2022 (Republic of South Africa, 2022b). Appendix A (2) Requirements for Emergency Medical Services, of the Emergency Medical Service Regulations, 2017 specifies the minimum requirements for an ambulance station/base (Department of Health South Africa, 2017). This section of the discussion contributes to answering the research question: What are the factors that motivate and foster quality improvement amongst EMS managers within EMS organisations?

In the Chapter Five survey results on Facilities and Infrastructure are presented in Figure 7.7. In the survey this domain was rated the lowest by the EMS managers. In response to Question 59: The building occupied by my service meets the requirements of the building regulations, overall, 34% (n = 122) said Strongly Agree or Agree. In response to Question 60: The building maintenance services are functional and enable safe and uninterrupted delivery of emergency medical services, overall, 33% (n = 114) selected the Strongly Agree or Agree option.

Figure 7.7: EMS Facilities and Instructure



Source: Researcher's own work extrapolated from Chapter Five

It became apparent during the workshops that many public EMS stations do not meet the stipulated the licensing specifications and requirements in the Emergency Medical Service Regulations, 2017 and are therefore not licenced. The EMS managers in workshops #W1, #W2 mentioned that many EMS stations fail the inspection because the regulations require vehicle wash bay facilities which have appropriate medical waste traps built in that comply with Local Municipal By-laws (Department of Health South Africa, 2017). #P8 has been waiting 3 years for a wash bay.

> *"Show me how many wash bays you can get for R12 million, and that project is been ongoing, you know, they sent the designer, they sent the planner, they sent public works, but nothing solid has gotten off the ground. So right now, for the last three years, none of my bases has been a licensed." #P8*

The dissatisfaction with EMS infrastructure and maintenance of infrastructure was also a common theme that emerged during the interviews. In the interview #P7 recounted that some EMS stations were deplorable and disgusting with a manager saying that if he does not have money to fix the station what is the point completing the ideal EMS framework survey.

"…some stations that I've seen that are deplorable, it's disgusting." #P7

In the survey only 47% (n = 166) agreed (6%; n = 21) Strongly Agree and 41% (n = 145) Agree with the statement: Where I work, we have an effective medical equipment management programme. #P8 gave an example of how equipment could not be accounted for because one station did not have an equipment storeroom, so everyone had access to the equipment lying on the floor in the crew room.

At the workshop #W5 it was noted that only 16% of public EMS stations are purpose built across SA. The National Department of Public Works and Infrastructure (DPWI) is responsible for all the construction and maintenance of all buildings occupied by any government department. Despite there being budget provision for building infrastructure and maintenance, participants' utterances in the workshops and interviews suggest that EMS infrastructure and maintenance is a low priority and projects take years to complete. The National Directorate for Emergency Medical Services and Disaster Management has recognised the need to prioritise the building of EMS stations and has been engaging with DPWI to focus on EMS infrastructure development.

In response to Question 45: In my workplace effective environmental cleaning minimises the risk of disease outbreaks and the transmission of infection, 8% (n = 48) said Strongly Agree, 46% (n = 161) Agree, 24% (n = 83) Neutral, 16% (n = 56) Disagree, and 7% (n = 23) Strongly Disagree. The lack of facilities to wash and clean the patient compartment of the ambulance and a sluice facility for cleaning of equipment compromises the health and safety of the frontline EMS employees; the users that may be exposed to pathogens in the ambulance; and the community that may be exposed to pathogens that enter local water systems. The concern was confirmed in an earlier study conducted by Naguran (2008) who found that contamination of ambulances was widespread in one health district with 10 of the 13 micro-organisms identified as pathogenic. The next section will discuss the infrastructure challenges facing EMS.

The literature supports the findings of the survey and the concerns raised by the EMS managers. Howard et al. (2020) identified infrastructure as a factor that affected the effectiveness of quality systems in EMS. The WHO calls for an action plan for water, sanitation and hygiene (WASH) at all healthcare facilities by 2030 (Potgieter et al., 2021). The poor infrastructure is not unique to EMS, it could be argued that hospitals and clinics are a higher priority (Stacey et al., 2021). The implications of poor facilities for occupational health and safety are discussed in the next paragraph.

In responding to a parliamentary question, the Minister of Health acknowledged that public health facilities have massive infrastructure needs, with 730 maintenance projects and 57 construction projects in the planning (Department of Health South Africa, 2021b). It is estimated that R200 billion is needed just for hospital maintenance for which there is no budget in the short to medium term. Added to the crisis is electricity load shedding that requires clinics and hospitals to invest in infrastructure to ensure the uninterrupted supply of water and electricity (Baduza & Lencoasa, 2023).

Against this backdrop, it will be many years before purpose built EMS stations are prioritised by the Department of Health and the DPWI. The concerns raised earlier in the discussion was the lack of support from executive management when in some districts EMS is being denied occupation of unused health facilities.

Public-private partnerships were mentioned as a possible solution for some stations. During #W2 the public-private partnership was discussed as a mechanism through which the private sector could become involved in developing, financing, and providing EMS infrastructure. In some provinces mining companies have built and donated EMS stations as their mining operation will benefit from having a station in proximity to the mine. The next paragraph will focus the discussion on the financial constraints affecting EMS.

7.6.1 EMS funding and the National Health Insurance (NHI)

This section contributes to answering the research questions: What are the factors that motivate and foster QI amongst EMS managers within EMS organisations? In the regulations relating to standards for EMS, Section 21 (2b) requires that management

ensure that financial management and supply chain management processes facilitate business continuity and efficient service delivery. The next paragraph will discuss the funding of EMS and the National Health Insurance.

The literature review in Chapter 2 discussed the unequal funding of the public and private health sector in SA. Whereas during apartheid the quality of access to emergency medical care was largely determined by racial classification, post-1994 has seen an access determined by minority (16%) who have access to private healthcare and the remaining 84% of the population that must rely on the state healthcare services. In 2023 the SA parliament passed the National Health Insurance (NHI) Bill which aims to provide Universal Health Coverage (UHC). The NHI aim is to address inequality and provide affordable access to all citizens in South Africa regardless of socio-economic status (Makoni, 2023). The NHI will purchase health services, including EMS for all citizens in South Africa. The OHSC will inspect and certify EMS providers to be NHI service providers according to the Regulations relating to Standards for EMS (Office Health Standards Compliance, 2021). The next paragraph will discuss the EMS and the NHI.

Although the specifics of how EMS will be provided under the NHI will become clear once the regulations are promulgated, it is assumed that the national emergency number 112 will be used to access both public and private EMS. Private EMS will be contracted by the NHI fund and according to Section 35(4)(a) be paid a standard fee for service, public EMS would provide public ambulance services. The NHI will contract sections within the provinces including EMS. EMS will then be reimbursed through the provincial equitable share very much in the same way it happens now so it is unlikely that there will be any additional funding of the public EMS by the NHI (Tandwa & Dhai, 2020). Of note, is that the NHI cannot tolerate inefficiency as these are cost drivers. There has not been any study to assess inefficiencies (as cost drivers) in South African EMS. The next paragraph will discuss the survey results.

In the survey, only 15% (n = 52) answered Yes, they have adequate resources to implement QI in the workplace. The national budget for Programme 3, Emergency Health Services has increased from R4.6 billion in 2012 to R8.6 billion in 2021, it is up

to each province to decide what percentage of the provincial health budget would be allocated to each component such as EMS (Tiwari et al., 2021). According to #P2 there is a disparity in the percentage budget allocation to EMS between the provinces with some provinces receiving a significantly higher percentage of the overall provincial budget. The next paragraph will discuss the impact of budget constraints on EMS.

In #W4 is was mentioned that the EMS budget was exceeded by R100 million due to expenditure on the compensation of employees, leaving little or no budget for other expenses such as equipment, and building infrastructure maintenance. In the province the 24-hour shift schedule results in employees exceeding the maximum working hours and therefore claiming R38 million in overtime pay every year. The budget deficit has resulted in critical vacant posts not being filled, as a result managers are appointed in acting positions.

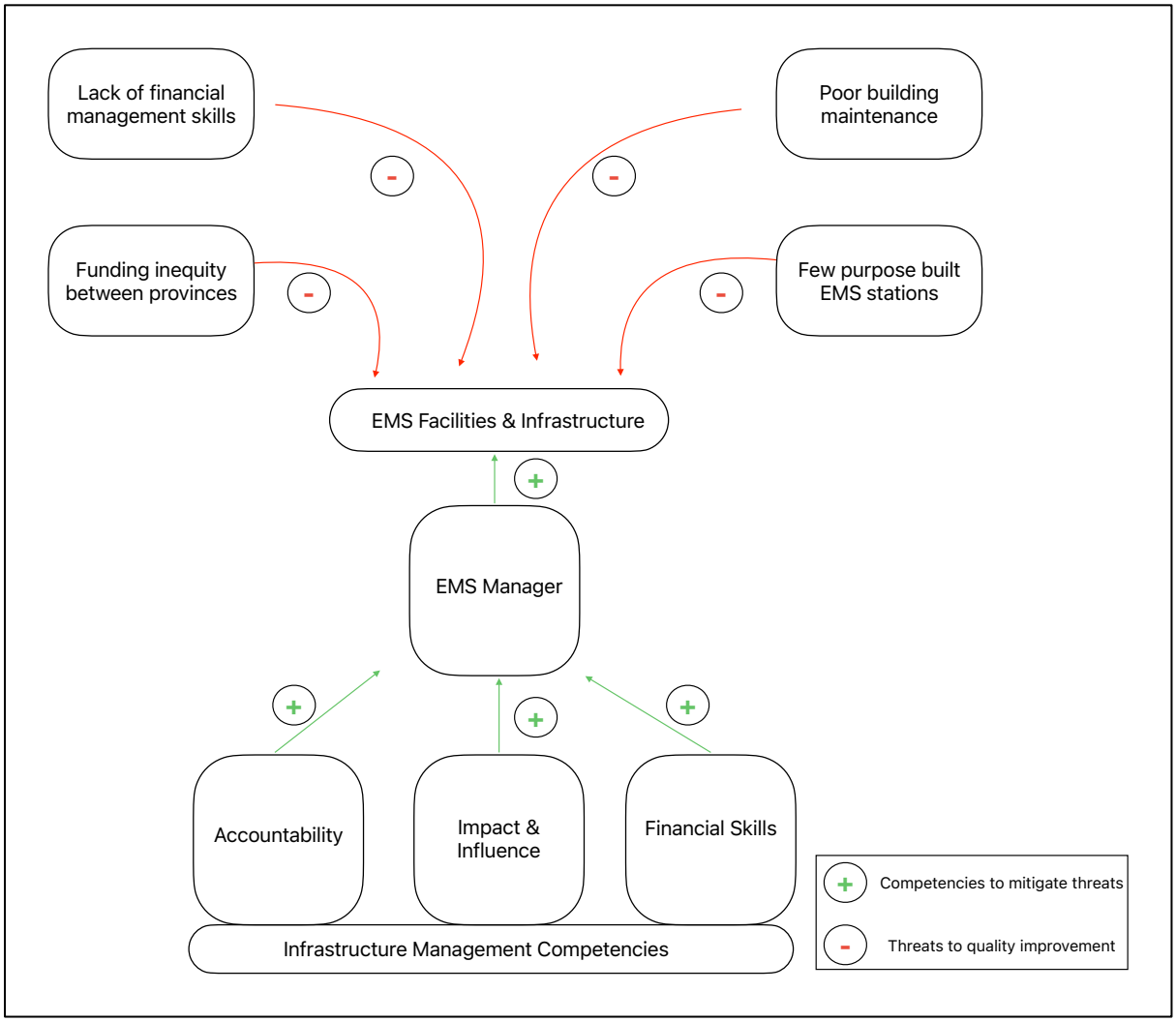
Throughout this chapter there have been examples of how the EMS budget impacts on the dimensions of quality related to EMS. At this early stage, it is unclear how the NHI funding model will impact on the allocation of public EMS financing and budgets. There is however a cautionary note regarding the contracting of private EMS as part of the NHI. #P2 was angry at a large ambulance contract awarded to a dubious private EMS company with the resulting overservicing, overcharging and sub-standard quality of services.

> *"…so, EMS money was siphoned off … to pay for a service that we didn't need… it was millions and millions of rands."*

In Figure 7.8 the leadership competencies of accountability, impact and influence, and financial skills (depicted by green arrows) are suggested as competencies for the EMS manager that can be used to overcome the challenges related to infrastructure and maintenance. The factors that negatively (depicted by red arrows) influence the lack and poor quality of EMS facilities and infrastructure include the lack of funding allocated to the different provinces for EMS, the lack of financial management skills within EMS, poor building maintenance and EMS utilising buildings as EMS stations that are not fit for purpose. The next section will present the discussion on the

knowledge and practice related to implementing QI and the collaboration between provinces to improve quality.

Figure 7.8: Factors influencing EMS facilities & infrastructure



Source: Researcher's own work

7.7 QUALITY IMPROVEMENT THROUGH EDUCATION, TRAINING & COLLABORATION

The main research question of this study was: How can a healthcare quality improvement framework transform the knowledge, attitude, and practices of EMS managers so that EMS organisations may develop the capacity to comply with the regulations relating to the standards for EMS. This section also in part answers the secondary question: What are the benefits, and impediments and opportunity costs to implementing Quality Improvement in EMS?

The findings of the survey revealed that public EMS managers were aware of their organisation's quality goals and objectives (90%; n = 315 said Yes); that their organisation has a data collection plan (84%; n = 297 said Yes); that quality indicators and performance measures for the organisation is collected (80%; n = 248 said Yes) which is used to develop quality improvement plans (76%; n = 266 said Yes). The next paragraph will discuss the results with regards to the managers having the knowledge about the tools used in quality improvement.

When asked the question have you received any training on how to manage the efficient use of resources, 36% (n = 128 said Yes); trained to manage a quality improvement project (17%; n = 60 said Yes); familiar with Plan-Do-Check-Act and/or Six Sigma (21%; n = 74 said Yes). When asked which improvement tools they were comfortable using, 66% (n = 234 said Yes) to Brainstorming but other tools scored lower: Cause and Effect Diagram (20%; n = 71 said Yes), Affinity Analysis (10%; n = 34 said Yes). The next paragraph will present the Education and Training Index statistical analysis pertaining to the survey questions.

> *"…some of the provinces didn't share some of the good practices. And I think that they were just trying to hold the intelligence to themselves. And I think that was rather selfish. You know we we've picked up some of those things." #P7*

The findings are not unexpected as one would expect the senior employees, employees with more years of experience and those from the more developed provinces would have higher scores. The results found that an education and training intervention for EMS managers in quality improvement is necessary. The QI education and training intervention would need to consider the differences between employees based on their years of service, level of seniority within EMS and the province. Albert Bandura's Social Cognitive Theory is applicable in this context as the theory recognises that learning is an interaction of behavioural, environmental, and personal factors. Personal and environmental factors are not independent of one another as people's attitudes, values, experience, and perceptions are used to create and alter the environment. These three factors will vary in influence depending on the

circumstances (Bandura, 1998). The next paragraph will discuss the interview and workshop comments in relation to NHQIP and QI management training.

The Department of Health's Quality Improvement Guide emphasises the importance of achieving QI through a team approach (National Department of Health, 2012). Teams can bring together different experiences, understandings and insights into the problem and offer alternate solutions. During the interview, mention was made of provinces competing rather than collaborating.

Equally important is communicating and collaborating with other health departments and the communities as was mentioned in a workshop:

> *"There is a well-structured partnership with fire department with joint rescue. Our focus now is about community engagement, not on response times. We don't have the budget and resources to provide an ambulance for every street block." #W6*

The Situated Learning Theory is applicable in this context as it suggests that learning occurs through participation in community activities where novices interact with senior members of the community thus creating a community of practice (Wright, 2008). Situated leaning is closely related to informal learning which is a significant dimension of learning that takes place in the course of our employment (Lave & Wenger, 1991).

> *"So you know there was a lack of managerial skills or people's skills and especially also trying to integrate higher qualified personnel into the public sector for them to understand the short course type of personnel." #P4*

The NHQIP proposes building capacity within the health system to embed and maintain QI through training, coaching, and mentoring using a multidisciplinary, bottom-up approach to ensure that there is buy-in and commitment. Although the model for implementation is based on establishing Quality Learning Centres that will become the focal point for QI learning and development for in-service personnel, the inclusion of QI in the curricula is equally important (Department of Health of South

Africa, 2021). In the interviews it was stressed that not enough attention is paid to management training in the emergency care curricula:

The next paragraph will discuss the lessons in the literature that should be considered when implementing QI training. The next section discusses the EMS human resource transformation agenda.

7.7.1 EMS HR Transformation Agenda

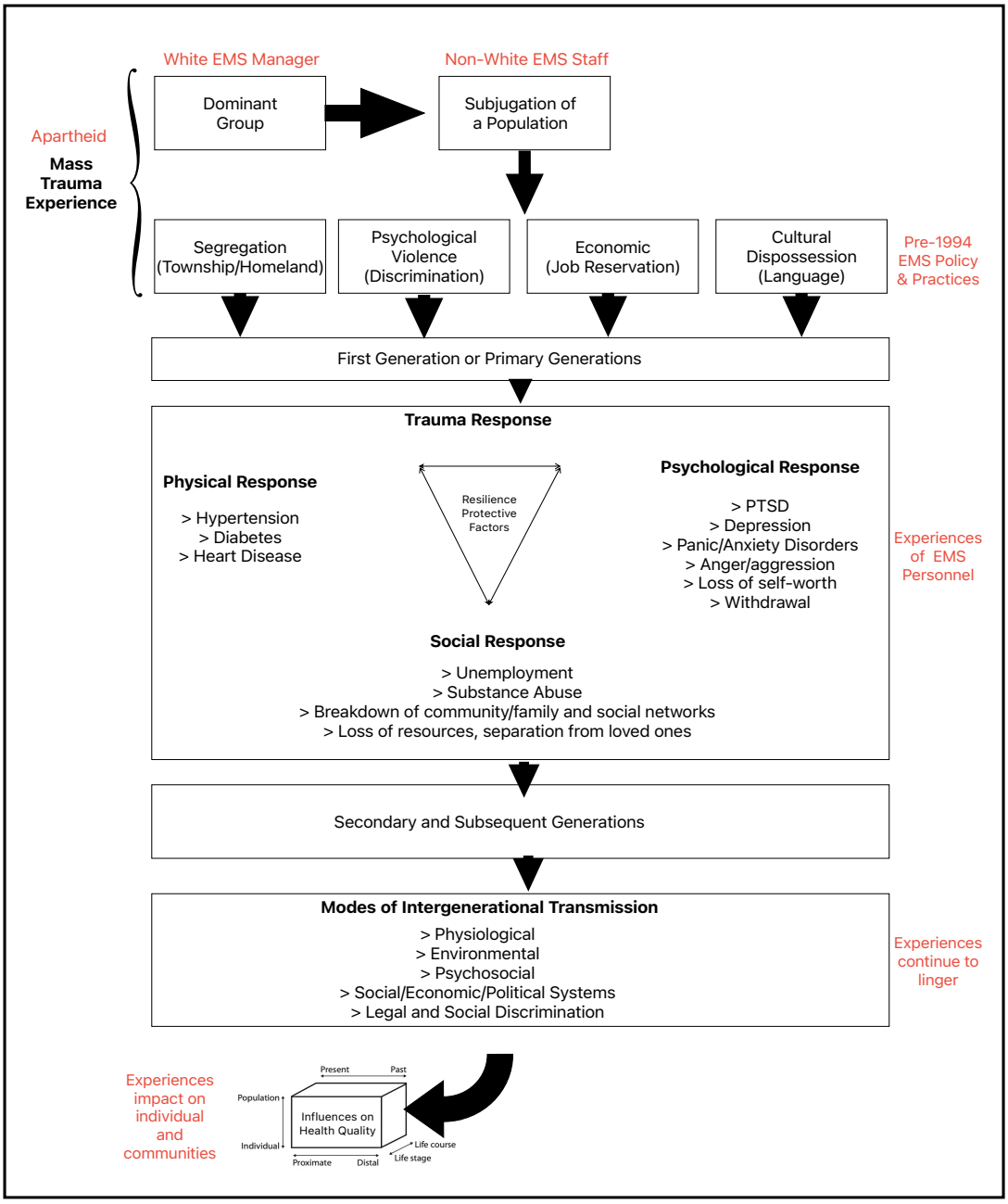
This section in part addressed the research objective which was to investigate, observe and document the quality champions perspectives on the application of the OHSC standards and implications of non-compliance. The EMS organisation is a microcosm of the society in which it exists. EMS employees are part of the organisation and citizens of the society it is intended to serve. This section is about transformation of knowledge, attitude and practice and aims to in part answer the main research question: how a healthcare quality improvement framework can transform the knowledge, attitude, and practices of EMS managers so that EMS organisations may develop the capacity to comply with the regulations relating to the standards for EMS.

The present-day health consequences of this trauma will be discussed next in relation to the Historical Trauma theory. In the post 1994 era, there is little consideration of how apartheid injustices affect the current and future generations. Historical trauma theory suggests that people live in specific historical times and places, if this context changes, it changes the way people live their lives (Elder, 2001 as cited in Sotero, 2006). Historical Trauma theory draws on the psychosocial theory that associate disease with the social environment; political/economic theory which associate disease with unjust power relations and class inequality; and third is the social/ecological systems theory that recognises the association between present and past life course factors and disease (Sotero, 2006).

The EMS organisation would daily witness the impact of the historical trauma in the non-white user population. Figure 7.9 is an adaptation of the Historical Trauma theory (Sotero, 2006) and how it applies to EMS. What was evident during the non-participant

workshops and interviews is that EMS personnel and managers as members of the South African society are not immune. The EMS personnel work in the communities, enter people's homes and interact with the injured and sick users when they are at their most vulnerable. They are witnesses to the effects of the discriminatory policies and practices on the marginalised population such as the civil unrest, violence, destruction of family life and poverty (Coovadia et al., 2009). The EMS personnel are themselves victims, and in a sense, they are wounded healers – wounded because of the racial discrimination and healers because of the emergency care they provided despite the circumstances (cf. Chapter 5). The rescuer-victim paradox cannot hold and must be resolved. QI programs must be trauma informed.

Figure 7.9: Adaptation of the Historical Trauma Conceptual Model



Source: Adapted from Sotero (2006)

Whilst there has been significant gains in addressing the inequity in the South African health system since 1994, the quadruple burden of disease and the recent COVID-19 pandemic have impacted heavily on the health system (Coovadia et al., 2009; Mbunge, 2020). Under these austere conditions the role of the EMS manager is challenged to meet the organisation's transformation agenda and deliver quality services. The next paragraph will discuss the post-1994 human resource

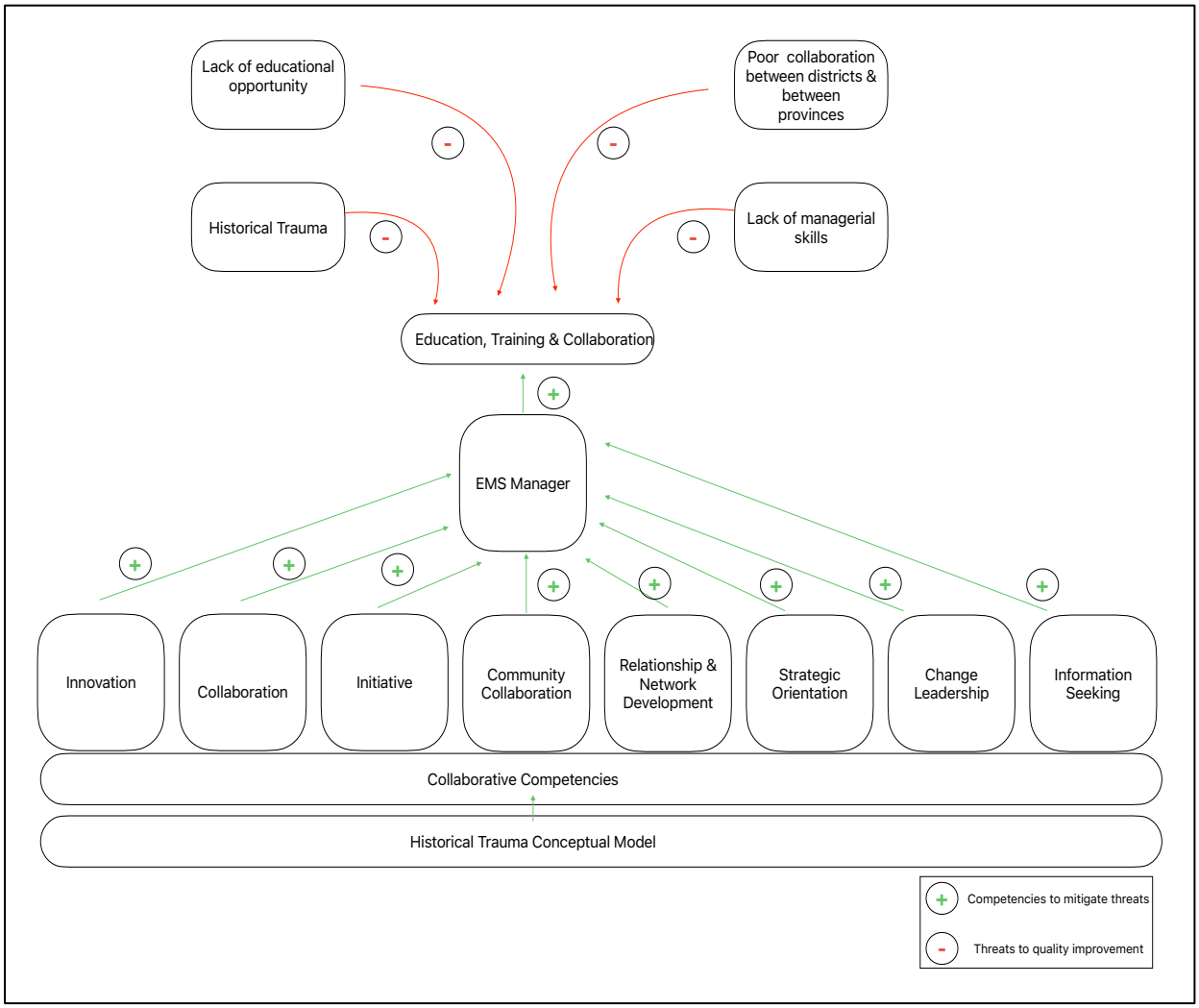
transformation of EMS which aligns to the research question: What are the benefits, and impediments and opportunity costs to implementing quality improvement in EMS?

Several studies (Archibong & Adejumo, 2013; Coovadia et al., 2009; Maphumulo & Bhengu, 2019) argue that the human resource transformation of the public service post-1994 through the passing of the Employment Equity Act 55 of 1998 resulted in a loss of institutional memory and the recruitment of inexperienced managers to senior positions in the health department. Gangaram (2015) cites the affirmative action policy and the Broad-Based Black Economic Empowerment (BBBEE) Act 53 of 2003 as marginalising minority groups in SA resulting in advanced life support practitioners with knowledge and skills leaving the public EMS to join private EMS, whilst others left the country. Although the affirmative action policy had good intentions it is characterised by favouring senior appointments based on nepotism and political affiliation and not qualifications, experience and abilities contributing to the delivery of poor quality healthcare (Archibong & Adejumo, 2013; Maphumulo, 2018).

A quality improvement framework for EMS in SA would need to be holistic, culturally relevant, and respectful of the historical experiences of pain and trauma and its impact on EMS employees, that of the health users and the community. The root causes of the substantial health inequities that exist today between public and private health sector, between urban and rural communities, between and within provinces, needs to be factored into a quality improvement framework for EMS.

In Figure 7.10 the Historical Trauma Conceptual Model should underpin the collaborative competencies of: Innovation, Collaboration, Initiative, Community Collaboration, Relationship and Network Development, Strategic Orientation, Change Leadership and Information Sharing that can strengthen (depicted by green arrows) the EMS manager’s response to Education, Training and Collaboration. The red arrows depict how historical trauma, lack of educational opportunities, poor collaboration, and managerial skills training impact negatively on EMS leadership. The next section will discuss the quality improvement framework.

Figure 7.10: Factors influencing EMS education, training & collaboration



Source: Researcher's own work

7.8 QUALITY IMPROVEMENT FRAMEWORK

This section aims to address the third research objective which was: to develop a framework that explicates how change in EMS policy and praxis may lead to quality improvement in public EMS systems, in the interest of patient safety and organisational sustainability. This section in part answers the fourth research question which was what are the benefits, and impediments and opportunity costs to implementing quality improvement in EMS?

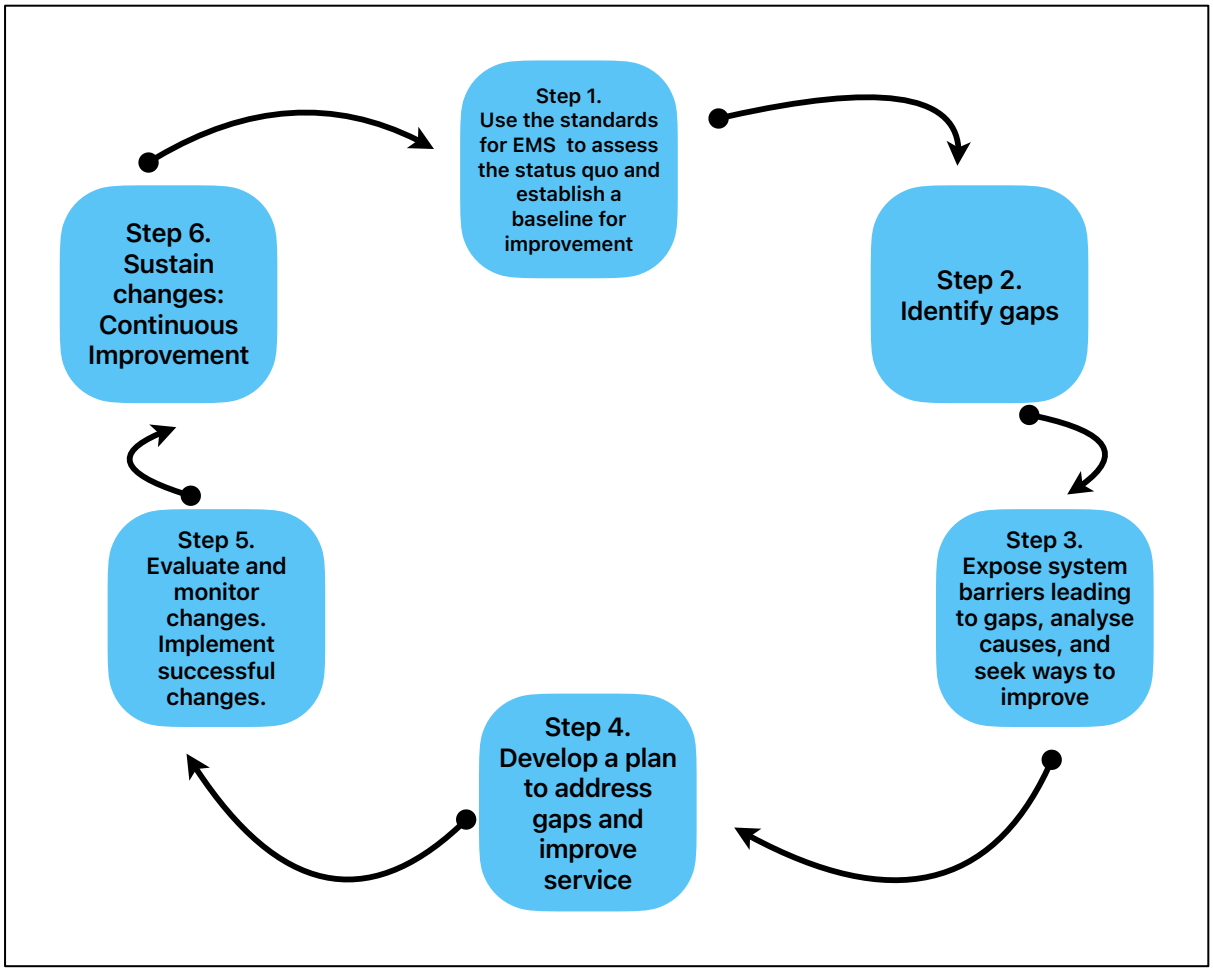
A holistic quality management programme would include four key components: quality planning, quality control, quality improvement and quality assurance. For the quality management programme to succeed it will require ownership and active participation

from senior management and the rest of the organisation; training in quality; and provision of adequate resources. The next paragraph will contextualise the EMS QI framework in relation to the NHQIP that encompasses the four quality components.

The NQIP lays out the quality improvement plan for health, it includes the National Core Standards that provide a regulatory framework that form the basis for the standards for EMS, and against which the EMS organisations will be evaluated. The Ideal EMS evaluation tool will be completed by the EMS organisations to establish a baseline for quality control. Quality assurance will be the responsibility of the OHSC that will include inspection and accreditation against the quality standards for EMS. Importantly, quality improvement is the mechanism to achieve new levels of performance to comply with the standards for EMS.

Quality improvement and patient safety is a dynamic process applied to solve complex problems through engaging people close to the problem in an iterative process of testing, measuring, learning (Goldman et al., 2021). It frequently makes use of multiple tools for improving quality. In Figure 7.11, QI is represented as a continuous cyclical process (National Department of Health, 2012). The next section will present the Leadership Competency Model.

Figure 7.11: Quality improvement as a cyclical process



Source: Adapted from quality improvement guide (National Department of Health, 2012:16)

7.8.1 Leadership competency model

Leadership competencies are described as outcomes related measures of knowledge, abilities, attributes and skills that make an effective leader especially in complex organisations that are evolving and need to be flexible and adapt to changing needs (Garman & Johnson, 2006). As opposed to the typical job description, competency descriptions are more general, and the competency model brings together a collection of competencies associated with successful performance of both individuals and organisations (Garman et al., 2020). Regardless of the instinctive leadership traits, leadership competencies must be taught. Competency models, such as the National Center for Healthcare Leadership (NCHL) Health Leadership Competency Model version 3.0 (Garman et al., 2019), shift the focus from what you know to what you can do. It combines both knowledge and skill and helps foster effective leadership.

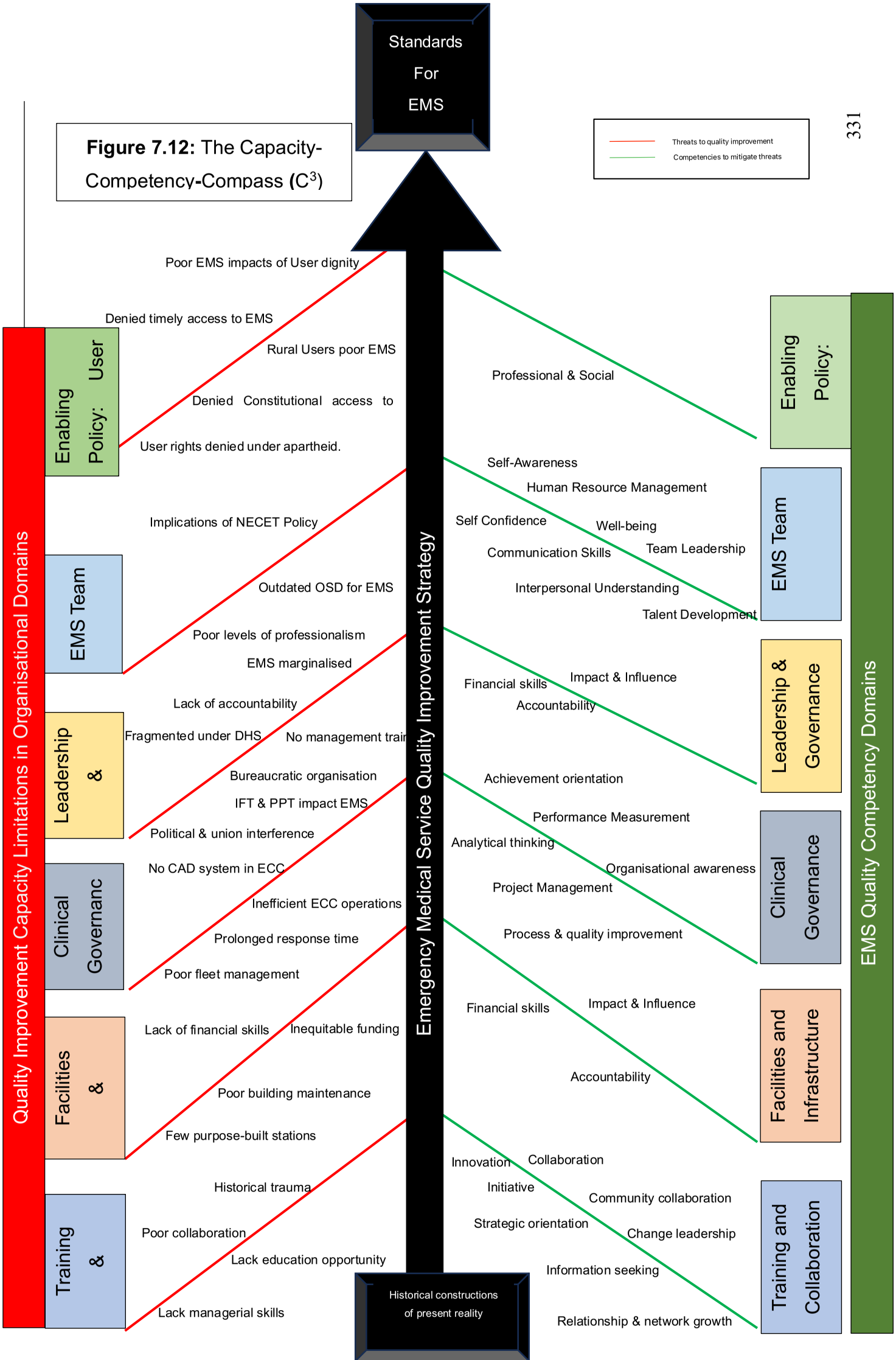
The leadership competency model aims to address the third research objective which was: to develop a framework that explicates how change in EMS policy and praxis may lead to quality improvement in public EMS systems, in the interest of patient safety and organisational sustainability. This model in part answers the fourth research question which was: what are the benefits, and impediments and opportunity costs to implementing quality improvement in EMS? The 'Capacity-Competency-Compass (C^3)' for quality improvement in EMS will be discussed next.

7.9 THE 'CAPACITY-COMPETENCY-COMPASS (C^3)' FOR QUALITY IMPROVEMENT IN EMS

The 'Capacity-Competency-Compass (C^3)' for quality improvement in EMS is an original output of this study that is intended to represent the strategic and structural dynamics of quality. Chapter Five and Six contained the empirical and observational data which when analysed, lead to findings. These findings were discussed in relation to existing theories and the literature in Chapter Seven. This process led from concrete observation to the abstract conceptualisation represented by this framework in Figure 7.12. There are multiple dynamics that merge at the spine, a metaphor for strategic and structural dynamism. The spine is flexible in that there is reciprocal movement (pushes and pulls); when it moves toward the capacity limitations, it demands the reciprocal competency factors to continue to attain the quality standards. In the Capacity-Competency-Compass for QI in EMS, the 'Fishbone[71]' is adapted and represents a contextual map, and the integrated compass is indicative of the state of affairs in EMS in relation to quality standards. The direction represents the alignment or misalignment between the 'map' and the place (jurisdictional emergency services, for example), i.e., an orientation of desired standards against a lived reality.

[71] The Fishbone diagram comes from Kaoru Ishikawa who developed the tool to identify problems in a system by showing how causes and effects are linked. The diagram helps analyse complex problems and identify system and process errors to arrive at effective solutions (Neyestani, 2017).

Figure 7.12: The Capacity-Competency-Compass (C^3)



7.10 DEFINING THE COMPETENCIES IN THE CAPACITY-COMPETENCY-COMPASS (C^3) FOR QUALITY IMPROVEMENT IN EMS

The tables 7.2, 7.3, 7.4, 7.5, and 7.6 below explains and unpacks the denotation and connotation for each of the competencies associated with quality leadership in EMS. Figure 7.12 illustrates the association between the competencies and quality challenges facing EMS.

Table 7.2: Operational team competencies

Competency	Denotation	Connotation for Quality Leadership
Self-awareness	Implies knowing one's strengths and weaknesses, including how these impact on others. A strength would be acknowledging the need for development through reflective, self-directed learning.	Acknowledges the importance of continuous education. Encourages critical feedback from internal and external stakeholders. Reflects and uses feedback to improve personal performance. Modifies behaviour in response to feedback.
Self-confidence	Believing in one's own ability to accomplish a task, having the confidence to deal with challenging situations, and confidence and belief in the decisions and views expressed.	Works independently and can make decisions. Can act in uncertain circumstances and can make things happen. Seeks out new opportunities, and willingly takes on additional responsibilities. Disagrees respectfully while maintaining confidence.
Well-being	Form good healthy habits. Create a work environment that supports the total health of oneself and others and monitor the environment for opportunities to improve one's health.	Adopts a healthy, balanced lifestyle and is a role model for fellow staff.
Human Resource Management	Develop and implement a staff development plan. Optimise the performance of the employees by undertaking performance assessments. Ensure	Demonstrates knowledge of the labour law and policies. Has the ability to manage ill-discipline and conduct meaningful engagements with labour unions. Can conduct negotiations, manage grievance procedures and mediation

Competency	Denotation	Connotation for Quality Leadership
	alignment with human resource policies and processes.	timeously and when appropriate. Can conduct performance reviews fairly and be impartial by treating all employees as equal.
Team Leadership	Lead people toward shared visions and goals. Set mission, values, and norms, and holding team members accountable individually and as a group	Conduct efficient and effective meetings. Provide information and keep people informed of the status of the decisions. Provide a clear direction. Use your own positional power, trust, respect of others, and relationships to address obstacles that the team meets. Coach and develop team members toward high performance.
Communication Skills	Use formal and informal spoken and written communication to convey meaning and shared understanding in the workplace.	Convey meaning clearly and efficiently. Identifies the receiver's level of interest and understanding. Pitches communication at the correct level without being condescending. Engage the audience, stay on topic, and complete within the allocated time. Demonstrate effective meeting management techniques. Can conduct a brainstorming, consensus building, group problem solving and conflict resolution session.
Interpersonal Understanding/ Cultural competence	Accurately hear and understand the unspoken or partly expressed thoughts, feelings, and concerns of others, especially those who may represent diverse backgrounds and very different worldviews.	During meetings accurately interpret emotion and content of what others say. Seek to understand people as individuals and their points of view. Be sensitive to diverse backgrounds of individuals and groups. Support greater diversity within their organisation.
Talent Development	Value the breadth and depth of the organisation's human capability and professionalism. Support by taking a personal interest in coaching and mentoring potential leaders.	Gives detailed instructions on what is expected with reasons and rationale. Provide practical support or assistance. Give feedback. Recognize that developing people in the organisation is a key priority to create future managers.

Source: Adapted from NCHL Health Leadership Competency Model (Garman et al., 2019)

Table 7.3: Clinical governance and clinical care

Competency	Denotation	Connotation for EMS Quality Leadership

Organisational Awareness	Be able to learn and understand the formal and informal decision-making structures within the organisation. Identify the real decision makers and those that influence them. Predict how new events will affect the organisation and the people within.	Uses the formal structures within the organisation to accomplish tasks. Understands the chain of command, the gatekeepers, the rules, regulations, policies, and procedures. Be aware of the organisational culture, the non-formal or unspoken guidelines within the organisation. Become familiar with the expectations and priorities of the key stakeholders.
Achievement Orientation	A desire to surpass standards of excellence. This may include striving for improvement, being results orientated, competitive, and innovative.	Delivers expected results in line with job position. Tracks and measures outcomes by comparing specific measures of baseline performance. Makes changes to improve performance
Analytical thinking	Develop a deeper understanding of a situation by breaking it down step by step systematically. Compare the different features, set priorities, identify time sequence, causal relationships, and if-then relationships	Identifies the cause-and-effect relationship. Identifies potential causes of events, analyses relationships between parts of the situation or problem. Develops a plan by using analytical techniques to identify possible solutions
Performance Measurement	Can understand and use statistical metrics and methods to set goals and measure performance, and continuous quality improvement.	Implements tracking of performance against the standards for EMS. Reports results in an accurate and timely manner
Process & quality improvement	Analyse and design organisational processes, including the High Reliability Organisations principles, and quality improvement	Uses process mapping and analysis applications. Identify key decision points. Determine staffing requirements, cost, and service implications. Benchmark with other EMS stations, districts, and provinces
Project Management	Plan, execute and manage a project with significant resources, scope, and impact.	Use project management tools with realistic timelines and budget. These include familiarity with the Lean Sigma (Define, Measure, Analyse, Improve and Control) quality improvement tools. Tracks performance against plan and budget and adjusts accordingly.
ICT Management	See the potential for clinical and administrative technologies to support processes and performance improvement.	Its proficiency is the use of software packages used in the office environment to receive and send email, type correspondence, reports, and memorandums. Demonstrate the ability to capture data and use basic statistical software to interpret and present the data. Be familiar with the computer aided dispatch and other software used in the EMS organisation.

Source: Adapted from NCHL Health Leadership Competency Model (Garman et al., 2019)

Table 7.4: Leadership, governance, facilities, and infrastructure

Competency	Denotation	Connotation for Quality Leadership
Accountability	Ability to hold employees accountable to standards of performance and ensure compliance.	Communicates requirements and expectations in relation to the EMS standards. Monitors performance against the standards. Addresses the team's shortfall and holds junior staff accountable for performance. Creates a culture of accountability. Be accountable for ensuring the facilities and infrastructure meeting the EMS regulation requirements
Impact & Influence	Persuade, convince, or influence others to support one's opinion or position by understanding other's interests and motivations.	Communicate intentions clearly to the team using visual aids. Appeal using data, reason, and self-interest. Analyse the needs, expectations, and interests of the key stakeholders,
Financial Skills	Understand and explain financial information, prepare, and manage budgets.	Become familiar with the public finance management act, the budget process, the procurement processes, and procedures. Seek guidance on financial matters if unsure before committing or signing any document. Report all instances of suspected fraud or other improprieties related to finance. Use financial skills to plan for building infrastructure and maintenance to comply with the EMS regulations and the Public Finance Management Act No.1 of 1999.

Source: Adapted from NCHL Health Leadership Competency Model (Garman et al., 2019)

Table 7.5: Education, training, and collaboration

Competency	Denotation	Connotation for Quality Leadership
Community Collaboration	Align one's own and organisations priorities with the needs and values of the community. Advance the health agenda in line with the population-based wellness needs and national health plan.	Schedule regular engagement with community forums and other key stakeholders within the community. Agree on the mutual expectations. Provide regular feedback on projects and problems that may affect the community (e.g., ambulance in for repairs). Provide after-hours contact information to community leaders. Mobilise the community when assistance is required and be sensitive and advocate for the community's needs.

Competency	Denotation	Connotation for Quality Leadership
Relationship & network development	Establish, build, and sustain professional contacts for the purpose of building networks with people with similar interests.	Can maintain relations and rapport with internal and external stakeholders. Organises gatherings that improve and strengthen professional relationships. Identifies and maintains contact and builds a rapport with key individuals in the sector.
Initiative	Identify problems, obstacles and opportunities and be proactive. Move from addressing the current situation to acting on long term opportunities and problems.	Recognise and react to opportunities, problems, and obstacles. Acts with a sense of urgency when required. Scans for potential crises to be responsive.
Collaboration	Work cooperatively and inclusively with individuals and teams.	Support the team by keeping members informed and up to date. Work towards developing effective working interactions and building morale. Value input and suggestions, learn from peers at other EMS stations, districts, and provinces. Work to create a shared mindset.
Strategic Orientation	Consider demographic, ethno-cultural, political, and regulatory implications of decisions and develop strategies to improve long term success.	Identify political, economic, social, technological, legal and environmental forces influencing the organisation. Identify strengths and weaknesses in light of these forces. Develop strategic goals to take advantage of the strengths, build on opportunities and minimise the threats. Develop a perspective on the long-term trends.
Change Leadership	Energise stakeholders and sustain their commitment to change.	Identify what needs to change and how. Ensure the change aligns to the mission, values, and strategic goals. Communicate with everyone that will be affected. Provide opportunities for engagement and develop a strategy for implementation. Provide direction for overcoming resistance to change.
Information Seeking	Curiosity and desire to know more about things, people, and issues. Staying current with trends and developments. Resolve discrepancies by questioning, and scan for opportunities.	Consult people that are knowledgeable about a topic. Find those closest to the source of the problem and speak to them directly. Ask probing questions: who, where, when, why, what, and how to get to the root cause of the problem or situation. Seek alternative perspectives before reaching a conclusion.
Innovation	Approach work and the organisation in new ways, including applying new concepts, developing creative	Identify patterns and trends. Notice when the present past situation appears similar. Modify as required and provide new perspectives on challenges, shift the paradigm.

Competency	Denotation	Connotation for Quality Leadership
	solutions that improve the long-term success and viability of the organisation.	

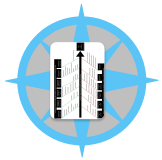
Source: Adapted from NCHL Health Leadership Competency Model (Garman et al., 2019)

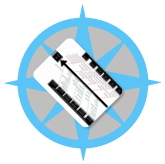
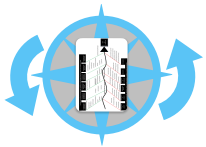
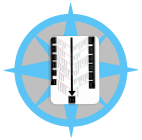
Table 7.6: User rights

Competency	Denotation	Connotation for Quality Leadership
Professional & Social Responsibility	Demonstrate ethical leadership, sound professional practice, social accountability, and community stewardship. Act in ways that are consistent with one's values.	Act in a manner that represents the core ethical value of the regulatory bodies and the professional values of the organisation. Ensure that there is honesty, integrity and fairness when dealing with all constituencies. Be open and transparent and publicly acknowledge mistakes. Be inclusive and acknowledge the diversity of the people of South Africa

Source: Adapted from NCHL Health Leadership Competency Model (Garman et al., 2019)

Table 7.7: Framework implementation mapping interpretation

Mapping interpretation	Predicted Alignment
Central alignment: When the National Standards are oriented/aligned 'North'. The central alignment suggests that there is a balance and dynamic stability where the leadership competencies balance equal against the capacity limitations that impact on the quality improvement. Overall, the organisation in this scenario can meet the minimum standards in the regulations for EMS.	

Left deviation: when the National Standards veer Westwards toward competencies. When the National Standards veer westward toward capacity limitations. A shift towards the left suggests that factors that impede quality improvement such as bureaucratic management, outweigh the growth in leadership competencies.	
Right deviation: when the National Standards veer Eastward toward competencies. The deviation of the compass to the right, suggests that the leadership competencies on the right outweigh the factors that impede quality improvement.	
Disorientation: Dynamic Instability, Little/NO balance between capacity limitations and mitigating competencies, Erratic, disproportionate, ineffective quality leadership.	
Reverse alignment: When the National standards align with 'South'. This scenario reflects latency of standards, where EMS organisations have the potential to attain standards but are 180 degrees from doing so. This may occur where there is significant change needed.	

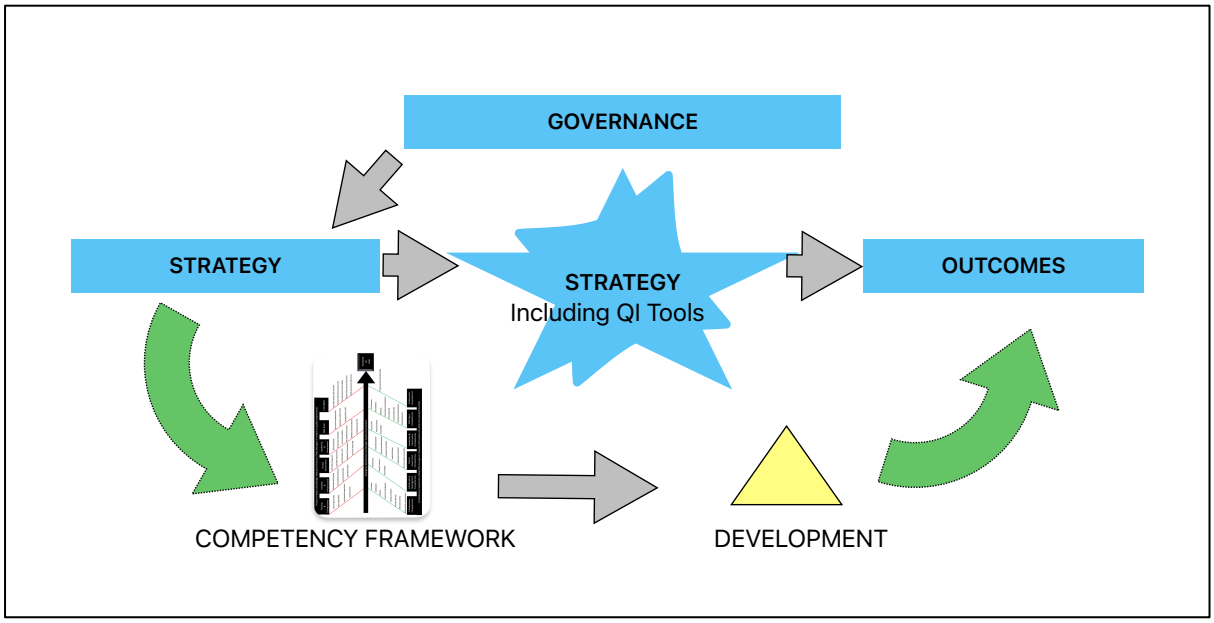
7.11 REVERSE CONTEXTUALISATION OF THE EMS CAPACITY-COMPETENCY-COMPASS (C^3) FOR QUALITY IMPROVEMENT

When the conceptualised framework, as emergent and original practice theory, is interpreted against the findings of this study, the following analysis emerges. The policy, Regulations Relating to Standards for EMS, represents what is desired and the compass direction represents the reality of the context in which EMS organisation can be found. When the reverse contextualisation is applied, provinces such as the Western Cape that meet and exceed the standards would show a stoic alignment to North where there is sufficient capacity and demonstrable competency and the rural provinces such as Northern Cape would show a deviation to the left, where capacity is lacking, and a reciprocal competency need emerges. The radar plot in Figure 5.1 in reflects that some provinces such as the Northern Cape the standards are still aspirational for most domains.

EMS organisations needs are dynamic as change in the environment, capacity and competency is constant. There is a change in policy, movement of personnel and constant changing demands on the organisation. A mismatch can occur when new policies (i.e., directions) are implemented without appraising the practice (i.e., landscape). There is potential for the senior EMS management to use the Capacity-Competency-Compass (C^3) for quality improvement to map the EMS standards against the reality within the organisation. This could be used to identify where there is malalignment (Left deviation, Disorientation and Reverse alignment) and build on the competencies and re-evaluate the direction of the compass.

The NCHL developed the Health Leadership Competency Model based on the principle that traditional approach as illustrated in Figure 7.13 that governance develops a strategy that managers and employees must execute to meet outcomes (Garman et al., 2020). Failure occurs at the point of execution and quality improvement tools such as Six Sigma, Just Culture and Total Quality Management are implemented to solve the execution failures. The alternative, depicted by the green arrow in Figure 7.14 is to focus on the competencies and development to ensure outcomes are met (Garman et al., 2020).

Figure 7.13: Organisational performance factoring framework



Source: Adapted from NCHL Health Leadership Competency Model (Garman, Standish & Wainio, 2019)

7.12 SUMMARY OF THIS CHAPTER

Chapters five and six presented the main findings of quantitative phase one and qualitative phase two of the study. The discussion was structured to answer the main research question of this study: How can a healthcare quality improvement framework transform the knowledge, attitude, and practices of EMS managers so that EMS organisations may develop the capacity to comply with the regulations relating to the standards for EMS?

The broad themes that emerged related to the KAP are the enabling and inhibiting factors were identified. Lastly the competency framework was aligned to the themes that emerged during the discussion. The next chapter will present the recommendations and conclusion.

CHAPTER EIGHT
CONCLUSIONS AND RECOMMENDATIONS

8.1 INTRODUCTION

The previous chapter discussed the Chapter Four quantitative findings and the qualitative findings from Chapter Five. Chapter Eight will conclude by providing an overview of each chapter and an overall conclusion. The chapter will include the key research findings in relation to the research aim, objectives, and research questions. The general conclusion will include how this study has contributed to the body of knowledge and provide recommendations for an EMS quality improvement framework. Recommendations and opportunities for future research will be added before the chapter's conclusion. The next section will summarise the preceding chapters.

8.2 SUMMARY OF THE PRECEDING CHAPTERS

8.2.1 Chapter One introduced the research topic and presented the background of the research problem. The background of the study provided a synopsis of literature that identified the gap in the knowledge. The problem statement and purpose statement were presented. This led to the formulation of the research objectives that were attained to through the answering of the research questions. The research propositions and significance of the research were discussed. The research design and methodology used to conduct the study were presented. This was followed by the discussion on the theoretical and conceptual frameworks that provided the structure and presented the main concepts of the research problem. The chapter concluded with the assumptions, limitations, delimitations, and positionality of the researcher.

8.2.2 Chapter Two provided a critical review of the literature in relation to healthcare quality and patient safety in general and as it relates to emergency medical services. The contextual nature of healthcare quality, and its complexity was discussed in relation to the global and local definitions and dimensions of quality. The healthcare system in South Africa was unpacked in relation to the quality improvement legislative framework, policies, and implementation challenges. The review concludes with a

critique of the evidence on EMS and prehospital quality improvement, which is scant for emergency medical services in South Africa.

8.2.3 Chapter Three provides the theoretical and conceptual frameworks that guided the research and grounded it in the principles, concepts and tenets of a theoretical construct thereby enhancing the rigour of the research findings. It provided the structure to the research approach in a way that they become meaningful and generalisable. It provided direction to the research based on the principles, constructs, tenants and concepts of an existing theory or theories.

8.2.4 Chapter Four described the research design and the use of Critical Theory as the research philosophy. The mixed methods research approach is presented, followed by a discussion on the research methods for phase one and two, and the study population and sampling strategy methodology. The quantitative and qualitative data collection methods were discussed, including the pilot testing of the survey instrument. The quantitative data analysis was done using R® statistical software[72] (R Core Team, 2023). The qualitative findings were analysed using ATLAS.ti® (Ver 23.1.1). The validity, reliability, trustworthiness, and reflexivity were presented. The chapter ended with a discussion on the ethical considerations.

8.2.4 Chapter Five provided the details of the quantitative survey data analysis from the 352 survey responses collected from public EMS from all nine provinces in the phase 1(a). The statistical methods employed in the analysis included Analysis of Variance (ANOVA), Cronbach's Alpha, Kendall's Nonparametric Statistical Method, and Tukey-Kramer honestly significant difference (HSD). Descriptive analysis was used to summarise and present the data using bar plots, Likert plots, histograms, frequency tables and cross tabulation tables.

In the analysis the aggregate Education and Training index score identified the need to QI training, was lower in the rural provinces of Mpumalanga and Limpopo, more

[72] R Core Team (2023). R: A language and environment for statistical computing. R Foundation for Statistical Computing, Vienna, Austria. URL https://www.R-project.org/.

tenured staff had higher Education and Training Scores, Operational Managers have consistently high Education & Training Index scores suggesting the need to prioritise the lower ranked EMS managers. The EMS Assessment Index score identified the need for QI training to meet the OHSC quality standards for EMS.

8.2.5 Chapter Six presented the qualitative data collected during phase 1(b) the non-participant workshops and interviews with key stakeholders during the second phase of the study. The digital recordings were transcribed and ATLAS.ti® (Ver 23.1.1) a computer-assisted qualitative data analysis software (CAQDAS) package was used to code and categorise the findings into themes and presented in schematic diagrams. The findings were presented as themes and sub-themes with supporting quotations.

The main themes that emerged included: apartheid's lingering effects on the quality of public EMS systems; deficiencies in the EMS managers QI education and training; the consequences of the DHS compared to the provincial health model on quality of EMS; Emergency Communications Centre and Computer Aided Dispatch impact on EMS quality; Infrastructure challenges impact EMS quality; and communities of practice.

8.2.6 Chapter Seven the discussion chapter, presented the integration of the literature, quantitative and qualitative data. The themes and sub-themes related to the knowledge, attitude, and practices of EMS managers in relation to quality improvement were discussed. A competency-based framework for quality improvement training of EMS managers is presented.

The major themes in the discussion were: User Rights, is EMS meeting their constitutional obligations? EMS team factors that influence quality; leadership and governance in the EMS context; EMS clinical governance and clinical care; infrastructure, EMS fleet management; and QI through education, training, and collaboration.

8.2.7 Chapter Eight is the concluding chapter of the thesis. The conclusions in relation to the aim, objectives and research question are presented. Finally, recommendations

for further research concludes the chapter. The next section restates the objectives and presents the related findings.

8.3 LINKING TO THE AIM, OBJECTIVES, AND RESEARCH QUESTIONS

The study aimed to potentiate eligibility and compliance with the OHSC quality standards for EMS. This study intended to recontextualise the quality improvement discourse through the construction of a quality improvement framework that strengthens the public service EMS manager's response to the OHSC quality standards for EMS. Three objectives were formulated to achieve the aim:

The first objective was to facilitate a quality self-audit including the critical appraisal of the knowledge, attitude and practice of EMS managers who are the power brokers in relation to EMS quality improvement. The second objective was to observe and document the quality champions perspectives on the application of the OHSC standards and implications of non-compliance. The third was to develop a framework that explicates how change in EMS policy and praxis may lead to quality improvement in public EMS systems, in the interest of patient safety and organisational sustainability. Each of the objectives will be discussed next in relation to the main findings.

8.3.1 Objective one

The first objective was to facilitate a quality self-audit including the critical appraisal of the knowledge, attitude and practice of EMS managers who are the power brokers in relation to EMS quality improvement. To achieve this objective, the following research questions were formulated: What are the knowledge, attitudes and practices of EMS managers who are quality champions, in the public EMS organisations in relation to Quality Improvement? The second research question was: What are the factors that motivate and foster QI amongst EMS managers within EMS organisations?

In considering the knowledge, attitudes, and practices of EMS managers in relation to QI, the survey results found that few (17%; n = 60) of public EMS managers were trained to manage quality. The low percentage of those trained is reflected in their knowledge of QI tools and techniques and is supported by the aggregate Education

and Training index score that identified the need for QI training. There were differences between the provinces with scores lower in the rural provinces of Mpumalanga and Limpopo. Managers with more years of experience had higher Education and Training Scores. When the position of the managers was considered, Operational Managers had consistently high Education & Training Index scores suggesting the need to prioritise the lower ranked EMS managers for QI training. Overall, the EMS Assessment Index score identified the need for QI training to meet the OHSC quality standards for EMS. Regarding quality improvement practices, the majority (84%) indicated that their organisation has a data collection plan, 82% (n =297) indicated that they can identify, evaluate, and manage patient care risks, 80% (n = 287) collect quality indicators and/or performance measures for their organisation.

The factors that foster and motivate QI, included the requirement to comply with the NHQIP, and improving the organisational reputation. A third of those surveyed indicated that QI is linked to their performance appraisal. The key factors that hinder QI included lack the resources (61%; n = 213) to implement quality improvement projects; most (60%; n = 212) indicated their employees do not follow policies and standards; with 32% (n = 131) saying they get strong support from management, and only 24% (n = 83) said their staff are motivated to improve quality.

8.3.2 Objective two

The second objective was to observe and document the quality champions perspectives on the application of the OHSC standards and implications of non-compliance. To achieve this objective, the research question was formulated: How do EMS managers perceive, interpret, and understand the OHSC quality standards for EMS? The survey questions 28 to 62 used a 5-point Likert Score to assess the level of agreement with each of the standards in the six domains in the regulations relating to standards for EMS. What emerged was that there is at least one statistically significant difference among the means. Multiple comparisons done using Tukey's Honestly Significant Difference Test show four significant differences: Limpopo differs from North West and from Western Cape, while Mpumalanga and Northern Cape differ from Western Cape. The standards that were rated the lowest related to building infrastructure and maintenance followed by not having an efficient vehicle dispatch

system to ensure patients rapid and safe access to services. The non-participant observations and interviews explored these findings in relation to the lack of computer aided dispatch, vehicle tracking and fleet management.

What also emerged was that there are underlying complex historical influences that have shaped public EMS in South Africa. This included the apartheid era practices that disadvantaged the majority black population and the non-white EMS employees. There are human resource challenges in relation to the manager's experience, education and training, unfilled vacant posts, and the unprofessional work ethic of employees. The managers felt disempowered when EMS was fragmented under the district health system, the perception was that EMS is marginalised within the provincial health department and the political and labour union influences negatively impact on the EMS quality. Although there has been standardisation such as qualifications, rank structure, vehicle markings, uniforms, the management, operational and administrative systems and processes vary significantly between provinces and this impacts negatively on quality.

8.3.3 Objective three

The third was to develop a framework that explicates how change in EMS policy and praxis may lead to quality improvement in public EMS systems, in the interest of patient safety and organisational sustainability. To attain the objective, the following research question was formulated: What are the benefits, and impediments and opportunity costs to implementing Quality Improvement in EMS?

The Capacity-Competency-Compass (C^3)[73] framework aligned to each of the themes that emerged from the findings. The framework aims to equip the EMS manager with differentiating competencies will help them become better leaders. Equipping the EMS managers with leadership competencies acknowledges underlying factors and recognises that failure occurs at the point of implementation. The next section addresses the recommendations of this study.

[73] © Christopher, 2023: The Capacity-Competency-Compass (C^3)©: A framework for quality improvement in EMS.

8.4 RECOMMENDATIONS

The recommendations were generated from the findings and supported by the literature review. It is suggested that there needs to be a holistic approach to managing quality in EMS. This includes quality improvement, quality planning, quality assurance and quality control. A consistent and sustainable quality framework would need to balance each of these approaches to manage quality. The recommendations are for the leadership competency training of EMS managers; quality improvement through collaboration and revisiting the recommendations of the EMS review committee.

8.4.1 Recommendation one: Quality Improvement Education and Training

Given the complexity of EMS, a bespoke leadership and management programme is needed to equip managers with the skills and knowledge to effectively lead, manage, innovate, and drive quality improvements. To improve quality and meet the standards, the EMS managers need to attain the competencies suggested in this competency framework. The leadership and management training must include the content of the core leadership competencies as outlined in the EMS Capacity-Competence-Compass framework. Developing EMS leadership competencies and attributes are necessary to lead change through continuous quality improvement while contributing to the development of complex EMS systems. The next paragraph discusses the recommendation for a one-year higher certificate in EMS management that would include quality.

The EMS leadership and management programme must be readily accessible to all EMS managers who wish to acquire these skills and they should be able to gain entrance by virtue of their qualifications and experience. The training and education should adopt a multimodal case-based learning and teaching methods that can be accessed online. The education programme should include peer contact sessions to allow for EMS reflection and sharing of how they applied the knowledge to their local context. The need for including quality management in all emergency medical care qualifications and a post-graduate diploma that will promote the EMS quality management research agenda.

8.4.2 Recommendation two: Quality Improvement through collaboration

Although there are significant variations in the operational and administrative policies and procedures between the provinces, there is an opportunity to communicate and collaborate, to share knowledge on QI processes and practices, that would lead to better outcomes. The findings of this study identified pockets of excellence, and innovative processes and practices happening in EMS. The platform to engage, share and exchange these practices between provinces and districts need to be expanded beyond just the national committee on EMS that meets with senior management. There is a need for engagement with managers at all levels through national working groups, and national and regional symposiums.

The National Health Act, 2003 (Act 61 of 2003) makes provision for the establishment of Health Facility (Hospital) Boards. Provinces should consider promulgating regulations to establish independent EMS Boards to perform similar functions. This would include monitoring performance, effectiveness, and efficiency of the provincial EMS; review of measures taken by the EMS management to improve the performance and quality of the service; foster community support for EMS; ensuring the needs, concerns and complaints of users are addressed; and recognise and reward excellence. The next recommendation is for a national EMS review committee to oversee quality improvements.

8.4.3 Recommendation three: National EMS Review Committee

The findings of this study are that some of the strategic decisions taken by the provincial Departments of Health, such as the fragmentation of EMS to the districts are not in the best interests of the users, EMS, and the health system. In the absence of an updated overall national policy on EMS, the provincial and district EMS management are disempowered when political expediency takes precedence over the interests of EMS and its users. The next section presents the contribution of this study to the body of knowledge.

8.5 CONTRIBUTION TO THE BODY OF KNOWLEDGE

This study is unique in that there has hitherto not been a national survey conducted of public EMS managers in all nine provinces in South Africa, or in the African continent.

The Regulations Relating to Standards for EMS are new and were promulgated for the first time in 2022. The survey of the public EMS managers knowledge, attitudes, and practices in relation to these standards has identified the EMS managers strengths and weaknesses in relation to quality. It therefore obtained a national perspective on the present capacity for EMS standards compliance. The wealth of knowledge and years of experience that the eleven senior participants provided during the interviews added to the richness of the findings. This study uncovered that the legacy issues continue to impede and plague quality improvement in EMS. The study concluded that EMS leadership competencies should take into consideration the provincial and local EMS context, the manager's prior medical qualifications, the management level, and years of experience of the participants.

There are impending standards, but they have lacked an implementation strategy which this study has now addressed by stating what capacity is needed in relation to the domains and by identifying what competencies are inextricably linked to them. The EMS Capacity-Competency-Compass (C^3) framework, as suggested in this study is new and aimed at addressing the EMS leadership deficiencies and highlights competency and capacity limitations in the EMS system. The framework will aid in EMS quality improvement by identifying the associated leadership competencies required to overcome the capacity limitations within the EMS organisation. The building of capacity and competencies will likely result in the standards being achieved, albeit progressively. The C^3 framework provides a strategy for implementation and a strategy for the evaluation of the implementation. As an evaluative tool, the C^3 framework will be able to show up where there may be competency but a lack of capacity or vice-versa. The C^3 framework can serve to highlight strengths and weaknesses in attaining (and retaining) the quality standards compliance.

These Regulations Relating to Standards for EMS create a benchmark against which both public and private EMS organisations in SA will be measured. Attaining these standards will be a prerequisite for private EMS companies to be contracted to render emergency medical services to the NHI, whereas in developed countries the quality research focus is on measuring and improving pre-hospital clinical care outcome

indicators such as OHCA and measuring access. In LMIC's and UMIC's quality is about achieving the best possible outcomes given the available resources. The findings may therefore also be relevant to EMS organisations in LMICs and UMICs countries.

The findings of this study in relation to EMS in Ukraine (demonstrating transferability) was published in an article in the Technology, Audit and Production Reserves journal (Appendix J). Two further draft manuscripts have been submitted and is under review.

The study findings were presented at the 2nd BRICS[74] postgraduate forum. The key findings contributed towards public administration as the findings were used to compile a policy brief that will be presented to the National Department of Health National Committee for EMS. The aim is to improve the public service implementation of the EMS standards across the country.

Through the research process, the researcher knowledge, and skills improved in the use of mixed method, survey development and implementation, non-participative observation, and interviews. This includes improvements in the researcher's competence in the use of statistical software and computer-assisted qualitative data analysis software for the analysis of quantitative and qualitative data. The researcher's body of knowledge increased as this study intersected EMS and public administration in relation to quality in healthcare and EMS in LMICs. In the next section, the recommendations for future research are presented.

8.6 RECOMMENDATIONS FOR FUTURE RESEARCH

Further research is required to define, describe, and evaluate the competencies within the EMS Capacity-Competency-Compass (C^3) framework. The further theoretical application of the framework could be an area to be investigated.

[74] BRICS postgraduate forum aims to develop opportunities for networking with emerging and established researchers from Brazil, Russia, India, China, and South Africa.

The bespoke EMS management education and training curricula that would include the leadership competencies, would need to be developed, implemented, and evaluated.

The envisaged web-based Ideal EMS Tool that will be used by OHSC to measure and audit performance in relation to the established standards would need to be evaluated for its effectiveness to monitor quality improvement as a true measure of the value EMS provides to its users.

There is an opportunity for further ethnographic research that would explore the behaviour of the individuals and groups in relation to quality in EMS.

8.7 LIMITATIONS AND QUALITY APPRAISAL OF THE STUDY

The purpose of this study was to critique the public EMS knowledge, attitude, and practices of public service EMS managers to construct a quality improvement framework that strengthens the response to the national quality standards for EMS. The survey results were not intended to infer correlation or associations but provide baseline findings that would be explored during the non-participant workshop observations and interviews with key stakeholders. Therefore, more focus was placed on the interpretation and meaning of the qualitative findings.

Evaluating the quality of research is an important part of the research process as the findings may have implications for policy and practice. Unlike quantitative research that apply statistical methods, qualitative research must incorporate strategies that ensure trustworthiness of the findings (Noble & Smith, 2015). In considering the findings of the study, Northcote's (2012) criteria to evaluate qualitative research was used. The paragraphs that follow will discuss the Northcote's criteria regarding the contribution of the findings.

Did the qualitative approach contributed to advancing wider knowledge or understanding about policy, practice, theory in EMS (Northcote, 2012)? The findings of this study contributed to our knowledge and understanding of the knowledge, attitude, and practices (KAP) of EMS managers in relation to quality improvement. The

knowledge generated provided insights to the KAP of public service EMS managers in relation to quality improvement and the standards for EMS. The survey findings identified the knowledge and practice gaps. The qualitative data provided the context and helped broaden the knowledge on the contributory factors that impacted quality improvement in EMS.

The research participants may have benefitted by reflecting on their own KAP and experiences. By answering the survey questions their knowledge and awareness of the regulation relating to the standards for EMS may have increased. They may also have identified opportunities for their own self-development. The next paragraph will focus on Northcote's criteria on the rigor of the study.

In reviewing the research methods used to gather, analyse, interpret, and present the data and ensure it is rigorous, systematic, and transparent, the criteria developed by Northcote is useful (Northcote, 2012). An explanatory, sequential mixed methods approach was used to gather quantitative survey data and qualitative data from non-participant observations and interviews. There was openness and transparency in the coding and development of themes from the transcriptions of the NPO workshops and interviews. The multiple data sources yielded similar findings leading to data saturation.

In considering Northcote's criteria for the study being defensible in design by providing a research strategy that can address the evaluative questions posed (Northcote, 2012). The research design of this study is defensible and trustworthy, and linked to the study's research questions. The quantitative survey results alone provided national data that has not previously been described and aided in answering the research objectives and questions. A survey of public EMS managers in all nine provinces had never previously been done. The time spent with the participants during the workshops and interviews allowed for gathering of rich information that was coded and analysed categorised using ATLAS.ti® (Version 23.2.0) software. The quantitative data was statistically analysed with the assistance of a statistician.

Was the research credible in claim through offering well-founded and plausible arguments about the significance of the evidence generated (Northcote, 2012)? The findings are credible and supported by evidence, noting that EMS in South Africa is under-researched. Prior to this study there was only one study done that focused on EMS quality in South Africa. The evidence to support the findings was found in other related studies on healthcare quality in SA, and other EMS studies done in related areas. Although EMS is nuanced, the findings were similar in respect to the research on quality in healthcare in SA.

Northcote's criteria considering the affective nature by acknowledging the excitement associated with research discoveries, the emotional involvement of the participants and the enthusiasm of the researcher was considered (Northcote, 2012). The research processes and findings communicated the emotional elements of how the participants and the researcher engaged in the research study. The emotional fatigue of many of the seasoned EMS managers was noticeable at the start of the workshops and during the interviews. There was perhaps a sense that nothing meaningful would come from the research. Participants were encouraged to speak about themselves, share their personal history and experiences. This then broke the ice and opened the discussion. Once participants felt at ease they shared in-depth, meaningful information that added to the richness of the qualitative data. The next paragraph will reflect on the literature review. I was moved by the commitment to a common purpose demonstrated and hopeful for quality improvement. The data was however, not confidence-inducing.

There is exhaustive literature on quality in healthcare and an ever-growing body of evidence on quality and quality indicators in EMS in developed countries such as a recent EMS quality indicators in Australia (Pap et al., 2022). The literature on EMS quality in LMIC's and specifically SA is scant. The 2020 PhD study on EMS quality indicators in SA by Ian Howard provided a reference point against which to compare the findings in this study. These publications are frequently referenced throughout the findings and discussion.

EMS is a complex organisation and the study attempted to provide a glimpse into the lived experiences of the EMS manager in the public sector. The actual number of EMS

managers is difficult to determine and therefore it is assumed that those who attended the workshops and participated in the survey represent those managers who were unavailable. The workshop attendance in the Eastern Cape Province was disrupted because of an illegal national health worker strike that started on the day. Strikers blocked entrances to hospitals and the venue for the workshop was moved to a university campus. In the Western Cape there was miscommunication and only managers from two districts attended. In other provinces budget constraints meant that managers from distant districts could not attend because there was no money for subsistence and travel allowances.

Seven participants were invited to attend the interview but either declined or did not respond to several requests to attend. Alternate participants were then sought. Much of what was already said was being repeated in interviews number 9, 10 and 11. It was therefore assumed that data saturation was achieved. Similarly, the same matters were being repeated in workshops 6 and 7. The EMS manager's depth of knowledge and daily practices regarding quality and quality improvement was generally weak and this limited the depth to which those topics were probed during the interviews.

The findings may not apply equally to all public EMS managers given the diversity of the people within the EMS and the variation between districts and provinces. Similarly, although SA is classified as a LMIC there are variants of EMS systems across the developed and developing world. Although diversity in representation of key stakeholders, factors such as selective memory, exaggeration, personal beliefs, and bias may be considered, and undue bias and non-generalisable findings must be factored when considering the qualitative data.

While the study may not be generalisable[75] to the SA private sector EMS, some of the findings, may be adapted or transferred to the private EMS sector and considered when implementing quality programmes to meet the Regulations relating standards for EMS. The last section of the research concludes the thesis.

[75] Note that the study intended generalising findings toward theoretical proposition, the quantitative component may be generalisable to the EMS population in SA.

8.8 CLOSING SUMMARY

The aim of the study was to strengthen EMS eligibility and compliance with OHSC quality standards for EMS. The main question of the study was: How can the EMS manager's knowledge, attitude, and practice (KAP) be transformed so that emergency medical service (EMS) organisations may develop capacity to comply with the Office of Health Standards Compliance (OHSC) quality standards for EMS? The EMS Capacity-Competency-Compass (C^3) framework can serve as the stimulus of quality improvement transformation in EMS as it is evaluative, quality standards oriented, and evidence based.

This final chapter outlined the extent to which each of the objectives were achieved. The attainment of the aim and recommendations that emerged from the study, what was unique about the study and how it has contributed to the body of knowledge is presented. Finally, the recommendations for future research was presented.

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APPENDIX A: SURVEY

SELF-ASSESSMENT SURVEY

I am enrolled for a doctorate in the Department of Public Administration & Governance in the Faculty of Business and Management Sciences at the Cape Peninsula University of Technology. This study is part of the National Quality Health Implementation Plan research project.

The project is approved by the Faculty of Business and Management Sciences, Faculty Research Ethics Committee, certificate number 2021 FBMSREC 078. Site approval for the study to be conducted in the nine provinces in South Africa has been obtained from the National Department of Health.

This is an invitation to participate voluntarily in my research project. Please be assured that your responses will remain confidential. Your name and place of work will not be identified in any part of my research. My supervisors and I will be the only people who will have access to the information gathered. You may refer any queries or questions to me or my supervisor Professor V. Naicker (naickerv@cput.ac.za).
Lloyd Christopher (lloydc@cput.ac.za)

The purpose of this questionnaire is to determine your current knowledge on quality management.

*Required

1. I, agree voluntarily to be part of the research undertaken. I understand that I am under no compulsion and may withdraw at any stage of the research project. *

Mark only one oval.

- ◯ Yes, I agree and have signed the consent form
- ◯ No, I do not wish to participate

Section A: BIOGRAPHIC INFORMATION & WORK EXPERIENCE

Tell us about yourself…

2. Please enter your age in years: *

3. Please select your gender: *

Mark only one oval.

- Female
- Male
- Prefer not to answer
- Gender-fluid
- Agender
- Non-binary
- Not listed

4. Which option best describes your current employer? *

Mark only one oval.

- Public Sector
- Private Sector
- Self Employed
- Non-Profit Organisation
- Other: _____

5. Which year did you start working in EMS? *

6. What position do you hold in your organisation?

Mark only one oval.

- ◯ Emergency Care Officer
- ◯ Emergency Care Technician
- ◯ Paramedic
- ◯ Emergency Care Practitioner
- ◯ EMS Shift Leader
- ◯ EMS Station Manager
- ◯ EMS Sub-District Manager
- ◯ EMS District Manager
- ◯ EMS Operational Manager
- ◯ EMS Provincial Manager
- ◯ Other: _____

7. Which year where you appointed to your current position? *

_____

8. Select your highest emergency medical qualification

Mark only one oval.

- ◯ Basic Ambulance Assistant
- ◯ Ambulance Emergency Assistant
- ◯ Critical Care Assistant
- ◯ Emergency Care Technician
- ◯ National Diploma Paramedic
- ◯ Emergency Care Practitioner
- ◯ Other: _____

9. How many people report (directly or indirectly) to you?

Mark only one oval.

- ◯ <5
- ◯ 5-10
- ◯ 10-50
- ◯ 50-100
- ◯ 100-500
- ◯ >500
- ◯ Other: _____

SECTION B: EDUCATION & TRAINING

With reference to Quality Management in your workplace, choose your level of agreement with these statements:

10. Do you collect quality indicators and/or performance measures for your organisation? *

Mark only one oval.

- ◯ Yes
- ◯ No
- ◯ Unsure

11. If yes, are the quality indicators and/or performance measures that you collect measured against a standard (e.g., national ambulance response times)?

Mark only one oval.

- Yes
- No
- Unsure

12. Are you aware of your organisation's quality goals and objectives? *

Mark only one oval.

- Yes
- No
- Unsure

13. In my organisation we have a data collection plan that determines what data is captured, * how data is captured, by who and how often?

Mark only one oval.

- Yes
- No
- Unsure

14. In our organisation quality indicators and/or performance measures are used to develop * a quality improvement plan?

Mark only one oval.

- Yes
- No
- Unsure

15. In our organisation we communicate performance information visually using tools such as: graphs, box plot, histogram, or pie chart? *

Mark only one oval.

- Yes
- No
- Unsure

16. I know how to analyse measurement results using trend analysis and control charts? *

Mark only one oval.

- Yes
- No
- Unsure

17. I am familiar with performance improvement models such as Plan-Do-Check-Act and *
18. Six Sigma?

Mark only one oval.

- Yes
- No
- Unsure

19. I have been trained to manage a quality improvement project? *

Mark only one oval.

- Yes
- No
- Unsure

20. I am familiar with quantitative project improvement tools such as: Pareto charts and scatter diagrams? *

Mark only one oval.

- Yes
- No
- Unsure

21. I can identify, evaluate, and manage patient care risks? *

Mark only one oval.

- Yes
- No
- Unsure

22. I can identify techniques to evaluate and improve the safety of healthcare processes? *

Mark only one oval.

- Yes
- No
- Unsure

23. If you answered Yes to the question above regarding techniques to evaluate and improve the safety of healthcare processes. Can you mention a few?

_____

_____

_____

_____

_____

24. Which, if any, qualitative project improvement tools are you comfortable using: *

Tick all that apply.

- [ ] Brainstorming
- [ ] Cause and Effect Diagram
- [ ] Affinity Analysis
- [ ] None

- [ ] Other: _____

25. Have you done a root cause analysis to identify the cause of an adverse event and prevent * it from recurring?

Mark only one oval.

- ◯ Yes
- ◯ No
- ◯ Unsure

26. Have you received any training on how to manage the efficient use of resources? *

Mark only one oval.

- Yes
- No
- Unsure

QUALITY MANAGEMENT PRACTICES

27. Which of the following hinder you from implementing quality improvements (QI) in your workplace? (Select all that apply or comment in the "other" section) *

Tick all that apply.

- [ ] Employees do not follow the quality policies and standards
- [ ] Lack resources to capture quality data
- [ ] Lack resources to capture quality data
- [ ] No support from management to implement quality improvements No
- [ ] support from operational staff to implement quality improvements I
- [ ] have insufficient time at work to implement quality improvements
- [ ] I find that change fatigue leads to frustration
- [ ] We have low morale to implement quality improvements amongst our employees
- [ ] Other: _____

28. Which of the following encourage you to implement quality improvements (QI) in your workplace? (Select all that apply or comment in the "other" section) *

Tick all that apply.

- [ ] There is peer pressure for quality improvements
- [ ] I get strong management support to support quality improvements
- [ ] I have adequate resources to implement quality improvements
- [ ] In my workplace staff are motivated to improve quality
- [ ] Quality improvements are linked to my performance appraisal
- [ ] Quality improvements will help improve reputation of our organisation
- [ ] Quality improvements will result in less complaints
- [ ] We need to comply with the national quality improvement plan
- [ ] Other: _____

EMS Assessment Tool-Domain 1: Patient Rights

With reference to the EMS Assessment Tool, indicate your level of agreement for each Standard in this Domain

29. In my workplace I can put systems in place to ensure that patients are treated with dignity *

Mark only one oval.

- ◯ Strongly disagree
- ◯ Disagree
- ◯ Neutral
- ◯ Agree
- ◯ Strongly agree

30. Patients that I see are provided with adequate information about the health care services. *

Mark only one oval.

- Strongly disagree
- Disagree
- Neutral
- Agree
- Strongly agree

31. Where I work there are mechanisms for stakeholders to communicate their experience of * care they are provided.

Mark only one oval.

- Strongly disagree
- Disagree
- Neutral
- Agree
- Strongly agree

32. At my place of work, complaints are recorded and analysed, and this information is used * to improve the quality of care provided.

Mark only one oval.

- Strongly disagree
- Disagree
- Neutral
- Agree
- Strongly agree

EMS Assessment Tool - Domain 2: Clinical Governance & Clinical Care	With reference to the EMS Assessment Tool, indicate your level of agreement for each Standard in this Domain

33. My place of work ensures that accurate records of the health care services provided to patients are created and maintained *

Mark only one oval.

- Strongly disagree
- Disagree
- Neutral
- Agree
- Strongly Agree

34. Within my organisation, the management of patient health records complies with legal and ethical prescripts *

Mark only one oval.

- Strongly disagree
- Disagree
- Neutral
- Agree
- Strongly agree

35. Where I work the communication systems facilitate the provision of effective and appropriate emergency care *

Mark only one oval.

- Strongly disagree
- Disagree
-

Neutral

Agree

Strongly Agree

36. Our call management processes ensure a safe and efficient response to requests for assistance. *

Mark only one oval.

- Strongly disagree
- Disagree
- Neutral
- Agree
- Strongly Agree

37. We have an efficient vehicle dispatch system in place to ensure patients have rapid and safe access to services *

Mark only one oval.

- Strongly disagree
- Disagree
- Neutral
- Agree
- Strongly Agree

38. We mostly respond to emergencies in a co-ordinated and efficient manner *

Mark only one oval.

- Strongly disagree
- Disagree
- Neutral
- Agree
- Strongly agree

39. Where I work, there are systems to ensure that patients are treated in accordance with * current evidence-based guidelines to reduce variations in care and improve patient outcomes

Mark only one oval.

- Strongly disagree
- Disagree
- Neutral
- Agree
- Strongly agree

40. We have systems implemented to support the provision of quality health care services * and prevent patient safety incidents.

Mark only one oval.

- Strongly disagree
- Disagree
- Neutral
- Agree
- Strongly agree

41. Our Planned Patient Transport Services or inter facility transfers are managed in a *

Mark only one oval.

- Strongly disagree
- Disagree
- Neutral
- Agree
- Strongly Agree

42. Our Planned Patient Transport Services or inter facility services are managed in a *

Mark only one oval.

- Strongly disagree
- Disagree
- Neutral
- Agree
- Strongly Agree

43. Systems to report and monitor all patient safety incidents are sufficiently implemented *

Mark only one oval.

- Strongly disagree
- Disagree
- Neutral
- Agree
- Strongly Agree

44. An infection prevention and control programme to minimise the risk of health care associated infections is implemented. *

Mark only one oval.

- Strongly disagree
- Disagree
-

Neutral

Agree

Strongly Agree

45. We decontaminate medical devices and equipment in a safe and effective manner as recommended by the manufacturer. *

Mark only one oval.

Strongly disagree

Disagree

Neutral

Agree

Strongly Agree

46. In my workplace effective environmental cleaning minimises the risk of disease outbreaks and the transmission of infection to patients or emergency medical service personnel *

Mark only one oval.

Strongly disagree

Disagree

Neutral

Agree

Strongly agree

47. Where I work, health care risk waste and general waste is handled, stored, and disposed of safely and in accordance with relevant legislation *

Mark only one oval.

Strongly disagree

Disagree

Neutral

Agree

Strongly agree

EMS Assessment Tool- Domain 3: Clinical Support Services

With reference to the EMS Assessment Tool, indicate your level of agreement for each Standard in this Domain

48. We have safety protocols in relation to administration of medicines to protect patients from medication errors.

Mark only one oval.

- Strongly disagree
- Disagree
- Neutral
- Agree
- Strongly agree

49. In my organisation there are efficient stock management processes to ensure sustainable service delivery and minimise waste?

Mark only one oval.

- Strongly disagree
- Disagree
- Neutral
- Agree
- Strongly agree

50. Where I work, we have an effective medical equipment management programme. *

Mark only one oval.

- Strongly disagree
- Disagree
-

Neutral

Agree

Strongly agree

EMS Assessment Tool- Domain 4: Leadership & Governance

With reference to the EMS Assessment Tool, indicate your level of agreement for each Standard in this Domain

51. Where I work, the Provincial Department of Health or parent company oversees and supports the emergency medical services. *

Mark only one oval.

Strongly disagree

Disagree

Neutral

Agree

Strongly agree

52. My place of work has a functional governance structure in place *

Mark only one oval.

Strongly disagree

Disagree

Neutral

Agree

Strongly agree

EMS Assessment Tool - Domain 5: Operational Management

With reference to the EMS Assessment Tool, indicate your level of agreement for each Standard in this Domain

53. Our management of the service ensures the provision of safe, effective, and efficient patient care. *

Mark only one oval.

- Strongly disagree
- Disagree
- Neutral
- Agree
- Strongly agree

54. We have HR systems in place to manage personnel in line with relevant legislation, policies and guidelines *

Mark only one oval.

- Strongly disagree
- Disagree
- Neutral
- Agree
- Strongly agree

55. Where I am employed, personnel are protected from workplace hazards by the establishment and implementation of occupational health and safety systems *

Mark only one oval.

- Strongly disagree
- Disagree
- Neutral
- Agree
- Strongly agree

56. We have a comprehensive safety programme that is designed and implemented to ensure * the safety of vehicle crew members and uninterrupted service to the community

Mark only one oval.

- Strongly disagree
- Disagree
- Neutral
- Agree
- Strongly Agree

57. As an EMS provider we collaborate in District emergency and disaster planning * processes and the provision of emergency and disaster response

Mark only one oval.

- Strongly disagree
- Disagree
- Neutral
- Agree
- Strongly agree

58. We have systems in place to ensure the safety of personnel in the event of fire *

Mark only one oval.

- Strongly disagree
- Disagree
-

Neutral

Agree

Strongly Agree

59. The vehicles in my organisation used to transport patients are safe and well maintained *

Mark only one oval.

- Strongly
- disagree
- Disagree
- N
- eu
- tr
- al
- A
- gr
- ee
- Strongly agree

EMS Assessment Tool- Domain 6: Facilities and Infrastructure

With reference to the EMS Assessment Tool, indicate your level of agreement for each Standard in this Domain

60. The building occupied by my service meets the requirements of the building regulations

Mark only one oval.

- Strongly
- disagree
- Disagree

N

eu

tr

al

A

gr

ee

Strongly agree

61. The building maintenance services are functional and enable safe and uninterrupted *

delivery of emergency medical services.

Mark only one oval.

Strongly

disagree

Disagree

N

eu

tr

al

A

gr

ee

Strongly Agree

62. Where I work security systems are in place to protect patients, personnel, and property from security threats and risks

Mark only one oval.

- Strongly disagree
- Disagree
- Neutral
- Agree
- Strongly Agree

63. In the emergency medical service where I am employed, clean linen is provided as required for the type of services

Mark only one oval.

- Strongly disagree
- Disagree
- Neutral
- Agree
- Strongly Agree

APPENDIX B: ETHICS APPROVAL

Cape Peninsula University of Technology

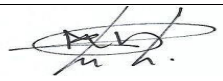
P.O. Box 1906 | Bellville 7535
Symphony Road Bellville 7535
South Africa
Tel: +27 21 4603291
Email: fbmsethics@cput.ac.za

Office of the Chairperson Research Ethics Committee	FACULTY: BUSINESS AND MANAGEMENT SCIENCES

The Faculty's Research Ethics Committee (FREC) on **16 November 2021**, ethics **APPROVAL** was granted to **Prof Visvanathan Naicker** for a research activity at the Cape Peninsula University of Technology.

Title of project:	National Health Quality Improvement Plan in South Africa [NHQIP] Researcher (s): Prof V Naicker/ Prof R Tengeh/ Prof R Rampersad

Decision: APPROVED

	17 November 2021
Signed: Chairperson: Research Ethics Committee	**Date**

The proposed research may now commence with the provisions that:

1. The researcher(s) will ensure that the research project adheres to the values and principles expressed in the CPUT Policy on Research Ethics.
2. Any adverse circumstance arising in the undertaking of the research project that is relevant to the ethicality of the study requires that the researcher stops the study and immediately informs the chairperson of the relevant Faculty Ethics Committee.
3. The researcher(s) will conduct the study according to the methods and procedures set out in the approved application.
4. Any changes that can affect the study-related risks for the research participants, particularly in terms of assurances made with regards to the protection of participants' privacy and the confidentiality of the data, should be reported to the Committee in writing accompanied by a progress report.
5. The researcher will ensure that the research project adheres to any applicable national legislation, professional codes of conduct, institutional guidelines, and scientific standards relevant to the specific field of study. Adherence to the following South African legislation is important, notably compliance with the Bill of Rights as provided for in the Constitution of the Republic of South Africa, 1996 (the Constitution) and where applicable: Protection of Personal Information Act, no 4 of 2013; Children's act no 38 of 2005 and the National Health Act, no 61 of 2003 and/or other legislations that is relevant.
6. Only de-identified research data may be used for secondary research purposes in future on condition that the research objectives are similar to those of the original research. Secondary use of identifiable human research data requires additional ethics clearance.
7. No field work activities may continue after two (2) years for Masters and Doctorate research project from the date of issue of the Ethics Certificate. Submission of a completed research ethics progress report (REC 6) will constitute an application for renewal of Ethics Research Committee approval.

Clearance Certificate No | 2021_FBMSREC 078

APPENDIX C: SITE APPROVAL

DIRECTOR GENERAL
HEALTH
REPUBLIC OF SOUTH AFRICA
PRETORIA
Private Bag X828, PRETORIA, 0001, Dr AB Xuma Building, 1112 Voortrekker Rd, Pretoria Townlands 351-JR, Pretoria, 0187, Tel (012) 395 8000
CAPE TOWN
P.O. Box 3675, CAPE TOWN, 8000, 103 Parliament Towers, Room 615, Plein Street, CAPE TOWN, 8000 Tel (021) 461 2040 Fax (021) 461 6884

To Whom it may concern

Letter of Support: National Quality Health Implementation Plan – Research Project to be conducted in the nine provinces of South Africa

The National Department of Health supports the conduct of following nine studies that will be conducted by Masters and Doctor students based at Cape Peninsula University of Technology under the leadership of Professor Visvanathan Naicker

1. A study of Healthcare Quality and Patient safety capacity building interventions in South Africa. A national sectoral analysis.
2. Bridging the Competency Gap in Quality Patient Care Amongst Clinicians and Clinical Managers.
3. Translation of knowledge during the training into tangible improvements in the quality of care provided for Emergency Medical Services.
4. Towards High Reliability Healthcare in RSA: A Study of capacity building of non-clinical managers and leaders in South Africa.
5. Translation of knowledge from the Healthcare Quality Management training into tangible improvements in healthcare social work services.
6. The lack of strategic management of health services and its effect on quality health care.
7. A "people-centred approach" to realising health care by facilitating patient, and community participation in health attainment.
8. The effect of critical staff shortages, inadequate training, and poor attitudes of staff on health care.
9. Delivering Emergency Medical Services in resource constrained circumstances

The benefit derived from this research will inform the health sector on where and what the problematic areas are - pre and post the training around the various topics the 9 students have chosen in quality healthcare. Evidence from this research and training will further encourage a strong stewardship and leadership for high quality universal health coverage for all South Africans

DR N CRISP
ACTING DIRECTOR-GENERAL: HEALTH
DATE: 15/11/2021

APPENDIX D: CONSENT FORM

CONSENT FORM FOR SURVEY AND INTERVIEW PARTICIPANTS

Dear Participant

I am enrolled for a doctoral study in the Department of Public Administration & Governance at the Faculty of Business and Management Sciences at the Cape Peninsula University of Technology (CPUT). The study focus of my research study is on quality in Emergency Medical Services.

This study is part of the National Quality Health Implementation Plan research project that is approved by the Faculty of Business and Management Sciences, Faculty Research Ethics Committee, certificate number 2021_FBMSREC 078. Site approval for the study to be conducted in the nine provinces in South Africa has been obtained from the National Department of Health.

This is an invitation to participate voluntarily in the research project. Please be assured that your responses will remain confidential. Your name and place of work will not be identified in any part of the research. The project supervisors and I will be the only people who will have access to the information gathered. CPUT had approved the data management plan to the management of all recordings, transcripts and any other data collected in this study. You may refer any queries or questions to me (lloydc@cput.ac.za) or the project supervisor Professor V. Naicker (naickerv@cput.ac.za).

Lloyd Christopher (Researcher)

I, _____

(*Please print your name and surname)*

agree voluntarily to be part of the research undertaken. I understand that I am under no compulsion and may withdraw at any stage of the research project.

Signed:_____ Date:_____

Please write your preferred email address to allow me to share a transcript of the interview with you for verification. Note that your email address will only be used for this purpose. The protection of your personal information will comply with the CPUT requirements for personal data as required by the POPIA Act.

Email Address:

APPENDIX E: INTERVIEW GUIDE

INTERVIEW QUESTION GUIDE

1. Can you tell me little bit about yourself, your experience, your position and your current role and responsibilities.
2. You have many years of experience. What has been your perception of quality management in EMS in the place where you have worked?
3. When you think about it, which time are you talking about, can you contextualise of your experience of quality management in EMS?
4. What are your thoughts of the Regulations Relating to Standards for EMS? How well prepared is EMS to meet these standards?
5. We just did a survey that found that ….
    a. EMS Managers have not been trained in quality improvement and were not familiar with QI tools. What are your thoughts on these findings?
    b. Do you think that the level of education and training is associated with EMS performance in terms of the national standards.
    c. Managers in the survey indicated that they do not get management support, lack resources, and that staff lack motivation. Is this your experience? What factors have contributed to this?
    d. The managers rated compliance with most domains highly except buildings and infrastructure and the effectiveness of the emergency control centre. Can you help explain this finding?
6. What are your views on the EMS managers capacity for quality improvement?
7. What are your views on the factors that affect quality improvement in EMS?
8. What in your mind needs to change?
9. Is there anything else that you would like to share?
10. Do you know of anyone else who may be able to contribute to this study?

APPENDIX F: DATA MANAGEMENT PLAN

LD Christopher: Doctor of Public Administration DMP - Data Management Plan

DATA COLLECTION

What data will you collect/create?

Sequential mixed methods will be used to collected quantitative and qualitative data in three phases:
During Phase 1 of the study quantitative survey data from questionnaires administered to public service emergency medical service managers will be collected in the three provinces and statistically analysed.
During Phase 2 interviews with key stakeholders will be conducted, transcribed, and analysed to provide depth and meaning to the data obtained in Phase 1.
Phase 3 will be the development and implementation of the training and the post-training survey to measure the change that has taken place in the ECP's knowledge and practices in relation to quality improvement. The survey well be developed guided by the Kirkpatrick training evaluation model to determine the reaction and learning. The data analysis will begin immediately once all the responses are received.

How will the data be collected or created?

In Phase 1 a self-administered questionnaire will be used to survey the participants. The survey questions will be developed following a review of the literature. To ensure construct and content validity, a panel of experts will examine the appropriateness and comprehensiveness of the survey. The survey will collect key biographical information (e.g., gender, age, qualification) relevant to the study. Closed-ended questions will used asked where participants would use a Likert scale. The 5-item Likert scale will allow participants to indicate the degree to which they agree or disagree with the opinion expressed in the statement. The endorsement of positively worded statements and non-endorsement for negative statements will be scored higher.

A pilot study will be conducted before the questionnaire is administered to identify any modifications that may need to be made to the survey questions and format. The common pitfalls in the wording questions such as the use of long questions and double-barrelled questions will be considered in the construction of the questionnaire. The questionnaire will be administered in person to participants attending workshops on the National Quality Improvement Plan (NQIP) and online to all participants who are unable to attend. The survey instrument will be divided into key sections to evaluate key main areas of interest needed to answer the research questions.

Scriven (2007) suggests that a checklist reduces the chances of valuable inferences being forgotten, thus reducing the errors. A Laundry List that indicates the presence of a set of categories, that the respondent must choose from to dictate whether these aspects are present or not will be used. They also reduce influence of the halo effect-where the tendency to allow the presence of a strong feature to over influence one's judgement of merit-prescribing the evaluator to consider separately and allocate appropriate merit to each dimension/category of the checklist (Scriven, 2007).

In phase 1, the survey will be administered to provincial EMS shift leaders, station managers, subdistrict, district, operational and provincial managers. The intention is to conduct the survey during the NIQP briefing workshops in the provinces on the Ideal EMS framework and the EMS Standards draft regulations that will be conducted by the Director EMS and Disaster Management. Written consent will be obtained from each participant after a briefing on the purpose of the study. Participants who do not consent will be allowed to participate in the workshop or leave without prejudice. There are an estimated number of 30 managers at this management level in each province. Phase 2 will follow the analysis of the quantitative survey data from Phase1. A list of questions that require in-depth understanding will be identified. The Director of EMS and Disaster Management, the Chairperson of Professional Board for Emergency Care and the National Committee for EMS will be asked to identify key EMS stakeholders to be interviewed to provide a deeper understanding of the survey responses and suggest how training may address any quality improvement deficiencies identified in the survey. At the end of each interview the interviewee will be asked if there is anyone who may have more information related to any of the

interview questions. All interviews will be conducted via MS Teams, be recorded and transcribed. A copy of the transcription will be provided to the participate to confirm the authenticity of the transcription. A short learning programme will be formulated to address the quality improvement gaps using the survey and interview data. The EMS quality training programme will be submitted to the University of Alabama Birmingham and the Office for Health Standards Compliance for review. No data from the survey or interviews will be shared with the University of Alabama Birmingham and the Office for Health Standards Compliance. The purpose of the collaboration is to provide external review of the course material.

After the completion of phase 2, invitations will be sent out to the participants that participated in the Phase 1 and that agree to participate in the pilot bespoke quality improvement training programme. The Kirkpatrick evaluation model will be administered post the training and used to evaluate the reaction and learning of the participants. Adjustments will be made to the course post the evaluation based on the feedback.

DATA DOCUMENTATION AND METADATA

What documentation and metadata will accompany your dataset?

The data will be available in Excel® format and be analysed using SPSS®. Quantitative data analysis is the techniques used to convert data to a numerical form and subject it to statistical analysis. The purpose is to reduce the data interpretable form so that the research problem can be studied and tested, and conclusions drawn (de Vos et al., 2011).

In Phase 1 and 3, the survey on the knowledge, attitudes, and practices of ECP's in relation to Quality Improvement will use Likert scales (or agreement or ranges). Survey data will be captured using Microsoft Excel®. Statistical analysis will first be performed on the data pilot study. Cronbach's Alpha is a statistic that is normally used for measuring the reliability of a multi-item scale will be used. A multiple linear regression model will be developed to allow for multivariate analysis of the relationship between the dependent variable and the independent variables (e.g., age, gender,

qualifications, experience). Detail on this data multi-item scale and the multiple linear regression model will be determent in consultation with a statistician.

Associations of interest between categorical variables will be identified using overlapping histograms and two-way frequency tables and analysed statistically using Pearson's chi-square test of association (Conover, 1999) and logistic regression (Hosmer & Lemeshow, 2000). Logistic regression is a method that allows analysis of the relationship between a binary response variable (e.g., training or no training) and one or more predictor variables, which could be numerical (e.g., Age) or categorical (e.g., Gender). The p-value of a significance test on the model coefficient(s) allows one to infer whether a relationship exists between the response variable and the predictor(s). The magnitude of the effect (if present) is typically expressed in the form of an expected odds ratio.

Pearson's Chi-square p-value on its own can provide data that relationships exist but provides no nature or direction of the relationship. The logistic regression p-value taken together with the coefficient(s) estimate adds more inferences about nature and direction of the relationship. This provided the need to consider both statistical analyses. Fisher's Exact Test, ANOVA and Tukey's post hoc method were used to find smaller associations between gender, age, and other variables.

In Phase 2 Atlas Ti ® software will be used to code the data. A coding frame will be created to lay out the key concepts and their definitions. These may change, as the data is read and re-read. The researcher will keep a memo to capture personal insights, ideas, and patterns. Open coding will be used to identify concepts and categories as it concerns the aims and objectives of the study. Axial coding will be used to create specific categories and selection coding will be used as the categories are integrated (Benaquisto, 2008:85; Saldana, 2008:27). The themes that emerge will be used as a basis for the argument in the discussion around them.

In qualitative studies credibility, dependability, confirmability, and consistency are necessary to subjectivity. Ensuring methodological coherence in the collection, analysis and interpretation of data is important, as is verification of the findings with

study participants, and a transparent audit trail (Guba & Lincoln, 1994:140). In this study a summary of my key interview findings will be made available to the participants, as this will allow for the true critique and reflection and will address the ethical concern of undue inducement due to the researcher–participant relationship.

To ensure controlled vocabularies, terminology used will be consistent with Metadata standard Medical Subject Heading (MeSH) which is maintained by the National Library of Medicine. MeSH terms will assist with indexing for PubMed.

All results and findings will be available on the CPUT data repositories **Figshare** https://cput.figshare.com/ , **MediaTum** http://rdm.cput.ac.za/ and the **Institutional repository** http://digitalknowledge.cput.ac.za/ . These repositories provide metadata fields to describe each dataset by adding title, author/s, subject categories, default list of keywords including options to add key words manually. There's a space to describe datasets or add abstract. Each dataset in each folder will be described using metadata fields with each data repository.

ETHICS AND LEGAL COMPLIANCE

How will you manage any ethical issues pertaining to data?

Any research involving human participants and the organisation in which they work will require the researcher to find the balance between the right to know versus the rights to privacy and not be harmed (de Vos, Strydom, Fouche, & Delport, 2011:12). The ethical guidelines developed by the National Health Research Ethics Council as published in the ‘Ethics in Health Research: Principles, Processes and Structures-2015” has been considered to ensure that this research is conducted responsibly and ethically. In this regard the individual consent of participants and their respective Emergency Medical Service (EMS) organisations, as their employer, will be obtained and ethical clearance will be sought.

Site approval to conduct the study in each of the province was granted by the Department of Health on the 15 November 2021. The request for access will be submitted to the private EMS companies. Care will be taken to ensure that participants

fully appreciate the nature of the study, and that participation is voluntary. Participants will be briefed, and informed consent will be obtained before data collection. Although participants may benefit from the training, they will not be compensated financially or materially. The study is deemed to have minimal risk to the participants. The risk of discomfort or harm anticipated is not greater than what any individual will encounter in their daily life.

The study will entail obtaining detailed information from participants on how their EMS organisations manage quality. It is important to protect the anonymity of individuals and organisations during the research process. An important consideration would be to triangulate any controversial findings as participants may inflate, conflate, or deflate information and facts for whatever reason. The ethical principles of beneficence and non-maleficence, equity and respect will underpin the study. The ethical norms and standards prescribed by Ethics in Health Research Policy of South Africa (2017) will be used to guide the study, (Wikler, 2010). The study has value in that it will inform quality improvement in EMS organisations in Low-Middle-Income-Countries and in so doing benefit the patient, the practitioner, and the EMS.

The study has a low risk as no patient data or clinical intervention is required. Informed consent will be each participant is the study will be assigned a unique code to anonymise the response. Participants will reserve the right to withdraw at any stage of the research process. Ethics approval for the study was granted by the FREC on the 16 November 2021 (Certificate No. 2021 FBMSREC 078).

This research will be undertaken in full compliance with Protection of Personal Information Act (POPIA), No. 4 of 2013, and to ensure that the rights of research participants (“data subjects”) as enshrined in the Act are upheld and respected.

Without derogating from the generality of the foregoing, in relation to the processing of all personal information, other than information which has been de-identified to the extent that it cannot be re-identified again, I undertake the following –

to ensure that the data subjects are aware of the purpose of the collection of their personal information;

to obtain the consent of data subjects for processing their personal information, and to refrain from further processing of the personal information of data subjects if they withdraw their consent;

to process such personal information lawfully and in a reasonable manner that does not infringe the privacy of the data subject;

to secure the integrity and confidentiality of such personal information in my possession or under my control, and to notify the Information Regulator, the data subjects concerned, of any access or acquisition of such information by unauthorised persons; and

to retain such personal information for no longer than is necessary for purposes of the research, and thereafter to destroy, delete or de-identify it as soon as reasonably practicable.

How will you manage copyright and Intellectual Property Rights (IPR) issues?

The intellectual property will belong to CPUT as the institution where the research is being undertaken and the researcher and project supervisors. The sharing of research results will be consistent with the CPUT policies governing copyright and the use and distribution of research outputs. The research community could freely apply to have access to the data on condition that CPUT is acknowledged. There are no restrictions to the publication of the results of the study.

DATA STORAGE AND BACKUP

How will you store and back up your data during the research?

The data collected with be stored on a separate password protected folder and retrieved electronically on a password protected laptop device using One Drive on the student CPUT Office 365 account. The data will be backed up to the 365-cloud based server daily via the CPUT network or the researcher fibre internet connection. A secondary local back up to a password protected external storage device owned by the researcher will be done once a week. The electronic data stored in a separate

folder will be deleted and any paper-based notes, surveys and other print material will be destroyed after the prescribed period on completion of the study.

The processed data will be uploaded via CTS services to the CPUT data repositories. CPUT support researchers with two data repositories including the institutional repositories. The data for this project will be saved and backed up in CPUT data repositories **Figshare** at https://cput.figshare.com/ or **MediaTum** at www.rdm.cput.ac.za as well as the **Institutional repository** accessible at http://digitalknowledge.cput.ac.za/

How will you manage access and security?

The confidential data such as the participants name and signature is limited to the consent form. No confidential information is collected as part of the survey form and any data breech poses a low risk to the participants, researcher and CPUT. The risk of data security breech will be countered by using a password manager on Mac OS and updating user passwords monthly. Any data shared between collaborators will be password protected and the password securely communicated via SMS. The survey questionnaire is paper-based and will be stored in a locked cabinet.

During research process access to datasets will only be given to direct or indirect participants by assigning rights. This includes collaborators who will be given rights to read, edit and collaborate through the data repositories (Figshare at https://cput.figshare.com/ or MediaTum at http://rdm.cput.ac.za/). These research data repositories are safe and secured and will allow the team leader to implement rights management in each PROJECT folder for active dataset based on specific groups or individuals.

Using Figshare, a private link or reserved Digital Object Identifier (DOI), the project leader or researcher will create a link which will secure each dataset, and this will allow sharing at the same time protecting the datasets between project team members.

DATA SELECTION AND PRESERVATION

Explain which data should be retained, shared, and /or preserved?

The period of data retention will be informed by the CPUT institutional policy. Upon completion of the project, the principal investigator and the project supervisors will identify project materials that may be of long-term interest for archiving and preservation. This data will be digitised to ensure ease of storage and retrieval. It is reasonable to assume that the data will be needed for up to 10 years after the study is completed.

The survey and interview data from all 3 phases of the study will be retained and may be used to validate the findings of the research or to conduct further analysis. The electronic data will be stored and available for at least 10 years. The paper-based questionnaires will be stored for a period of 5 years post the study.

DATA SHARING

How will data be shared?

Data will be shared between collaborators using "MY DATA and PROJECT" on Figshare (https://cput.figshare.com/) or folders and directories within MediaTum (http://rdm.cput.ac.za/) This will allow the project leader/s or researchers to invite participants via email to view or participate in each project folder and each dataset will be protected by either private link or DOI. After publications, data will be shared using Open Access Repositories Figshare (https://cput.figshare.com/) and the Institutional Repository (http://digitalknowledge.cput.ac.za/) for public access.

The raw data will be shared with the project supervisors. The interview transcripts of the interviews with the key informants will be made available to of each participant to ensure accuracy of the transcript. There will be no reference to any of the organisations or individuals and generic terms such as “Interviewee 1” will be used to ensure anonymity of participants. The anonymised data will be available on the CPUT repository for any future research endeavour.

Are any restrictions on data sharing required?

There will be no restrictions on data sharing. Should there be any need to restrict parts of the data which may be deemed sensitive, the principal investigator and supervisors may restrict the sharing of data within CPUT repositories (Figshare, MediaTum and the Institutional repository) by giving rights (view only, read, collaborate, edit) to each participant using one of the data repositories.

RESPONSIBILITIES AND RESOURCES

Who will be responsible for data management?

The principal investigator and supervisors will be responsible for the data management. These responsibilities will include data capture, metadata production, data quality, storage and backup, data archiving & data sharing. As the principal investigator and primary supervisor are employed at CPUT, it will be their responsibility to ensure all CPUT policies are respected.

As there are no external collaborators or partners, the principal investigator will be responsible for the review and updating the DMP.

What resources will you require to deliver your plan?

No additional resources are required to deliver the DMP. The principal investigator has access to the CPUT library specialists to provide any additional support that may be required.

PERSONAL, SENSITIVE, AND IDENTIFIABLE HUMAN RESEARCH DATA

Will you be collecting personal information?

Yes, the survey will collect biographical data

List all the types of personal/sensitive/identifiable data you will be collecting.

The data collected from the survey will include Gender, description of current employer, position held within the organisations, years of experience and medical qualifications.

The separate consent form will require the participants name and signature.

Conduct a benefit/risk analysis to ensure that the benefit of collecting such data outweighs the risk and then motivate why you need to collect such information. The risk of identifying the participant from the data provided in minimal given that 300+ participants are expected to complete the survey. The study has a low risk as no patient data or clinical intervention is required. Informed consent will be each participant is the study will be assigned a unique code to anonymise the response. Participants will reserve the right to withdraw at any stage of the research process. Ethics approval for the study was granted by the FREC on the 16 November 2021 (Certificate No. 2021 FBMSREC 078).

This research will be undertaken in full compliance with Protection of Personal Information Act (POPIA), No. 4 of 2013, and to ensure that the rights of research participants ("data subjects") as enshrined in the Act are upheld and respected.

Without derogating from the generality of the foregoing, in relation to the processing of all personal information, other than information which has been de-identified to the extent that it cannot be re-identified again, I undertake the following –

1. to ensure that the data subjects are aware of the purpose of the collection of their personal information;

2. to obtain the consent of data subjects for processing their personal information, and to refrain from further processing of the personal information of data subjects if they withdraw their consent;

3. to process such personal information lawfully and in a reasonable manner that does not infringe the privacy of the data subject;

4. to secure the integrity and confidentiality of such personal information in my possession or under my control, and to notify the Information Regulator, the data subjects concerned, of any access or acquisition of such information by unauthorised persons; and

5. to retain such personal information for no longer than is necessary for purposes of the research, and thereafter to destroy, delete or de-identify it as soon as reasonably practicable.

Confidentiality, anonymity, and privacy of human participants.

The dataset will not contain identifiable personal information that will enable the individual to be identified. For the interviews, codes and pseudonyms will be used to and any mention of names, organisations and places will be deleted/blocked out from the transcript or anonymised.

What happens to the information if a participant withdraws from a study?

Participants will have the option of withdrawing from the study at any stage of the research without having to provide a reason. The participant who opts out will not be prejudice in any way. All data collected from the participant will be deleted or destroyed and confirmation of the removal of the data will be communicated to the participant. A copy of the communication confirming the deletion will be sent to the research supervisor.

After completion of the research, will the information be used for anything else in the future?

The biographical data will be kept for a period of 10 years after which it will be deleted and destroyed. The information may not be used for further research without obtaining ethical approval and consent. As the type of biographical data collected is limited, the risk of identifying the participant is low and therefore the risk to privacy or security is minimal.

Will study participants/groups etc. receive feedback before disseminating the results of the research?

In qualitative studies credibility, dependability, confirmability, and consistency are necessary to subjectivity. Ensuring methodological coherence in the collection, analysis and interpretation of data is important, as is verification of the findings with study participants, and a transparent audit trail (Guba & Lincoln, 1994:140). In this study a summary of my key interview findings will be made available to the

participants, as this will allow for the true critique and reflection and will address the ethical concern of undue inducement due to the researcher–participant relationship.

The survey data findings will be communicated via a webinar. The invitation will be sent via the provincial manager to all managers in the province who completed the survey.

Given the type and nature of the study, the risk of individual and group harm is low.

Outline your informed consent process and details of the data management plan.

The following letter of consent will be provided to each participant:

Dear Participant

I am enrolled for a doctoral study in the Department of Public Administration & Governance at the Faculty of Business and Management Sciences at the Cape Peninsula University of Technology (CPUT). The topic of my research study is *Quality in Emergency Medical Services (EMS): A framework for strengthening public and private EMS quality compliance through an education intervention for Emergency Care Personnel (ECP).*

This study is part of the National Quality Health Implementation Plan research project that is approved by the Faculty of Business and Management Sciences, Faculty Research Ethics Committee, certificate number 2021_FBMSREC 078. Site approval for the study to be conducted in the nine provinces in South Africa has been obtained from the National Department of Health.

This is an invitation to participate voluntarily in the research project. Please be assured that your responses will remain confidential. Your name and place of work will not be identified in any part of the research. The data will be securely stored, and all data will be deleted and destroyed after 10 years in compliance with the CPUT policies on data management. The data will it be used for anything else, nor will it be shared. The

project supervisors and I will be the only people who will have access to the information gathered. You may refer any queries or questions to me (lloydc@cput.ac.za) or the project supervisor Professor V. Naicker (naickerv@cput.ac.za).

I, Lloyd Christopher (Researcher)

(*please print your name and surname)*
agree voluntarily to be part of the research undertaken. I understand that I am under no compulsion and may withdraw at any stage of the research project without prejudice. Any data or part thereof of participants who withdraw with be deleted and destroyed and confirmation thereof will be communicated to you. You also have the right to request removal after the study has been completed.

LD Christopher

Signed:_____ Date:__22/09/2022____

If you would like to receive further information on Quality Management training and be invited to a webinar where the results of the study will be discussed. All records will be deleted at the end of the study period.

This research will be undertaken in full compliance with Protection of Personal Information Act (POPIA), No. 4 of 2013, and to ensure that the rights of research participants (“data subjects”) as enshrined in the Act are upheld and respected.

Without derogating from the generality of the foregoing, in relation to the processing of all personal information, other than information which has been de-identified to the extent that it cannot be re-identified again, I undertake the following –

1. to ensure that the data subjects are aware of the purpose of the collection of their personal information;

2. to obtain the consent of data subjects for processing their personal information, and to refrain from further processing of the personal information of data subjects if they withdraw their consent;

3. to process such personal information lawfully and in a reasonable manner that does not infringe the privacy of the data subject;

4. to secure the integrity and confidentiality of such personal information in my possession or under my control, and to notify the Information Regulator, the data subjects concerned, of any access or acquisition of such information by unauthorised persons; and

5. to retain such personal information for no longer than is necessary for purposes of the research, and thereafter to destroy, delete or de-identify it as soon as reasonably practicable.

APPENDIX G: EMERGENCY MEDICAL SERVICE REGULATIONS

32 No. 41287 GOVERNMENT GAZETTE, 1 DECEMBER 2017

DEPARTMENT OF HEALTH

NO. 1320 01 DECEMBER 2017

NATIONAL HEALTH ACT, 2003 (ACT NO. 61 OF 2003)

EMERGENCY MEDICAL SERVICES REGULATIONS

I, Dr Aaron Motsoaledi, the Minister of Health has, in terms of section 90(1)(m) read with section 43(1) of the National Health Act, 2003 (Act No. 61 of 2003), made the Regulations in the Schedule.

DR A MOTSOALEDI, MP
MINISTER OF HEALTH
DATE: 26/10/2017

TABLE OF CONTENTS

SCHEDULE

PART 1 - REGULATORY FRAMEWORK

DEFINITIONS

1. In these Regulations, a word or expression to which a meaning has been assigned in the Act, bears the meaning so assigned and, unless the context otherwise indicates-

"Advanced Life Support (ALS)" means a level of care provided within the Paramedic, Emergency Care Technician or Emergency Care Practitioner scope of practice, as determined by the Health Professions Council of South Africa in terms of the Health Professions Act;

"adverse patient incident" means an event or circumstance that leads to unintended harm, injury, suffering or illness of a patient;

"air ambulance" means an airborne vehicle-

(a) appropriately equipped, designed or adapted solely for the purpose of providing emergency care and conveyance of patients;
(b) which is licensed to an Emergency Medical Service;
(c) registered as an air ambulance in terms of the Civil Aviation Act, 2009 (Act No. 13 of 2009); and
(d) staffed and equipped as per "Annexures A and B;

"ambulance" means a motor vehicle-

(a) appropriately equipped, designed or adapted solely for the purpose of providing emergency care and conveyance of patients;
(b) owned by an Emergency Medical Service;
(c) registered as an ambulance in terms of the National Road Traffic Act; and
(d) staffed and equipped as per "Annexures A and B;

"Ambulance Emergency Assistant" means a person registered as such with the Health Professions Council of South Africa in terms of the Health Professions Act;

"Basic Ambulance Assistant" means a person registered as such with the Health Professions Council of South Africa in terms of the Health Professions Act;

"Basic Life Support (BLS)" means a level of emergency care provided primarily by emergency care providers that practise within the Basic Ambulance Assistant scope of practice as determined by the Health Professions Council of South Africa in terms of the Health Professions Act;

"Committee" means the Emergency Medical Services Advisory Committee appointed in terms of regulation 3;

"dirty utility facility" means a facility that is dedicated to the laundering of dirty linen, cleaning of soiled equipment and sluice requirements;

"Education Institution Emergency Medical Service" means an organisation or body that is dedicated, staffed and equipped to operate as an ambulance or medical response vehicle in order to offer emergency care for the purpose of educating and training emergency care students who are registered with the Health Professions Council of South Africa in terms of the Health Professions Act;

"emergency care" means the evaluation, treatment and care of an ill or injured person in a situation in which such emergency evaluation, treatment and care is required, and the continuation of treatment and care during the transportation of such person to or between health establishments;

"Emergency Care Assistant" means a person registered as such with the Health Professions Council of South Africa in terms of the Health Professions Act;

"emergency care personnel" means personnel who are registered with the Health Professions Council of South Africa under the auspices of the Professional Board for Emergency Care;

"Emergency Care Practitioner" means a person registered as such with the Health Professions Council of South Africa in terms of the Health Professions Act;

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"Emergency Care Technician" means a person registered as such with the Health Professions Council of South Africa in terms of the Health Professions Act;

"Emergency Medical Service" means an organisation or body that is dedicated, staffed and equipped to operate an ambulance, medical rescue vehicle or medical response vehicle in order to offer emergency care;

"Event Medical Service" means an organisation or body that is dedicated, equipped and staffed by persons registered with the Health Professions Council of South Africa in terms of the Health Professions Act to operate an ambulance or medical response vehicle in order to offer emergency care at mass gatherings or high risk events;

"Emergency Medical Service Manager" means a person who is duly appointed as the responsible manager for the Emergency Medical Service and who is registered with the Health Professions Council of South Africa in terms of the Health Professions Act;

"Head of Department" means the accounting officer for a provincial health department;

"Health Professions Act" means the Health Professions Act, 1974 (Act No.56 of 1974);

"Health Professions Council of South Africa" means the body established in terms of section 2 of the Health Professions Act;

"inspecting officer" means a person employed or appointed by the Provincial Health Licensing and Inspectorate Authority;

"Intermediate Life Support (ILS)" means a level of emergency care provided within the Ambulance Emergency Assistant and Emergency Care Assistant scope of practice as determined by the Health Professions Council of South Africa in terms of the Health Professions Act;

"licence" means a licence issued in terms of these Regulations, which authorises the provision of an emergency medical service;

"Licensing and Inspectorate Authority" means the provincial health component appointed by the Head of Department for the licensing and inspection of Emergency Medical Services;

"MEC" means the Member of the Executive Council responsible for Health;

"Medical Practitioner" means a person registered as such in terms of the Health Professions Act;

"medical rescue" means practices involving the location, access, extrication and emergency care of a person.

"medical rescue vehicle" means a vehicle-

(a) appropriately equipped designed or adapted solely for the purpose of providing medical rescue;
(b) owned by an Emergency Medical Service;
(c) registered as a medical rescue vehicle in terms of the National Road Traffic Act; and
(d) staffed and equipped as per "Annexures A and B;

"medical response vehicle" means a vehicle-

(a) appropriately equipped designed or adapted solely for the purpose of providing medical response;
(b) owned by an Emergency Medical Service;
(c) registered as a medical response vehicle in terms of the National Road Traffic Act; and
(d) staffed and equipped as per "Annexures A and B;

"member" means a person appointed in terms of regulation 3 to serve on the Committee;

"National Road Traffic Act" means the National Road Traffic Act, 1996 (Act No.93 of 1996);

"Paramedic" means a person registered as such with the Health Professions Council of South Africa in terms of the Health Professions Act;

"response time" means the time measured from when an Emergency Medical Service receives an emergency call to the time the first emergency care personnel or medical practitioner arrives at the scene;

"responsible person" means a person, a nominee, in the case of a company or an association of persons (whether corporate or not) or an organ of state, registered with the Health Professions Council of South Africa, who establishes, extends, conducts, maintains or renders an emergency medical service;

"Register of Emergency Medical Services" means the register referred to in regulation 9(15);

"station" means a dedicated self-contained facility for the housing of emergency vehicles, personnel and associated emergency equipment;

"temporary licence" means a valid licence issued in terms of these Regulations which authorises the temporary provision of an emergency medical service; and

"Volunteer Emergency Medical Service" means an organisation or body-

(a) licensed to provide such volunteer emergency medical services as formally approved by the relevant Provincial Department of Health;
(b) registered in accordance with the National Road Traffic Act; and
(c) registered as a Non-Profit Organisation, as well as a Public Benefit Organisation as provided for in the Non-Profit Organisation Act, 1997 (Act No. 71 of 1997) and the Income Tax Act, 1962 (Act No. 58 of 1962), respectively;

"**Volunteer Emergency Medical Service personnel**" means personnel who-

(a) are registered practitioners with the Health Professions Council of South Africa in terms of the Health Professions Act;
(b) are members of a licensed Volunteer Emergency Medical Service; and
(c) do not receive any remuneration for the provision of emergency medical services, but may receive reasonable reimbursement for expenses incurred.

SCOPE OF APPLICATION

2. These Regulations apply to public and private Emergency Medical Services operating in the Republic of South Africa, excluding the South African National Defence Force.

PART 2 – EMS ADVISORY COMMITTEE

EMERGENCY MEDICAL SERVICES ADVISORY COMMITTEE

3. (1) The Head of Department must appoint members of the Committee.

(2) The Committee must-

(a) advise and make recommendations on licence applications referred to in regulation 8; and

(b) advise the Head of Department on matters concerning licensing.

(3) The Head of Department must determine the terms of reference of the Committee.

(4) (a) The Committee must be comprised of at least five (5) members.

(b) Members referred to in sub-regulation (5)(a), (c) and (d) must have a minimum of 10 years' experience in emergency medical services.

(5) The Committee must consist of at least-

(a) one member who is a specialist in emergency medicine or an equivalent field;

(b) one member, nominated by an organisation recognised in terms of the Organised Local Government Act, 1997 (Act No. 52 of 1997), to represent local government in the Province;

(c) one member with extensive technical expertise of public emergency medical services nominated by the National Department of Health;

(d) one member with extensive technical expertise from private emergency medical services; and

(e) one member representing health care users in the Province.

(6) The Head of Department must appoint a member recommended by the Committee, as the Chairperson of the Committee.

(7) At the first meeting of the Committee-

(a) the Chairperson must determine the procedure to be followed at the meetings of the Committee;
(b) the Committee must appoint a Deputy Chairperson; and
(c) the Committee must establish a code of conduct for members.

(8) The Chairperson may, at any stage in the consideration of an application in terms of regulation 8, co-opt any person to participate in the proceedings of the Committee, provided that the Chairperson is satisfied that such person will be able to assist the Committee in making a recommendation.

(9) The Chairperson must ensure that a full record of the overall proceedings is kept, together with a record of attendance and of any resolutions taken at a meeting of the Committee.

(10) The Committee must be convened as frequently as may be necessary, to deal with applications in terms of regulation 8.

(11) A quorum for a meeting is 50%+1 of the members of the Committee, but either the Chairperson or Deputy Chairperson must always be present.

(12) Voting-

(a) a decision of the majority of members present at a meeting of the Committee is considered to be a decision of the Committee;
(b) in the event of the number of votes leading to a tie, the Chairperson or Deputy Chairperson presiding at the meeting, has a casting vote; and
(c) a person co-opted in terms of sub-regulation (8), does not have voting power when participating in proceedings of the Committee.

(13) The Chairperson of the Committee must submit an annual report on the activities and expenditure of the Committee, to the Head of Department, within 40 working days of the end of the financial year.

(14) The Head of Department must pay members who are not employed by the State-

(a) reasonable remuneration; and
(b) reasonable allowances for actual subsistence and travelling expenses necessitated by the attendance of a meeting of the Committee,

as determined by the MEC, with the concurrence of the MEC responsible for finance.

EXCLUSION OF MEMBERS OF COMMITTEE

4. (1) A member of the Committee may not be present during, or participate in-

(a) a discussion;
(b) the taking of a decision; or
(c) the making of recommendations,

in respect of an application serving before the Committee in which that member, his or her spouse, an immediate family member, a business partner, associate or employer (other than the State) has any financial or material interest, or where that member, his or her spouse, an immediate family member, a business partner, associate or employer (other than the State) has had any such interest during the 12 months preceding the application in question.

(2) For the purpose of sub-regulation (1), the term-

(a) **"spouse"** includes a person with whom the member lives as if they were married or with whom the member habitually cohabits; and
(b) **"immediate family member"** means, whether by blood or in law, a grandparent, parent, child or sibling, irrespective of whether such a relationship results from birth, marriage or adoption.

(3) A person may not, whilst serving on the Committee, accept any form of employment, remuneration, gratuity or reward, from–

(a) a person having an interest in an Emergency Medical Service; or
(b) a person who has applied for a licence in terms of regulation 8.

(4) Where a member of the Committee has a current or potential conflict of interest, that member must–

(a) declare such a conflict of interest to the Chairperson of the Committee timeously; and
(b) recuse himself or herself from any proceedings where such a conflict of interest may arise.

DECLARATION BY COMMITTEE MEMBERS

5. (1) A person who is appointed to the Committee in terms of regulation 3(1) must, upon receiving notice of his or her appointment, and prior to commencement of duties as a member, submit a written declaration to the Head of Department, detailing-

(a) any financial or other interest that he or she may have, which may be in competition or in conflict with such an appointment; and
(b) any relevant information about a conviction for an offence listed in Schedule 1 of the Criminal Procedure Act, 1977 (Act No. 51 of 1977).

(2) Failure to submit the declaration referred to in sub-regulation (1)(a) will result in the appointment being suspended for a period not exceeding forty (40) working days until the declaration is received.

(3) If a member of the Committee-

(a) experiences a change in circumstances pertaining to financial or other interests that may affect his or her ability to consider any matter impartially,

such a member must, within ten (10) working days from the date of the change in circumstances and within a reasonable period prior to consideration of an affected matter, submit a written notice to the Head of Department outlining the relevant change in circumstances;

(b) fails to comply with sub-regulation (3)(a), his or her appointment as a member may be revoked;

(c) has their appointment revoked, as contemplated in sub-regulation (3)(b), the member may lodge an appeal to the MEC within twenty (20) working days of being notified, which appeal must-

(i) be in writing;

(ii) set out the reasons for the appeal being made; and

(iii) stipulate reasons as to why the membership of the person concerned should not be revoked.

(4) A declaration submitted in terms of sub-regulation (1) must be for the sole purpose of determining whether any possible conflict of interest precludes the appointment, or the continued membership, of a person as a member of the Committee.

(5) The Head of Department must ensure that a declaration submitted is confidential and is not publicly disclosed.

(6) A member of the Committee may not use his or her appointment to the Committee as a means of promoting the financial or other interests of another person in relation to emergency medical services.

(7) A member of the Committee who knowingly and willingly-

(a) fails to give truthful answers, or provide a full declaration of financial, or a possible conflict of, interest;

(b) uses his or her appointment to promote the financial or other interest of any person; or

(c) fails to recuse himself or herself as contemplated in regulation 4(4)(b),

commits an offence and is, upon conviction, liable to a fine not exceeding R25 000.00 and ceases to be a member of the Committee.

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TERMINATION OF MEMBERSHIP

6. (1) A member of the Committee may, at any time, resign as a member of the Committee by giving not less than twenty (20) working days written notice to the Head of Department.

(2) The Head of Department may terminate the appointment of a member of the Committee with immediate effect if the member-

(a) is or becomes an un-rehabilitated insolvent;
(b) fails to-

(i) declare his or her financial interest or other conflict of interest; or
(ii) recuse himself or herself where he or she or an immediate family member has an interest in the outcome of a decision to be made or made by the Committee;

(c) is suffering from an infirmity of mind or body which prevents him or her from properly discharging his or her duties as a member of the Committee;
(d) has engaged in conduct, which brings or which could bring the Committee into disrepute or threatens the integrity of the Committee;
(e) fails to attend two consecutive meetings of the Committee without having been granted leave of absence by the Chairperson;
(f) fails to carry out the duties and functions of the Committee to the best of his or her ability; or
(g) is convicted of an offence referred to in regulation 5(7).

PART 3 – LICENSING OF EMERGENCY MEDICAL SERVICES

LICENSING

7. (1) A person, organisation or organ of state may not, without the requisite

licence, establish, control, change ownership, rename, temporarily or permanently relocate, or alter the services of-

(a) an Emergency Medical Service;
(b) an Aeromedical Service;
(c) an Event Medical Service;
(d) a Volunteer Emergency Medical Service; or
(e) an Education Institution Emergency Medical Service.

(2) The minimum licensing category must be Intermediate Life Support.

(3) An Emergency Medical Service that is licensed at either Intermediate Life Support level or Advanced Life Support level, must be allowed to operate up to, but not exceeding, 50% of the ambulances operated by the Emergency Medical Service at Basic Life Support level and the remaining 50% of the ambulances being operated by the Emergency Medical Service must be operated at either Intermediate Life Support level, or Advanced Life Support level, or a combination thereof.

(4) The Head of Department may only issue a licence if the service has been inspected by an inspecting officer and is found to be in compliance with the requirements outlined in Annexures A and B, and is considered suitable and adequate for the purpose of providing a service in respect of the licence application.

(5) A Volunteer Emergency Medical Service must comply with the requirements for the licensing of an Emergency Medical Service with the exclusion of sections 2(b), 5(c) and 5(d) in Annexure A.

(6) A private Emergency Medical Service (excluding Event Medical Services) may only provide emergency medical services within the demarcated boundary within a health district as specified in its application for a licence and in which its station is located, unless it is transporting patients between health establishments or it is requested by the Head of Department.

APPLICATION FOR LICENCE

8. (1) An application for the licensing of an Emergency Medical Service must be-

(a) submitted on the prescribed form (Annexure C) to the Head of Department for the Province where the service will operate;
(b) accompanied by the required supporting documents; and
(c) accompanied by the prescribed application fee as per Annexure D.

2) A Volunteer Emergency Medical Service must only pay annual licensing fees per ambulance or response vehicle, as stipulated in Annexure D.

(3) An application submitted in terms of sub-regulation (1)(a) must be an original application delivered by hand, by registered mail or by electronic mail, to the Head of Department.

(4) An applicant may withdraw the application at any time before it has been evaluated by the Committee, in which case the application fee will be refunded to the applicant.

(5) If an applicant withdraws the application after the Committee has considered it, the application fee will be forfeited.

(6) The Head of Department may, on the receipt of an application relating to the relocation of a licensed vehicle from one Province to another, issue a temporary licence valid for a period of six (6) months, except–
(a) where the relocation occurs in the course of an inter-provincial patient transfer;
(b) in the case of the replacement of an existing licensed vehicle; or
(c) when additional vehicles are procured.

(7) A temporary licence-

(a) must be issued within 10 working days of receipt of an application;
(b) may not be renewed; and

(c) must be considered to have expired in the event that an application for a licence is refused or if an application for a licence is withdrawn.

(8) The prescribed annual licensing fee is payable in respect of a temporary licence issued in the event of a licensed vehicle moving from one Province to another.

(9) An application received without proof of payment of the application fee may not be processed until the application fee is paid, but the Head of Department may then pend the application for a period not exceeding 60 working days, after which period, if the application fee has still not been paid, the application may be considered to have been withdrawn.

(10) An applicant submitting an application for the licensing of an Emergency Medical Service must have a station located within the health district in which the applicant intends to operate so as to optimise service delivery and the station must adhere to the minimum norms and standards provided for in Annexure A.

PROCESSING OF APPLICATION

9. (1) On receipt of the application, the Head of Department must, within five (5) working days and by way of registered mail or electronic mail, issue the applicant with an acknowledgement of receipt, indicating there upon the date on which the application was received.

(2) The Head of Department must, within ten (10) working days of receipt of an application, review the application to determine whether it has been properly completed or whether additional information is required.

(3) If the Head of Department is of the opinion that the application form has not been properly completed or that additional information is required, the Head of Department must inform the applicant, in writing, of the incompleteness of the application and request the applicant to properly complete the application form or supply the additional information required within twenty (20) working days.

(4) If an applicant fails to properly complete an application form or to supply the additional information within the period specified in sub-regulation (3), the applicant must be regarded as having withdrawn the application.

(5) If the Head of Department is of the opinion that the application form has been properly completed, he or she must-

(a) refer the application to the Committee to advise and make recommendations on the application; and

(b) concurrently place a notice in a local newspaper and in the *Gazette* to inform the public of the application and invite public comment on the application, providing a period of fifteen (15) working days for such public comment.

(6) The Committee must consider the application and public comments received (if any) within twenty (20) working days and make a recommendation to the Head of Department.

(7) The Head of Department must, within fifteen (15) working days of receipt of recommendations from the Committee, consider the recommendations and make a decision.

(8) The Head of Department may, prior to taking a decision in terms of sub-regulation (7), refer an application back to the Committee for reconsideration of its recommendations, stating in writing, the reasons for referring the application back to the Committee.

(9) If the Head of Department refers the application back for reconsideration, the Committee must make its final recommendation on such an application within twenty (20) working days of the application being referred back to it.

(10) The Head of Department must, within ten (10) working days of receipt of a final recommendation in terms of sub-regulation (9), consider the recommendation.

(11) The Head of Department must, within ten (10) working days of deciding on an application as contemplated by sub-regulation (7) or (10), inform the applicant in writing of the decision and, if the application is refused, give written reasons for the

refusal and also inform the applicant of his or her right to appeal in terms of regulation 21.

(12) If the Head of Department has confirmed the Committee's recommendations that an application be approved, the Head of Department must, within ten (10) working days, instruct an inspecting officer, in writing, to inspect the Emergency Medical Service concerned.

(13) The inspecting officer must carry out an inspection of the Emergency Medical Service and submit a written report, on the findings relating to the inspection, to the Committee within twenty five (25) working days of the instruction by the Head of Department.

(14) (a) An applicant must provide a date for inspection to the Licensing and Inspectorate Authority within one hundred and twenty (120) working days of the date specified by the Head of Department.

(b) If an applicant fails to provide a date for inspection as provided for in paragraph (a), the applicant must be regarded as having withdrawn the application.

(15) If the Head of Department has confirmed the Committee's recommendations that a licence be approved, subject to the Emergency Medical Service being inspected by a duly authorised inspecting officer and the Emergency Medical Service is found to be compliant in terms of these Regulations, the Head of Department must issue a licence for the Emergency Medical Service to be registered in the Register of Emergency Medical Services.

CONSIDERATION OF APPLICATION FOR LICENCE

10. When considering an application for a licence, the Committee must consider the comments and responses received in respect of the application in order to determine whether there is a justifiable need for the proposed Emergency Medical Service and may take into account the following:

(a) The need to ensure consistency of health service planning and development at national, provincial and local levels and the need to promote equitable distribution and rationalisation of health services with a view to correcting inequities based on racial, gender, economic and geographical factors and taking into account-

(i) the demographic and epidemiological characteristics of the population to be served;
(ii) the total and target population in the area;
(iii) the age and gender composition of the population; and
(iv) the morbidity and mortality profiles of the population;

(b) the availability of existing emergency medical services;
(c) the need to promote quality services which are accessible, affordable, cost-effective and safe;
(d) the potential advantages and disadvantages of the application for any affected communities;
(e) the need to advance persons or categories of persons designated in terms of the Employment Equity Act, 1998 (Act No. 55 of 1998), the Broad-Based Black Economic Empowerment Act, 2003 (Act No. 53 of 2003), the Co-operatives Act, 2005 (Act No. 14 of 2005) and the small, medium and micro-enterprise sector, including cooperatives;
(f) the potential benefits of training and research and development with a view to the improvement of health service delivery;
(g) the need to ensure that ownership of Emergency Medical Services does not create perverse incentives for service providers to over service patients or refer them inappropriately;
(h) where applicable, the quality of health services rendered by the applicant in the past; and
(i) where applicable, compliance with reporting requirements as set out in these Regulations in the past.

RECOMMENDATIONS OF COMMITTEE

11. Following an analysis of the application, the Committee may make the following recommendations to the Head of Department:

(a) That the application be approved;
(b) that the application be approved subject to conditions which the Committee considers appropriate, including but not limited to, the nature or extent of services to be provided by the Emergency Medical Service; or
(c) that the application be refused.

DECISION OF HEAD OF DEPARTMENT

12. The Head of Department may make the following decisions:

(a) Confirm the recommendation of the Committee;
(b) confirm the recommendation to approve the application subject to the conditions recommended by the Committee; or
(c) reject the recommendation of the Committee.

ISSUING OF LICENCE AND LICENCE TOKENS

13. (1) When an application for an Emergency Medical Service has been approved, or conditionally approved, subject to the Emergency Medical Service being inspected by a duly authorised inspecting officer and found to be compliant in terms of these Regulations, the Head of Department must–

(a) issue a licence to operate the service concerned; and
(b) issue a licence token for each vehicle to be used by that Emergency Medical Service as an ambulance, medical rescue vehicle or medical response vehicle.

(2) A licence contemplated in sub-regulation (1)(a) must contain the following:

(a) The name of the owner of the Emergency Medical Service;
(b) the name of the Emergency Medical Service;

(c) the geographical location of the station of the Emergency Medical Service within the health district;
(d) the type of service to be rendered by the Emergency Medical Service;
(e) the type and number of vehicles the Emergency Medical Service will operate; and
(f) any other information which the Head of Department may consider necessary.

(3) A licence token contemplated in sub-regulation (1)(b) must contain the following:

(a) The name of the Emergency Medical Service;
(b) the registration number of the vehicle;
(c) the date on which the licence token was issued;
(d) the date on which the licence token expires; and
(e) the type of vehicle.

ANNUAL RENEWAL OF LICENCE AND LICENCE TOKEN

14. (1) The licence and licence tokens of a licensed Emergency Medical Service are valid for a period of twelve (12) months from the date of issue and must be renewed annually, subject to the Emergency Medical Service being inspected by a duly authorised inspecting officer and found to be compliant with these Regulations.

(2) A licensed Emergency Medical Service must timeously apply for the renewal of its licence and related tokens, within twenty (20) working days prior to the expiry of such licence and licence tokens.

(3) The renewal of a licence and related tokens is subject to re-inspection by a duly authorised inspecting officer.

SUSPENSION OR CANCELLATION OF LICENCE

15. (1) If an Emergency Medical Service contravenes or does not comply with these Regulations, the Head of Department must give written notice of the non-compliance to the licence holder.

(2) The notice must state-

(a) the nature and extent of the non-compliance which must be rectified;
(b) that failure to rectify the non-compliance within a period specified in the notice may lead to the cancellation or suspension of the licence; and
(c) that the licence holder is entitled to make written representations to the Head of Department, within a period specified in the notice, regarding the proposed cancellation or suspension of the licence.

(3) If, at the expiry of the period specified in terms of sub-regulation (2)(b), the non-compliance has not been rectified to the satisfaction of the Head of Department, the Head of Department may, having regard to all the relevant facts, including the report of the inspecting officer and any representation by the licence holder, cancel or suspend the licence of the Emergency Medical Service.

(4) If the licence is cancelled or suspended, the Head of Department must, within ten (10) working days, inform the licence holder in writing of-

(a) the decision;
(b) the reasons for the decision; and
(c) the right of appeal.

REINSTATEMENT OF LICENCE AND LIFTING OF SUSPENSION

16. (1) An Emergency Medical Service whose licence has been cancelled or suspended may, at any time, apply for the reinstatement of the licence or the lifting of its suspension.

(2) The provisions of regulation 8 apply, with the changes required by the context, in respect of the application for the reinstatement of a licence.

(3) Before the Head of Department reinstates a licence or lifts its suspension, an inspecting officer must inspect the Emergency Medical Service concerned in order to determine whether the Emergency Medical Service–

(a) complies with Annexures A and B; and

(b) is suitable and adequate for the purpose of providing the service for which it is licensed and make a recommendation to the Head of Department.

(4) The Head of Department may submit the representation for the reinstatement of the licence or the lifting of the suspension to the Committee for further consideration and recommendation.

AMENDMENT OF LICENCE

17. (1) In order to change the level of service provision for which a licence has been issued, a licence holder must apply to the Head of Department to amend the licence accordingly.

(2) The provisions of regulations 8 and 9 apply, with the changes required by the context, in respect of the application for the amendment of a licence.

CHANGE OF OWNERSHIP

18. (1) A licence for an Emergency Medical Service may not be transferred.

(2) If an Emergency Medical Service is sold to a new owner-

(a) the new owner must submit an application in terms of regulation 8;

(b) the new owner may operate on the existing licence for a maximum period of six (6) months or on a new licence or temporary licence if one has been issued in the name of the new owner; and

(c) the Head of Department must effect an inspection within the six (6) months period referred to in paragraph (b).

FEES

19. (1) The fees for an application for a licence, renewal of a licence and inspection in respect of an application for, or renewal of, a licence are as set out in Annexure D.

(2) An applicant may make representations to the respective MEC for a waiver of the applicable fees.

(3) The fee for the renewal of a licence is payable each year on completion of the annual inspection contemplated in regulation 14.

(4) The renewal licence and licence tokens must not be issued until proof of payment of the relevant fee is submitted.

EXEMPTIONS

20. (1) The Head of Department may, at any time and on such conditions and for such period as he or she may determine, but not longer than three months, in writing, grant an organisation or body an exemption from any requirements of these Regulations, provided the exemption would not adversely impact on patient care.

(2) An exemption granted in terms of these Regulations and reasons for granting the exemption must be reflected in the Register of Emergency Medical Services.

APPEAL

21. (1) A person who-

(a) has applied for a licence for an Emergency Medical Service or for the renewal of such licence, and whose application has been refused; or
(b) whose licence has been suspended or cancelled,

may lodge an appeal, in writing, to the MEC within ten (10) working days of being notified of the refusal, suspension or cancellation, and give reasons for the appeal.

(2) The MEC must, within five (5) working days of receipt of an appeal, submit a copy of the appeal to the Head of Department.

(3) The Head of Department must, within ten (10) working days of receipt of a copy of an appeal, submit a response to the appeal to the MEC.

(4) The MEC may appoint up to three (3) independent and suitable persons, who are not employees of the Department or members of the Committee, to advise the MEC on the appeal.

(5) The MEC may uphold or refuse an appeal and may, in the event that the appeal is upheld, replace the decision of the Head of Department and grant the application.

(6) An appeal must be finalised within twenty (20) working days of the date on which the Head of Department submits a response to the MEC in terms of sub-regulation (3).

(5) The MEC must communicate the decision on the appeal to the appellant in writing and, if the appeal is refused, give the reasons for the refusal of the appeal.

(8) (a) If the MEC upholds an appeal, the decision, together with the reasons for the decision, must be communicated to the Head of Department in writing.

(b) On receipt of the decision, the Head of Department must make the necessary entry in the Register of Emergency Medical Services.

PART 4 – INSPECTION OF EMERGENCY MEDICAL SERVICES

INSPECTION FOR NEW APPLICATIONS

22. (1) Upon approval of an application by the Head of Department, the applicant must pay an inspection fee as per Annexure D and provide proof of payment of the inspection fee.

(2) If an applicant fails to provide proof of payment to the Licensing and Inspectorate Authority, the inspection will not be undertaken until the inspection fee is paid.

(3) An inspection in terms of these Regulations is carried out in order to determine whether the Emergency Medical Service–

(a) complies with the minimum criteria for accreditation set out in Annexures A and B; and

(b) is suitable and adequate for the purpose of providing the service for which it is applying or has applied, to be licensed.

(4) Subject to a patient's right to privacy and confidentiality, the owner of an Emergency Medical Service or any other person responsible for the management or control of an Emergency Medical Service or who is in charge of the service, must provide, to an inspecting officer acting in terms of these Regulations-

(a) the information that the inspecting officer may require with regard to the organisation and management of that Emergency Medical Service, including the accommodation, care and treatment of the patients;

(b) registers, clinical records and any other records of patients, staff and vehicles; and

(c) any other information necessary to assess compliance with these Regulations, including compliance with the requirements listed in Annexures A and B.

(5) The inspecting officer may request the submission of any other information related to the application, including but not limited to service performance data.

(6) In the case of an Emergency Medical Service operating multiple stations, the inspecting officer must take into consideration that items such as the registers and clinical registers, including electronic records and registers, may be held at another station or office which may be the primary station or head office of the Emergency Medical Service.

(7) Subject to a patient's right to privacy and confidentiality, and provided that the inspection process does not adversely affect service delivery, a person may not-

(a) in any way, obstruct an inspecting officer from carrying out her or his inspection;

(b) refuse to furnish, to the best of her or his knowledge, information requested by the inspecting officer;

(c) refuse when requested by the inspecting officer, to show any vehicle, apparatus or place; or

(d) refuse, when requested by the inspecting officer, to unlock a cupboard or storage compartment or area.

INSPECTION OF REGISTERED EMERGENCY MEDICAL SERVICES

23. (1) The Head of Department must, at least once in every calendar year in addition to an inspection in terms of regulation 22, inspect or cause to be inspected, by a duly authorised inspecting officer, every Emergency Medical Service registered in terms of these Regulations in order to determine whether the Emergency Medical Service–

(a) complies with Annexures A and B; and

(b) is suitable and adequate for the purpose of providing the service for which it is licensed.

(2) The Head of Department may, whenever it is considered necessary, in writing instruct the Licensing and Inspection Authority to carry out additional inspections in order to determine whether the Emergency Medical Service–

(a) complies with Annexures A and B; and

(b) is suitable and adequate for the purpose of providing the service for which it is licensed.

PART 5 – EMS OPERATIONAL AFFAIRS

DISPLAY OF LICENCE AND LICENCE TOKEN

24. The Emergency Medical Service Manager must ensure that-

(1) the licence referred to in regulation 13(1)(a) is displayed in a conspicuous position at the primary station or head office of the Emergency Medical Service;

(2) the licence token referred to in regulation 13(1)(b) is displayed in a conspicuous position on every vehicle that is licensed.

NAME OF EMERGENCY MEDICAL SERVICE

25. (1) The name of the Emergency Medical Service must–

(a) be approved by the Head of Department;
(b) contain the words Emergency Medical Service as the final three words;
(c) be unique and not be the same or similar to another accredited Emergency Medical Service provider; and
(d) be displayed on all vehicles.

MANAGEMENT OF EMERGENCY MEDICAL SERVICE

26. (1) An Emergency Medical Service must appoint, in a full time capacity, an Emergency Medical Services Manager who is qualified and registered with the Health Professions Council of South Africa, as, at least, an Ambulance Emergency Assistant, to manage the Emergency Medical Service.

(2) A Volunteer Emergency Medical Service must appoint an Emergency Medical Services Manager who is qualified and registered with the Health Professions Council of South Africa, as, at least, an Ambulance Emergency Assistant, to manage the service.

(3) The Emergency Medical Service Manager must-

(a) ensure that the number of patients conveyed in an ambulance does not exceed the maximum number permitted in terms of its design and safety constraint provisions;
(b) ensure that the Emergency Medical Service is operated in a way that provides quality care and does not compromise the safety of the public, patient or personnel;

(c) keep patient records confidential, as required by law and the ethical rules of the Health Professions Council of South Africa;

(d) inform the Head of Department within twenty (20) working days, of any change in the particulars furnished by or on behalf of the licence holder in terms of these Regulations;

(e) ensure that a patient is not refused emergency medical treatment by the Emergency Medical Service because of the patient's inability to pay, or on any other grounds;

(f) ensure that protocols exist for immediate intervention in the event of the exposure of personnel to situations that are hazardous biologically, chemically, psychologically or physically;

(g) maintain a formal set of standard operating procedures that staff members must adhere to;

(h) promote safe driving techniques, as well as awareness of defensive driving techniques;

(i) ensure that every vehicle operated by the Emergency Medical Service is fitted with a satellite tracking device that is capable of live satellite tracking, including current location, speed and route travelled and that is capable of generating historic reports;

(j) ensure that the Emergency Medical Service maintains valid calibration certificates for the relevant equipment in use by the Emergency Medical Service as prescribed in Annexure B;

(k) ensure that every ambulance manufactured on, or after, the implementation date of these Regulations complies with the South African National Standards (SANS) Regulations applicable to a registered vehicle manufacturer;

(l) ensure that every operational and licensed vehicle is in a road worthy condition as per the relevant Road Traffic legislation;

(m) ensure that the Emergency Medical Service maintains copies of each of the following documents for every ambulance manufactured on, or after, the implementation date of these Regulations:

(i) A Manufacturer / Importer / Builder (MIB) Certificate of the manufacturer, importer or builder of the ambulance;

(ii) a Builder's Certificate for each ambulance; and

(iii) an eNaTIS Certificate for each ambulance as issued by the manufacturer of the ambulance;

(n) ensure that scheduled medication is stored and recorded as per the Medicines and Related Substance Act,1965 (Act No. 101 of 1965) and the Pharmacy Act; 1974, (Act No. 53 of 1974);

(o) ensure that all Emergency Care Personnel are registered with the Health Professions Council of South Africa and practise within the Health Professions Council of South Africa's scope of practice and that patients are not over-serviced for financial gain;

(p) ensure and maintain good conduct and high levels of professionalism;

(q) ensure compliance with the provisions relating to emergency driving in the National Road Traffic Act;

(r) ensure that in multiple patient situations, patients are treated and transported according to the triage priority and that there is compliance with the carrying capacity of the ambulance;

(s) retain ultimate responsibility for ensuring ethical behaviour of Emergency Care Personnel;

(t) ensure that there are mechanisms in place for the management of complaints, consultation, clinical governance and quality assurance;

(u) ensure compliance with norms and standards determined by the Office of Health Standards Compliance;

(v) ensure that all indicators for Emergency Medical Services as per the National Indicator Data Set are submitted as stipulated by the Auditor General of South Africa; and

(w) ensure compliance with the Basic Conditions of Employment Act, 1997 (Act No. 75 of 1997) and the applicable provisions of the Public Service Regulations, 2001, as amended.

INFORMATION CONCERNING EMERGENCY MEDICAL SERVICE

27. (1) The Emergency Medical Service Manager must ensure that an individual patient care record is kept for every patient treated or conveyed by the service.

(2) The Emergency Medical Service Manager must ensure that the following information is captured on a monthly basis, is properly secured and is readily

available to inspect at the request of an inspecting officer or the Head of Department:

(a) Response time performance appropriately categorised into the response categories for urban and rural areas;
(b) the names, qualifications, relevant Health Professions Council of South Africa registration details and number of hours worked per month of employees, contractors and volunteers;
(c) a file for each staff member employed by the Emergency Medical Service with the following, as a minimum:
    (i) Copy of the identity document;
    (ii) copy of Driver's Licence and Professional Driver's Permit;
    (iii) copy of employment contract; and
    (iv) company's payroll;
(d) proof of registration of every staff member-
    (i) with the Compensation for Occupational Injuries and Diseases Fund;
    (ii) for Pay As You Earn;
    (iii) for the Skills Development Levy; and
    (iv) with the Unemployment Insurance Fund;
(e) proof of the number of ambulances and response vehicles in the service;
(f) a record of the number and nature of adverse patient incidents;
(g) the monthly staff shift rosters; and
(h) a record of complaints received and the resolutions thereof.

POWERS OF EMERGENCY CARE PERSONNEL

28. Emergency Care Personnel may, whenever they regard it necessary or expedient in order to perform their functions of saving life or preventing bodily harm, perform any act reasonably necessary, in order to enable them to perform their functions, and may also, subject to the applicable law-

(a) close any road or street;
(b) enter or break into any premises;
(c) damage or destroy any property;

(d) cause to be removed from the scene any person who is dangerous, or is in danger, or who obstructs the Emergency Care Personnel in the performance of their duties; and

(e) cause to be removed from the scene any Emergency Care Personnel that refuses appropriate levels of care to a patient that requires higher qualification intervention.

PART 6 – MISCELLANEOUS PROVISIONS

DELEGATIONS

29. The Head of Department may delegate a power or function conferred or imposed upon her or him in terms of these Regulations to an official, except-

(a) the power to decide on an application in terms of these Regulations;
(b) the power to cancel or suspend a licence in terms of regulation 15(3); and
(c) the duty to submit a response to the appeal to the MEC in terms of regulation 21(3).

OFFENCES AND PENALTIES

30. A person who-

a) establishes, operates, extends, manages, controls an Emergency Medical Service, or who changes the ownership of, renames, temporarily or permanently relocates the resources, or alters the services of, an Emergency Medical Service without a licence or without complying with these Regulations;
b) is the responsible person for, or is employed by an Emergency Medical Service and who-
   (i) obstructs or refuses to allow an inspection officer or a person acting on the officer's behalf, access to such Emergency Medical Service for the purpose of an inspection in terms of these Regulations;
   (ii) fails to comply with these Regulations;
   (iii) obstructs or prevents access of Emergency Care Personnel to a patient in a situation requiring emergency care;

(iv) behaves, or allows staff members to behave (in the case of a responsible person), in a manner that may reasonably be considered to be bringing the industry into disrepute;

(v) conducts clinical procedures that are not within the scope of practice of the relevant Emergency Care Personnel as defined by the Health Professions Council of South Africa;

(vi) has knowledge of a situation requiring emergency care and wilfully or negligently withholds relevant information from an Emergency Medical Service;

(d) abuses or summons a service while he or she knows that there is no reason to do so;

(e) displays on, or fits a vehicle not licensed in terms of these Regulations with-

(i) a siren;

(ii) red flashing lights;

(iii) the "star of life" symbol or other symbols, emblems, logos, heraldic devices, marks, words or phrases in a way associated with Emergency Medical Services; or

(iv) the phrases, "Paramedic", "Emergency Medical Services", "Emergency Care Practitioner", "ECP", "Advanced Life Support", "ALS", "Intermediate Life Support ", "ILS", "Emergency Care Technician", "ECT", "Emergency Care Assistant", "ECA", "ambulance", "Emergency Medical Response", "Basic Ambulance Assistant", "BAA", "Basic Life Support", "BLS", medic or a derivative thereof;

(f) displays the word "Paramedic", "Intensive Care Unit", "ICU", or the phrase "Advanced Life Support", "ALS" or "Emergency Care Practitioner", "ECP", medic on a vehicle where such vehicle is not-

(i) staffed by at least one person registered as a medical practitioner, emergency care practitioner or paramedic registered with the Health Professions Council of South Africa;

(ii) equipped to provide an advanced life support service;

(iii) licensed in terms of these Regulations as an ambulance, medical response vehicle or medical rescue vehicle;

(g) impersonates Emergency Care Personnel; or

(h) obstructs Emergency Care Personnel in the performance of their functions in terms of regulation 28.

is guilty of an offence and liable, on conviction to a fine not exceeding R500 000.00 or imprisonment for a period not exceeding five (5) years or both, such fine and imprisonment for a period not exceeding five (5) years.

TRANSITIONAL PROVISIONS

31. (1) An Emergency Medical Service which is operational before the commencement of these Regulations must be allowed to continue to provide services for a maximum period of one (1) year after the commencement of these Regulations.

(2) The Emergency Medical Service referred to in sub-regulation (1) must be licensed in terms of these Regulations before it may continue to operate after the period of one (1) year following the commencement of these Regulations.

(3) Failure to licence an Emergency Medical Service referred to in sub-regulation (1) constitutes an offence as provided for in regulation 30(a).

REPEAL

32. The Emergency Medical Services Regulations, 2015, published in Government Notice No. R413, Government Gazette No. 38775 dated 8 May 2015 are hereby repealed.

SHORT TITLE

33. These Regulations are called the Emergency Medical Services Regulations, 2017.

Annexure A

health
Department:
Health
REPUBLIC OF SOUTH AFRICA

REQUIREMENTS FOR EMERGENCY MEDICAL SERVICES

1) SERVICE LEVELS

a) An Emergency Medical Service will operate in accordance with its licence, and the infrastructure shall be capable of supporting it over the period of its intended operation.

b) Emergency Medical Services must be registered to provide services within the following categories:
   i) Intermediate life support;
   ii) advanced life support;
   iii) aeromedical service;
   iv) event medical service; or
   v) education institution Emergency Medical Service

c) Where such service requires in addition to provide medical rescue services, it shall ensure that it has personnel trained in accordance with courses approved by the Health Professions Council of South Africa, be in possession of the appropriate specialised rescue equipment and vehicles registered as Medical Rescue Vehicles in accordance with the National Road Traffic Act.

d) Event Medical Services and education institution Emergency Medical Services must adhere to the minimum requirements for either Intermediate Life Support or Advanced Life Support or Aeromedical Service and classified as such.

2) GENERAL REQUIREMENTS

a) The service must be supervised by an Emergency Medical Service Manager who is qualified in at least Ambulance Emergency Assistant and registered with the Health Professions Council of South Africa.

b) The service must have a base or station that-
   i) has rest facilities; and
   ii) has permanent, plumbed, clean and hygienic ablution facilities.

c) There must be available, including a service level agreement with appropriate providers for such facilities-
   i) dirty utility facilities with which to clean contaminated equipment and linen; and
   ii) vehicle washing facilities which have the appropriate medical waste traps built in that comply with Local Municipal By-laws.

d) There must be an adequate medical waste management system and the Emergency Medical Service must have documentary proof available of a current agreement with a

registered waste management disposal company or health establishment for the disposal of such medical waste.

e) Medical store room that complies with the requirements for the safe storage of medicines and pressurised vessels as per the relevant legislation.

f) The Emergency Medical Service must be registered in accordance with the appropriate legislation:
   i) In the case of private sector services, the applicant must be registered as a company in terms of the Companies Act, 2008 (Act No. 71 of 2008); and with the Board of Healthcare Funders subsequent to being licensed and prior to commencement of practice;
   ii) In the case of a Volunteer Emergency Medical Service the applicant must be registered as an entity incorporated not-for-profit, as well as a Public Benefit Organisation as per Non-Profit Organisation Act, 1997 and Income Tax Act, 1962 respectively.

g) Proof of liability insurance must be available for the said Emergency Medical Service, the amount of which must be determined by the type and size of service provision.

h) An Emergency Medical Service must operate according to the Ethical and Professional Rules of the Health Professions Council of South Africaand the Ethical Guidelines for good practice in the health care professions. The Responsible Person, Supervising Medical Practitioner and Emergency Service Manager must at all times be in good standing with the Health Professions Council of South Africa.

3) PERSONNEL

a) A minimum of two persons must staff an ambulance or medical rescue vehicle, and a minimum of one person must staff a medical response vehicle.

b) Personnel must be registered with the Health Professions Council of South Africa as determined by the level of service offered and must be as follows:

i) Basic Life Support
(1) Personnel must be registered as a Basic Ambulance Assistant.

ii) Intermediate Life Support
(1) The patient attendant must hold a minimum registration as an Ambulance Emergency Assistant or Emergency Care Assistant, whilst the second crew must hold a minimum registration of Basic Ambulance Assistant.

iii) Advanced Life Support - Ambulance
(1) The patient attendant must hold a registration of Paramedic or Emergency Care Technician or Emergency Care Practitioner whilst the second crew must hold a minimum registration of Basic Ambulance Assistant, though it should preferably be a person holding a minimum registration of Ambulance Emergency Assistant or Emergency Care Assistant.

c) The crew of an ambulance, medical response unit or medical rescue unit must hold an appropriate valid driver's licence and, in the case of a patient carrying vehicle both the

second crew as well as the patient attendant must also be in possession of a valid professional driving permit which must be in the category "Passengers".

d) All personnel must be dressed in appropriate uniform protective clothing, with their first name or initial, surname and registration category clearly depicted on the said clothing.

e) Emergency Care Personnel must at all times, remain in the company of the patient while he or she is in the care of the Emergency Medical Service or until hand over at a health establishment.

f) Emergency Care Personnel must not exceed the maximum working hours as per the regime of shift workers as guided by the Basic Conditions of Employment Act, 1997 and the applicable Public Service Regulations, 2001, as amended.

4) MINIMUM STAFF REQUIREMENTS

a) An Emergency Medical Service must employ the following, minimum number of operational staff members:

i) Advanced Life Support

(1) In a health district where the total population is more than 150 000 persons as described by Statistics South Africa in the most recently published "Census" report, an Emergency Medical Service licensed at Advanced Life Support level shall ensure that a Paramedic or Emergency Care Technician or Emergency Care Practitioner registered with the Health Professions Council of South Africa, is staffing at least one vehicle per operational shift at all times.

(2) In a health district where the total population is less than or equal to 150 000 persons as described by Statistics South Africa in the most recently published "Census" report, an Advanced Life Support service should employ at least one registered Paramedic or Emergency Care Technician or Emergency Care Practitioner.

ii) Intermediate Life Support

(1) An Emergency Medical Service should employ a minimum of one Ambulance Emergency Assistant or Emergency Care Assistant per ambulance licensed to the respective Emergency Medical Service at all times for all ambulances that are intended to be operated at intermediate life support level.

(2) This must be in addition to the Emergency Medical Service Manager.

iii) Medical Response Vehicle

While it is preferred that this vehicle is staffed by two members, it must be staffed with at least one staff member, who must hold a minimum registration of Ambulance Emergency Assistant with the Health Professions Council of South Africa.

iv) Medical Rescue

(1) Both personnel must be registered with the Health Professions Council of South Africa and at least one of the personnel must hold a minimum registration of Ambulance Emergency Assistant.

(2) In addition to this both personnel must hold a minimum qualification of Basic Medical Rescue or equivalent.

v) Aeromedical Service

The senior medical staff member on the air ambulance must be registered in the category of a Paramedicor Emergency Care Technician or Emergency Care Practitioner with the Health Professions Council of South Africa, who must hold valid CAT 138, Aviation Health Care Provider, Advanced Cardiac Life Support, Intermediate Trauma Life Support or Advanced Trauma Life Support and Paediatric Advanced Life Supporter equivalent certificates.

vi) Second Staff Member on an Ambulance

(1) The minimum staffing requirement for the second staff member on an ambulance must be a person registered in at least the category of Basic Ambulance Assistant with the Health Professions Council of South Africa.

vii) Nurses

(1) A nurse may assist a fully staffed ambulance with a minimum of two ambulance crew members that are registered at a minimum level of Basic Ambulance Assistant.

(2) The nurse must not be considered to be one of the two staff members required to staff the ambulance, unless the nurse in question holds dual registration with both the Health Professions Council of South Africa as well as South African Nursing Council (SANC).

viii) Supervising Medical Practitioner

(1) One supervising Medical Practitioner with suitable emergency medical qualifications and experience must be appointed to or contracted by the service in a supervisory clinical capacity for each health district in which it operates.

(2) The supervising Medical Practitioner must be registered with the Health Professions Council of South Africa in terms of the Health Professions Act

(3) The supervising Medical Practitioner must not be contracted to more than three Emergency Medical Services simultaneously.

(4) The supervising Medical Practitioner is regularly consulted by Emergency Care Personnel as and when required.

(5) The Emergency Medical Service must hold a current, written, service level agreement with the supervising medical practitioner that confirms that the supervising medical practitioner is available to assist with clinical governance, medical advice as well as supervision and training, where necessary.

5) VEHICLES

a) All Emergency Medical Service vehicles utilised must comply with the National Road Traffic Act or the relevant vehicle registration and safety legislation, as applicable.

b) Ambulances must–

i) be configured in such a way that the medical personnel have complete access to a patient in order to begin and maintain life support;

ii) be fitted with a two way radio or cellular communication system or a combination thereof which allows for communication at all times with the dispatch centre;

iii) be fitted with red warning lights that must be visible from the front, rear and both sides of the vehicle at all times, and siren in accordance with the relevant vehicle registration and safety legislation;

iv) display the word "Ambulance" on the front and rear of all ambulances and must adhere to the following minimum dimensions: 600mm X 150mm; or large as possible proportionate to make of the vehicle.

v) be configured in such a way that the interior of the patient compartment, excluding the driver's cab section, must be a minimum of-

(1) height 1222mm;
(2) width 1333mm;
(3) length 1900mm;

vi) be configured in such a way that adequate, permanently installed lighting is provided in the patient compartment;

vii) have installed within the ambulance a minimum of a 2 000 watt electrical inverter, capable of providing a 220 volt power supply to the patient treatment compartment of the vehicle;

viii) have an adequate entry that allows for the loading and off-loading of the patient without compromising the condition of the patient;

ix) be configured in such a way that a patient can be carried in the supine position with specialised medical equipment fitted;

x) have an approved restraining device fitted for all patients and emergency care personnel;

xi) have a stretcher restrained with a restraining device, approved by the manufacturer of the stretcher, which shall be permanently fitted to the vehicle and shall restrain both the front and rear of the stretcher;

xii) have a stretcher that is secured in such a way that it allows medical personnel clear view of, and access to, the patient and specialised medical equipment;

xiii) have a stretcher that is fitted in such a way that it does not block the entry or emergency exits of the vehicle;

xiv) have a stretcher that is fitted in such a way that it does not block access to the airway of the patient and in such a way that the performance of advanced airway techniques will not be hindered;

xv) be configured in such a way that medical equipment and medical gas cylinders are secured in brackets that are attached to the body of the vehicle and do not allow any vertical or horizontal movement of the medical equipment or medical gas cylinders within the compartment of the ambulance;

xvi) be configured in such a way that medical equipment and medical gas cylinders are fitted in such a way that they do not obstruct the entry or emergency exits of the vehicle or pose a potential threat to personnel or patients;

xvii) have medical gas cylinders and outlets marked in accordance with SANS Codes of Practice and that have been subjected to visual and hydrostatic inspection by a Department of Labour approved testing facility;

xviii) have an adequate supply of convenient hanging devices that are fitted for intravenous therapy - such must be fitted in such a way as not to inflict injury to patients or medical personnel;

xix) have a patient compartment that is lined with a non-porous material to avoid blood and other body fluids from contaminating the area, and allows for the cleaning of the compartment;

xx) have surfaces and equipment within the ambulance free from the visible appearance of any and all contaminants including but not limited to: dust, dirt, blood, faeces, urine, vomit, human tissue or any other bodily fluid;

xxi) have a patient compartment separated from the driver compartment in such a way that the patient, treatment of the patient, and actions of the patient must in no way interfere with the driving of the vehicle;

xxii) in the case of a vehicle with a gross vehicle mass which exceeds 3 500kg, be fitted with retro-reflective red and retro-reflective yellow chevron strips on the rear of the vehicle, as required by the National Road Traffic Act;

xxiii) in the case of a vehicle with a gross vehicle mass which exceeds 3 500kg, be fitted with yellow, retro-reflective strips to both the sides of the vehicle as well as the rear of the vehicle, in addition to the chevron, which must be fitted no more than 600mm from the lower part of the body of such vehicle, as required by the National Road Traffic Act;

c) The number of emergency medical response vehicles registered to an Emergency Medical Service may not exceed the number of ambulances registered to that Emergency Medical Services unless there is a service level agreement with an accredited Emergency Medical Service. The accreditation requirements of the contracted party will also be reviewed to ensure compliance with these Regulations.

d) The vehicles included on the licence for the Emergency Medical Service must be listed as being owned by the applicant of an Emergency Medical Service and registered in the category "Owner" on the "Certificate of Registration" as per the National Road Traffic Actor other relevant vehicle registration and safety legislation.

e) Volunteer Emergency Medical Service registered as an entity incorporated not-for-profit, as well as a Public Benefit Organisation as per the Non-Profit Organisation Act, 1997 and the Income Tax Act, 1962 respectively, are permitted to register a maximum of three (3) medical response vehicles.

f) Each vehicle operated as an ambulance, medical response vehicle or medical rescue vehicle must be clearly marked, licensed, registered as per the National Road Traffic Actor relevant vehicle registration and safety legislation and in accordance with nationally approved livery.

g) Livery that is not reflective of the functions of an emergency medical service will not be approved.

6) EMERGENCY TELEPHONE NUMBER

a) Every emergency vehicle operated by the emergency medical service must display the emergency telephone number of the respective ambulance service on the rear and both sides of the respective emergency vehicle.

7) LICENCE TOKEN

a) All ambulances, medical response vehicles and medical rescue vehicles operated by the Emergency Medical Services must display a valid licence token in a prominent position on the windscreen of the ambulance where it is easy to view in terms of the National Road Traffic Act.

8) AEROMEDICAL SERVICE

a) In the case of an aero-medical service, the aircraft operator must hold the appropriate G7 licence and CATS/Part 138 accreditation as specified by the Civil Aviation Authority of South Africa.

9) COMMUNICATION SYSTEM

a) All Emergency Medical Services must have an appropriate communication system that allows for easy communication between the station and vehicles.

10) COMPLAINTS MECHANISM

a) All Emergency Medical Services must have an appropriate complaints mechanism that aligns with the National Complaints Management Protocol for the Public Health Sector of South Africa, 2014 the details of which must be made available to Emergency Medical Service users, including by the clearly visible posting of such details in each vehicle and at each Emergency Medical Service station.

11) EQUIPMENT

a) All ambulances, medical response vehicles and medical rescue vehicles must have, as a minimum, the equipment as listed in Annexure B.

APPENDIX H: Regulations relating standards for EMS

DEPARTMENT OF HEALTH

NO. 2819 2 December 2022

NATIONAL HEALTH ACT, 2003 (ACT NO. 61 OF 2003)

REGULATIONS RELATING STANDARDS FOR EMERGENCY MEDICAL SERVICES

The Minister of Health has, under section 90(1)*(m)* of the National Health Act, 2003 (Act No. 61 of 2003), and after consultation with the Office of Health Standards Compliance, to make Regulations in the Schedule.

DR M.J. PHAAHLA, MP
MINISTER OF HEALTH
DATE: 10/08/2022

SCHEDULE

ARRANGEMENT OF REGULATIONS

DEFINITIONS, APPLICATION AND PURPOSE

Definitions

1. In these Regulations any word or expression to which a meaning has been assigned in the Act, has the meaning so assigned, and unless the context otherwise indicates—

"Advanced Life Support (ALS)" means a level of care provided within the Paramedic, Emergency Care Technician or Emergency Care Practitioner scope of practice as determined by the Health Professions Council of South Africa in terms of the Health Professions Act, 1974 (Act No. 56 of 1974);

"Ambulance" means an appropriately equipped vehicle which is either airborne, or land-based and designed or adapted for the purpose of providing emergency care and the transportation of user which is licensed to an EMS registered, staffed and equipped in terms of the EMS Regulations, published in the Government *Gazette* of 1 December 2017;

"Ambulance Emergency Assistant" means a person registered as such with the Health Professions Council of South Africa in terms of the Health Professions Act, 1974;

"Basic Ambulance Assistant" means a person registered as such with the Health Professions Council of South Africa in terms of the Health Professions Act, 1974;

"Basic Life Support (BLS)" means a level of emergency care provided primarily by emergency care providers that practice within the Basic Ambulance Assistant scope of practice as determined by the Health Professions Council of South Africa in terms of the Health Professions Act, 1974;

"Emergency Care" means the evaluation, treatment and care of an ill or injured person in a situation in which such emergency evaluation, treatment and care is required, and the continuation of treatment and care during the transportation of such person to or between health establishments;

"Emergency Care Assistant" means a person registered as such with the Health Professions Council of South Africa in terms of the Health Professions Act, 1974;

"Emergency Care Personnel" means personnel who are registered with the Health Professions Council of South Africa under the auspices of the Professional Board for Emergency Care;

"Emergency Care Practitioner" means a person registered as such with the Health Professions Council of South Africa in terms of the Health Professions Act, 1974;

"Emergency Care Technician" means a person registered as such with the Health Professions Council of South Africa in terms of the Health Professions Act, 1974;

"ECC" means **Emergency Communication Centre** which houses call handlers and dispatch personnel for the EMS;

"EMS" means Emergency Medical Service, an organisation or body that is dedicated, staffed and equipped to operate an ambulance, medical rescue vehicle or medical response vehicle in order to offer emergency care;

"EMS Manager" means a person who is duly appointed as the responsible manager for the EMS and who is registered with the Health Professions Council of South Africa in terms of the Health Professions Act, 1974;

"EMS Station" means a dedicated self-contained facility for the housing of emergency vehicles, personnel and associated emergency equipment;

"EMS Station Manager" means a person who is duly appointed as the responsible manager for the EMS Station and who is registered with the Health Professions Council of South Africa in terms of the Health Professions Act, 1974;

"EMS sub-station" means a small, dedicated self-contained facility for the housing of emergency vehicles, personnel and associated emergency equipment which reports to a main EMS station within the geographic area where the supervisory and administrative functions are held and may be developed into a fully-fledged station;

"Health Professions Act" means Health Professions Act, 1974 (Act No. 56 of 1974);

"Health Professions Council of South Africa" means the body established in terms of section 2 of the Health Professions Act; 1974

"Intermediate Life Support (ILS)" means a level of emergency care provided within the Ambulance Emergency Assistant scope of practice as determined by the Health Professions Council of South Africa in terms of the Health Professions Act, 1974;

"Medical emergency" means conditions requiring rapid intervention to avert death or disability, and those for which treatment delays of hours or less make interventions less effective;

"National Road Traffic Act" means the National Road Traffic Act, 1996 (Act No.93 of 1996);

"Paramedic" means a person registered as such with the Health Professions Council of South Africa in terms of the Health Professions Act, 1974;

"Planned user transport services" means the systematic transportation of non-emergency user from one health facility to another within an established referral system;

"Response time" means the time measured from when an EMS receives an emergency call to the time the first medical responder arrives at the scene;

"Register of EMS" means the publicly available register referred to in Regulation 9(15) of the Emergency Medical Services Regulations, published in the *Government Gazette* of 1 December 2017;

"Satellite point" means a specific location were EMS vehicles are located on an *ad hoc* bases to be on stand by for emergency response during high profile events or during peak seasons to provide timeous emergency response thereby reducing emergency response times;

"Service Licence" means a licence issued to an EMS service in terms of the EMS Regulations, published in the *Government Gazette* of 1 December 2017, which authorises the provision of an EMS;

"the Act" means the National Health Act, 2003 (Act No. 61 of 2003);

"Triage" means to sort user according to medical priority using an evidence-based triage scale; and

"Vehicle Licence" means a licence issued to a vehicle adapted for use as an emergency vehicle in terms of the EMS Regulations, published in the *Government Gazette* of 1 December 2017.

Scope and application

2. These Regulations apply to public and private EMS operating in the Republic of South Africa, excluding the South African National Defence Force to the extent specified in measurement tools derived from these Regulations.

Purpose of Regulations

3. The purpose of these Regulations is to promote and protect the health and safety of user, health care personnel and general public.

CHAPTER 1:
HEALTH CARE USER RIGHTS

Dignity of health care user

4. (1) The EMS must have systems in place to ensure that users are treated with dignity and respect at all times.

(2) The EMS must have organisational policies and practices regarding user's rights that are consistent with sections 10, and 27(1)(a) and (3) of the Constitution of the Republic of South Africa, 1996 and Chapter 2 of the Act.

Information for health care users

5. The EMS must provide users with adequate information about the health care services provided, including information: -

(a) about the service made available to users, including the cost for services; and

(b) relating to the quality of services provided.

Stakeholder satisfaction surveys

6. (1) The EMS must have the mechanisms and systems to enable the stakeholders and users to communicate their experiences of care.

(2) The EMS station or ECC must, implement systems and processes to assess, monitor and improve their stakeholder satisfaction with the services provided annually.

Complaints management

7. (1) The EMS must have a system for monitoring, assessing and responding to complaints.

(2) The EMS must provide users with information about the process of lodging a complaint.

(3) The EMS must record and analyse complaints to improve quality of care provided to the users.

(4) The EMS must have a system to provide feedback to the complainant.

CHAPTER 2
CLINICAL GOVERNANCE AND CLINICAL CARE

Health care users records

8. (1) The station must ensure that accurate and comprehensive records of the health care services provided to users are created and maintained.

(2) The EMS must record accurate biographical information for users.

(3) The accurate and comprehensive records of clinical care provided to users must be documented by the EMS to facilitate continuity of care.

(4) The EMS must ensure that users health records are stored, accessible and can be retrieved when needed.

Clinical management of emergency care

9. (1) The EMS must put in place an efficient call management system to facilitate access to communication systems to facilitate the provision of effective and appropriate emergency care.

(2) The EMS must ensure that contingency plans for communication system failure or malfunction are available and known to personnel and managers.

Dispatch of emergency vehicles

10. (1) An efficient vehicle dispatch system must be in place to ensure user have rapid and safe access to services.

(2) For the purposes of sub-regulation (1), the EMS must -

(a) have a Computer Aided Dispatch (CAD) system that facilitates vehicle allocation, routing and tracking and where an ECC does not have a Computer Aided Dispatch (CAD) system, a paper-based system must facilitate vehicle allocation, direction and tracking;

(b) have a standardised process for dispatching vehicles; and

(c) monitor response times for each stage of the call management and dispatch process.

Response management

11. (1) Emergencies must be responded to in a co-ordinated and efficient manner by the EMS.

(2) For the purposes of sub-regulation (1), the EMS must -

(a) ensure emergency vehicles are appropriately equipped and staffed; and

(b) have systems to ensure that users are treated in accordance with current Health Professions Council of South Africa approved evidence-based guidelines to reduce variations in care and improve user outcomes.

(3) For the purposes of sub-regulation (2) (b)-

(a) health care professionals must have and adhere to evidence-based clinical practice guidelines on stabilising user before and during transportation; and

(b) comply with the standardised method of user handover to a receiving health care provider.

Clinical leadership and clinical risk

12. (1) Systems to support the provision of quality health care services and prevent user safety incidents must be implemented by the EMS.

(2) For the purposes of sub-regulation (1), the EMS station must -

(a) participate in local and regional clinical governance activities; and

(b) have systems in place to ensure that user requiring resuscitation receive an immediate response by emergency care personnel trained in resuscitation.

Interfacility transfers

13. (1) Interfacility transfers must be managed in a manner which promotes user safety.

(2) For the purposes of sub-regulation (1), the EMS must implement -

(a) a standardised process for the arrangement of interfacility transfers, and

(b) a standardised process for the pickup, transfer and drop off of user requiring an interfacility transfer.

Planned user transport services

14. (1) Planned user transport services must be managed in a manner which promotes efficiency.

(2) For the purposes of sub-regulation (1), the EMS must implement a standardised process for the arrangement of planned user transport services.

User safety incidents

15. (1) A system to report and monitor all user safety incidents, as per the current National Guideline for Patient Safety Incident Report and Learning in the Health Sector of South Africa, must be implemented.

(2) For the purposes of sub-regulation (1), the EMS must -

(a) implement a system for recording, investigating and managing user safety incidents to minimise the risk of harm and the risk of recurrence; and

(b) have systems in place to report user safety incidents to the responsible authority.

Infection, prevention and control of infections

16. (1) An infection, prevention and control programme, as per the current National Department of Health's National Infection Prevention and Control Strategic Framework, to minimise the risk of health care associated infections must be implemented.

(2) For the purposes of sub-regulation (1), the EMS must -

(a) ensure infection prevention and control processes are implemented to reduce the risk of transmission of infection, and

(b) ensure personnel receive training on the prescribed infection prevention and control practices.

(3) The decontamination of medical devices and equipment must be provided in a safe and effective manner, as per the current National Department of Health's National Infection Prevention and Control Strategic Framework.

(4) For the purposes of sub-regulation (3), the EMS must -

(a) have systems in place for the decontamination of medical devices and equipment; and

(b) ensure equipment used for decontamination is managed and maintained to ensure sustainability of decontamination services.

(5) Effective environmental cleaning which minimises the risk of disease outbreaks and the transmission of infection to user or EMS personnel must be implemented.

(6) For the purposes of sub-regulation (5), the EMS must -

(a) ensure cleaning agents and equipment are approved by the relevant authority and available for cleaning personnel; and

(b) ensure that the performance of the cleaning service is monitored, and corrective actions are taken where necessary.

Waste management

17. (1) Health care risk waste and general waste must be handled, stored, and disposed of safely in accordance with relevant environmental legislation.

(2) For the purposes of sub-regulation (1), the EMS must -

(a) ensure health care risk waste and general waste is handled, stored and disposed of safely; and

(b) ensure procedures for recording of waste removed for destruction are implemented.

CHAPTER 3
CLINICAL SUPPORT SERVICES

Medicines and medical supplies look at flow

18. (1) Safety protocols in relation to the administration of medicines must be made available to EMS personnel to protect user from medication errors.

(2) For the purposes of sub-regulation (1), the EMS must ensure that medicines are administered safely in accordance with standard operating procedures to minimise the risk of user safety incidents.

(3) Efficient stock management processes to ensure sustainable service delivery and minimisation of waste must be in place.

(4) For the purposes of sub-regulation (3), the EMS must –

(a) ensure stock control and inventory procedures for medicines and medical supplies are implemented and maintained;
(b) ensure medical supplies required for the care of user transported by the EMS are available;
(c) implement controls for the management, recording and disposal of expired medicines and medical supplies;
(d) including expired medicines ensure medicines are stored in accordance with Good Pharmacy Practice and manufacturer's guidelines; and
(e) implement controls for the management, recording and distribution of medicines listed in Schedules 5 and 6 of the Medicines and Related Substances Act, 1965 (Act No.101 of 1965).

Medical equipment management

19. (1) A medical equipment management programme must be implemented.

(2) For the purposes of sub-regulation (1), the EMS must -

(a) ensure medical equipment is available and functional to provide care to user; and

(b) ensure medical equipment is maintained and repaired according to a planned maintenance schedule, developed in accordance with the manufacturer's specifications.

CHAPTER 4
LEADERSHIP AND GOVERNANCE

Oversight and accountability

20. (1) The provincial department must oversee and support the EMS.

(2) For the purposes of sub-regulation (1) -

(a) The EMS are licensed as per the requirements of the Emergency Medical Services Regulations, published in the Government *Gazette* of 1 December 2017 and any other applicable legislation; and

(b) A functional governance structure oversees service delivery to ensure quality services are provided.

CHAPTER 5
OPERATIONAL MANAGEMENT

General management

21. (1) Management of the EMS must ensure the provision of safe, effective and efficient user care.

(2) For the purposes of sub-regulation (1), the EMS must -

(a) ensure the service is managed by an appropriately qualified individual, who is responsible for ensuring the provision of quality services; and

(b) ensure that financial management and supply chain management processes facilitate business continuity and efficient service delivery.

Human resources management

22. (1) Systems must be in place to manage personnel in line with relevant legislation, policies and guidelines.

(2) For the purposes of sub-regulation (1), the EMS must -

(a) ensure copies of the most up to date human resource policies and relevant legislation are available at the EMS;

(b) ensure human resource practices which maximise the efficiency of service delivery and personnel management are implemented;

(c) ensure healthcare professionals maintain their registration with the relevant statutory health professional councils;

(d) implement a performance management system in place for all employees; and

(e) ensure the management of contracted service providers and volunteers maximises the benefit for the service while minimising risk to users and the service.

Occupational Health and Safety

23. (1) Personnel must be protected from workplace hazards by the establishment and implementation of occupational health and safety systems.

(2) For the purposes of sub-regulation (1), the EMS must -

(a) ensure that the health and safety of personnel is protected by implementing the requirements of the Occupational Health and Safety Act, 1993 (Act No.85 of 1993),

(b) implement measures to minimise the incidence of occupationally acquired injuries and diseases;

(c) make available comprehensive wellness services to EMS personnel; and

(d) facilitate claims of compensation for occupational injuries or diseases.

(3) A comprehensive safety programme must be designed and implemented to ensure the safety of vehicle crew members and uninterrupted service delivery to the community.

(4) For the purposes of sub-regulation (3), the must -

(a) ensure that the EMS station collaborates with all relevant stakeholders in the design and implementation of the EMS safety plan;

(b) facilitate a programme of community engagement that builds relationships between EMS personnel and the communities they serve;

(c) ensure EMS personnel participate in activities designed to improve social solidarity in the local community;

(d) ensure all EMS personnel receive training to mitigate the risk of confrontation and violence during user transport episodes;

(e) implement a system for the reporting of safety incidents;

(f) ensure the EMS station or ECC manager utilises the national safety incident reporting database; and

(g) implement a system for the management of safety incidents including outcomes and feedback to ensure quality improvement.

Emergency and disaster preparedness

24. (1) The EMS provider must participate in district emergency and disaster planning processes and the provision of emergency and disaster response.

(2) For the purposes of sub-regulation (1), the EMS must -

(a) attend local emergency and disaster planning meetings; and

(b) implement systems to ensure adequate response during emergencies and disasters.

(3) Systems must be in place to ensure the safety of personnel in the event of fire.

(4) For the purposes of sub-regulation (3), the EMS must have systems in place to respond to fire in the EMS station or ECC.

Fleet management

25. (1) The vehicles used to transport user and personnel must be safe and well maintained.

(2) For the purposes of sub-regulation (1), the EMS must -

(a) ensure all vehicles are licensed and maintained;

(b) ensure all drivers have a valid driver's licence and public transport driving permit;

(c) ensure all EMS vehicles must comply with the National Road Traffic Act, 1996, or the relevant vehicle registration and safety legislation, as applicable; and

(d) implement an effective fleet management system.

CHAPTER 6
FACILITIES AND INFRASTRUCTURE

Management of buildings and grounds

26. (1) The building occupied for service delivery must meet the requirements of the National Building Regulations and Building Standards Act, 1977 (Act No. 103 of 1977) and the national building regulations made thereunder.

(2) For the purposes of sub-regulation (1), the EMS must -

(a) have all the required compliance certificates in terms of the building regulations;

(b) be equipped with the facilities required for service delivery; and

(c) inspect and maintain building premises and grounds in accordance with a maintenance schedule.

Facility management services

27. (1) The facility management services must be functional and enable safe and uninterrupted delivery of EMS.

(2) For the purposes of sub-regulation (1), the EMS must ensure routine and emergency electrical and water supplies are available on a continuous basis.

Security services

28. (1) Security systems must be in place to protect users, personnel and property from security threats and risks.

(2) For the purposes of sub-regulation (1), the EMS must implement a security plan to protect users and personnel.

Linen services

29. (1) Clean linen is provided as required for the type of services delivered.

(2) For the purposes of sub-regulation (1), the EMS must –

(a) monitor the EMS station linen stock; or

(b) manage the service provider effectively where laundry services are outsourced.

(c) ensure the appropriate management of contaminated linen.

GENERAL PROVISIONS

Short title and commencement

30. These Regulations are called the Regulations relating to the Standards for Emergency Medical Services, 2022, and will come into operation 12 months after the date of promulgation.

APPENDIX I: ATLAS.ti report

APPENDIX I: ATLAS.ti Code Book Summary

ATLAS.ti Report

Combined Workshop Interview

Codes

Report created by Lloyd Denzil Christopher on 17 Sep 2023

○ Advanced Life Support (ALS)

Used In Documents:
13 #W4 Free State Workshop.docx 15 #W2 NWP EMS WORKSHOP.docx

○ Aeromedical

Used In Documents:
16 #W5 Northern Cape.docx

○ Amicability

Used In Documents:
9 #P9 Interview_2023-03-24.docx

○ Aparthied Era

Used In Documents:
3 #P3 Interview_2023-04-05 edit.docx 7 #P7 Interview_2023-04-03 edit.docx 9 #P9 Interview_2023-03-24.docx 10 #10 Interview 2023 14 #W1 KZN Workshop Observations.docx

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○ aspirational

Used In Documents:
12 #W3 Gauteng Workshop.docx

○ Assessment and Evaluation

Used In Documents:
8 #P8 Interview_2023-03-23.docx 9 #P9 Interview_2023-03-24.docx

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○ Assessment and Evaluation: Risk assessment

Used In Documents:
9 #P9 Interview_2023-03-24.docx

○ Assessment and Evaluation: Time-consuming

Used In Documents:
8 #P8 Interview_2023-03-23.docx

○ **Bantustan Homelands/ Township**

Used In Documents:
3 #P3 Interview_2023-04-05 edit.docx 10 #10 Interview 2023 14 #W1 KZN Workshop Observations.docx

○ **Bed linen management**

Used In Documents:
3 #P3 Interview_2023-04-05 edit.docx 9 #P9 Interview_2023-03-24.docx 11 #11 Interview 2023

○ **Budget constraints**

Used In Documents:
8 #P8 Interview_2023-03-23.docx 13 #W4 Free State Workshop.docx 14 #W1 KZN Workshop Observations.docx 15 #W2 NWP EMS WORKSHOP.docx 16 #W5 Northern Cape.docx 17 #W6 Western Cape Workshop.docx

○ **Bureaucratic process**

Used In Documents:
1 #P1 Interview_2023-03-03.docx 7 #P7 Interview_2023-04-03 edit.docx 8 #P8 Interview_2023-03-23.docx 10 #10 Interview 2023

○ **Bursary**

Used In Documents:
9 #P9 Interview_2023-03-24.docx

○ **CAD (Computer Aided Dispatch) in ECC (Emergency Control Centre)**

Used In Documents:
2 #P2 Interview Quality in EMS _2023-03-09.docx 3 #P3 Interview_2023-04-05 edit.docx 4 #P4 Interview_Edit.docx 6 #P6 Interview _2023-03-28 edit.docx 7 #P7 Interview_2023-04-03 edit.docx 8 #P8 Interview_2023-03-23.docx 9 #P9 Interview_2023-03-24.docx 10 #10 Interview 2023 11 #11 Interview 2023 13 #W4 Free State Workshop.docx 14 #W1 KZN Workshop Observations.docx 15 #W2 NWP EMS WORKSHOP.docx 16 #W5 Northern Cape.docx

○ **Career Development & Work Experience**

Used In Documents:
5 #P5 Interview_2023-03-27 edit.docx 6 #P6 Interview _2023-03-28 edit.docx 7 #P7 Interview_2023-04-03 edit.docx 8 #P8 Interview_2023-03-23.docx 9 #P9 Interview_2023-03-24.docx 11 #11 Interview 2023 14 #W1 KZN Workshop Observations.docx

○ **Career Development & Work Experience: Academic achievement**

Used In Documents:
6 #P6 Interview _2023-03-28 edit.docx 11 #11 Interview 2023

○ **Career Development & Work Experience: Career advancement**

Used In Documents:
8 #P8 Interview_2023-03-23.docx 11 #11 Interview 2023

○ **Career Development & Work Experience: Career development**

Used In Documents:
11 #11 Interview 2023

○ **Career Development & Work Experience: Criticism of work culture**

Used In Documents:
8 #P8 Interview_2023-03-23.docx

○ **Career Development & Work Experience: Critique of government work culture**

Used In Documents:
7 #P7 Interview_2023-04-03 edit.docx

○ **Career Development & Work Experience: Education and training**

Used In Documents:
9 #P9 Interview_2023-03-24.docx 14 #W1 KZN Workshop Observations.docx

○ **Career Development & Work Experience: Induction program**

Used In Documents:
9 #P9 Interview_2023-03-24.docx

○ **Career Development & Work Experience: Job changes**

Used In Documents:
8 #P8 Interview_2023-03-23.docx

○ **Career Development & Work Experience: Job Experience**

Used In Documents:
8 #P8 Interview_2023-03-23.docx

○ **Career Development & Work Experience: Job title**

Used In Documents:
5 #P5 Interview_2023-03-27 edit.docx

○ **Career Development & Work Experience: Job title/position**

Used In Documents:
8 #P8 Interview_2023-03-23.docx

○ **Career Development & Work Experience: Management skills**

Used In Documents:
9 #P9 Interview_2023-03-24.docx

○ **Career Development & Work Experience: Professional experience**

Used In Documents:
9 #P9 Interview_2023-03-24.docx

○ **Career Development & Work Experience: Work ethic**

Used In Documents:
7 #P7 Interview_2023-04-03 edit.docx 8 #P8 Interview_2023-03-23.docx 14 #W1 KZN Workshop Observations.docx

○ **Career Development & Work Experience: Work experience**

Used In Documents:
5 #P5 Interview_2023-03-27 edit.docx

○ **Career Development & Work Experience: Work quality**

Used In Documents:
8 #P8 Interview_2023-03-23.docx

○ **Career Development & Work Experience: Working conditions**

Used In Documents:
8 #P8 Interview_2023-03-23.docx

○ **Case workload**

Used In Documents:
8 #P8 Interview_2023-03-23.docx 9 #P9 Interview_2023-03-24.docx

○ **Central Provincial EMS**

Used In Documents:
2 #P2 Interview Quality in EMS _2023-03-09.docx 7 #P7 Interview_2023-04-03 edit.docx 8 #P8 Interview_2023-03-23.docx 12 #W3 Gauteng Workshop.docx 15 #W2 NWP EMS WORKSHOP.docx

○ **Chain of command**

Used In Documents:
9 #P9 Interview_2023-03-24.docx

○ **Civil Protests**

Used In Documents:
17 #W6 Western Cape Workshop.docx

○ **Clinical Governance**

Used In Documents:
1 #P1 Interview_2023-03-03.docx 2 #P2 Interview Quality in EMS _2023-03-09.docx 3 #P3 Interview_2023-04-05 edit.docx 4 #P4 Interview_Edit.docx 6 #P6 Interview _2023-03-28 edit.docx 11 #11 Interview 2023

○ **Clinical Governance (3)**

Used In Documents:
1 #P1 Interview_2023-03-03.docx 12 #W3 Gauteng Workshop.docx

○ **Collaboration and knowledge sharing**

Used In Documents:
1 #P1 Interview_2023-03-03.docx 3 #P3 Interview_2023-04-05 edit.docx 5 #P5 Interview_2023-03-27 edit.docx 6 #P6 Interview _2023-03-28 edit.docx 7 #P7 Interview_2023-04-03 edit.docx 8 #P8 Interview_2023-03-23.docx 9 #P9 Interview_2023-03-24.docx 10 #10 Interview 2023 11 #11 Interview 2023 15 #W2 NWP EMS WORKSHOP.docx 17 #W6 Western Cape Workshop.docx

○ **Collaboration and knowledge sharing: Agreement to help/cooperate**

Used In Documents:
3 #P3 Interview_2023-04-05 edit.docx 5 #P5 Interview_2023-03-27 edit.docx 6 #P6 Interview _2023-03-28 edit.docx 7 #P7 Interview_2023-04-03 edit.docx 9 #P9 Interview_2023-03-24.docx 10 #10 Interview 2023 11 #11 Interview 2023 15 #W2 NWP EMS WORKSHOP.docx 17 #W6 Western Cape Workshop.docx

○ **Collaboration and knowledge sharing: Community engagement**

Used In Documents:
7 #P7 Interview_2023-04-03 edit.docx 8 #P8 Interview_2023-03-23.docx 9 #P9 Interview_2023-03-24.docx 17 #W6 Western Cape Workshop.docx

○ **Collaboration and knowledge sharing: Consultation**

Used In Documents:
1 #P1 Interview_2023-03-03.docx 5 #P5 Interview_2023-03-27 edit.docx 8 #P8 Interview_2023-03-23.docx

○ **Collaboration and knowledge sharing: Expertise**

Used In Documents:
8 #P8 Interview_2023-03-23.docx

○ **Collaboration and knowledge sharing: Sharing best practices**

Used In Documents:
11 #11 Interview 2023

○ **Collaboration and knowledge sharing: Technical terminology**

Used In Documents:
5 #P5 Interview_2023-03-27 edit.docx

○ **Collaboration between provinces**

Used In Documents:
12 #W3 Gauteng Workshop.docx 15 #W2 NWP EMS WORKSHOP.docx

○ **Communication**

Used In Documents:
8 #P8 Interview_2023-03-23.docx 17 #W6 Western Cape Workshop.docx

○ **Complaints**

Used In Documents:
3 #P3 Interview_2023-04-05 edit.docx 5 #P5 Interview_2023-03-27 edit.docx 6 #P6 Interview _2023-03-28 edit.docx 7 #P7 Interview_2023-04-03 edit.docx 8 #P8 Interview_2023-03-23.docx 9 #P9 Interview_2023-03-24.docx 11 #11 Interview 2023

○ **Compliance**

Used In Documents:
5 #P5 Interview_2023-03-27 edit.docx

○ **compliance checklist**

Used In Documents:
6 #P6 Interview _2023-03-28 edit.docx

○ **Conflict resolution**

Used In Documents:
8 #P8 Interview_2023-03-23.docx

○ **Conflict resolution (2)**

Used In Documents:
14 #W1 KZN Workshop Observations.docx

○ **Consequences of poor management**

Used In Documents:
1 #P1 Interview_2023-03-03.docx 2 #P2 Interview Quality in EMS _2023-03-09.docx 3 #P3 Interview_2023-04-05 edit.docx 4 #P4 Interview_Edit.docx 8 #P8 Interview_2023-03-23.docx 14 #W1 KZN Workshop Observations.docx

○ **Contingency resource in emergencies**

Used In Documents:
9 #P9 Interview_2023-03-24.docx

○ **Continuing Professional Development**

Used In Documents:
3 #P3 Interview_2023-04-05 edit.docx

○ **Continuous improvement**

Used In Documents:
5 #P5 Interview_2023-03-27 edit.docx

○ **Corruption**

Used In Documents:
2 #P2 Interview Quality in EMS _2023-03-09.docx 4 #P4 Interview_Edit.docx 7 #P7 Interview_2023-04-03 edit.docx 8 #P8 Interview_2023-03-23.docx 14 #W1 KZN Workshop Observations.docx 15 #W2 NWP EMS WORKSHOP.docx

○ **Crew support each other**

Used In Documents:
9 #P9 Interview_2023-03-24.docx

○ **Data Accuracy**

Used In Documents:
2 #P2 Interview Quality in EMS _2023-03-09.docx 8 #P8 Interview_2023-03-23.docx 11 #11 Interview 2023

○ **Dedication**

Used In Documents:
8 #P8 Interview_2023-03-23.docx

○ **District size**

Used In Documents:
8 #P8 Interview_2023-03-23.docx

○ **Doctor as Ambulance Chief**

Used In Documents:
2 #P2 Interview Quality in EMS _2023-03-09.docx 8 #P8 Interview_2023-03-23.docx 9 #P9 Interview_2023-03-24.docx

○ **Documenting**

Used In Documents:
8 #P8 Interview_2023-03-23.docx 9 #P9 Interview_2023-03-24.docx

○ **ECP/ECT Manager**

Used In Documents:
1 #P1 Interview_2023-03-03.docx 2 #P2 Interview Quality in EMS _2023-03-09.docx 4 #P4 Interview_Edit.docx 10 #10 Interview 2023

○ **Efficiency**

Used In Documents:
8 #P8 Interview_2023-03-23.docx

○ **Emergency response procedures**

Used In Documents:
6 #P6 Interview _2023-03-28 edit.docx 12 #W3 Gauteng Workshop.docx 13 #W4 Free State Workshop.docx 14 #W1 KZN Workshop Observations.docx

○ **Emotions and attitudes**

○ **Emotions and attitudes (2)**

Used In Documents:
14 #W1 KZN Workshop Observations.docx

○ **Employ Right people**

Used In Documents:
3 #P3 Interview_2023-04-05 edit.docx

○ **EMS challenges are unique**

Used In Documents:
3 #P3 Interview_2023-04-05 edit.docx 4 #P4 Interview_Edit.docx 5 #P5 Interview_2023-03-27 edit.docx 6 #P6 Interview _2023-03-28 edit.docx 8 #P8 Interview_2023-03-23.docx 9 #P9 Interview_2023-03-24.docx 10 #10 Interview 2023

○ **EMS Experience**

Used In Documents:
1 #P1 Interview_2023-03-03.docx 2 #P2 Interview Quality in EMS _2023-03-09.docx 3 #P3 Interview_2023-04-05 edit.docx 4 #P4 Interview_Edit.docx 9 #P9 Interview_2023-03-24.docx 11 #11 Interview 2023

○ **EMS MANAGER**

Used In Documents:
1 #P1 Interview_2023-03-03.docx 2 #P2 Interview Quality in EMS _2023-03-09.docx 3 #P3 Interview_2023-04-05 edit.docx 4 #P4 Interview_Edit.docx 5 #P5 Interview_2023-03-27 edit.docx 6 #P6 Interview _2023-03-28 edit.docx 7 #P7 Interview_2023-04-03 edit.docx 8 #P8 Interview_2023-03-23.docx 9 #P9 Interview_2023-03-24.docx 10 #10 Interview 2023 11 #11 Interview 2023 14 #W1 KZN Workshop Observations.docx 15 #W2 NWP EMS WORKSHOP.docx

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○ **EMS MANAGER: Acting positions**

Used In Documents:
2 #P2 Interview Quality in EMS _2023-03-09.docx 4 #P4 Interview_Edit.docx 8 #P8 Interview_2023-03-23.docx 11 #11 Interview 2023 14 #W1 KZN Workshop Observations.docx 15 #W2 NWP EMS WORKSHOP.docx

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○ **EMS MANAGER: Amb Emergency Asst (AEA) Manager**

Used In Documents:
1 #P1 Interview_2023-03-03.docx 2 #P2 Interview Quality in EMS _2023-03-09.docx 4 #P4 Interview_Edit.docx 5 #P5 Interview_2023-03-27 edit.docx 7 #P7 Interview_2023-04-03 edit.docx 11 #11 Interview 2023 14 #W1 KZN Workshop Observations.docx

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○ **EMS MANAGER: Staff Management**

Used In Documents:
2 #P2 Interview Quality in EMS _2023-03-09.docx 3 #P3 Interview_2023-04-05 edit.docx 4 #P4 Interview_Edit.docx 5 #P5 Interview_2023-03-27 edit.docx 6 #P6 Interview _2023-03-28 edit.docx 7 #P7 Interview_2023-04-03 edit.docx 8 #P8 Interview_2023-03-23.docx 9 #P9 Interview_2023-03-24.docx 10 #10 Interview 2023 11 #11 Interview 2023

○ **EMS Regulations**

Used In Documents:
1 #P1 Interview_2023-03-03.docx 2 #P2 Interview Quality in EMS _2023-03-09.docx 3 #P3 Interview_2023-04-05 edit.docx 4 #P4 Interview_Edit.docx 6 #P6 Interview _2023-03-28 edit.docx 7 #P7 Interview_2023-04-03 edit.docx 8 #P8 Interview_2023-03-23.docx 9 #P9 Interview_2023-03-24.docx 10 #10 Interview 2023 11 #11 Interview 2023 12 #W3 Gauteng Workshop.docx 14 #W1 KZN Workshop Observations.docx 16 #W5 Northern Cape.docx

○ **EMS split in DHS**

Used In Documents:
1 #P1 Interview_2023-03-03.docx 2 #P2 Interview Quality in EMS _2023-03-09.docx 4 #P4 Interview_Edit.docx 6 #P6 Interview _2023-03-28 edit.docx 7 #P7 Interview_2023-04-03 edit.docx 8 #P8 Interview_2023-03-23.docx 10 #10 Interview 2023 12 #W3 Gauteng Workshop.docx 14 #W1 KZN Workshop Observations.docx 15 #W2 NWP EMS WORKSHOP.docx

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○ **EMS stations**

Used In Documents:
12 #W3 Gauteng Workshop.docx 15 #W2 NWP EMS WORKSHOP.docx 16 #W5 Northern Cape.docx

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○ **EMS treated unfairly**

Used In Documents:
4 #P4 Interview_Edit.docx 5 #P5 Interview_2023-03-27 edit.docx 14 #W1 KZN Workshop Observations.docx 15 #W2 NWP EMS WORKSHOP.docx

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○ **Equipment maintenance/servicing**

Used In Documents:
7 #P7 Interview_2023-04-03 edit.docx

○ **Excess staff management**

Used In Documents:
14 #W1 KZN Workshop Observations.docx

○ **External accountability**

Used In Documents:
6 #P6 Interview _2023-03-28 edit.docx 9 #P9 Interview_2023-03-24.docx

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○ **Financial implication**

Used In Documents:
1 #P1 Interview_2023-03-03.docx 2 #P2 Interview Quality in EMS _2023-03-09.docx 3 #P3 Interview_2023-04-05 edit.docx 4 #P4 Interview_Edit.docx 6 #P6 Interview _2023-03-28 edit.docx 7 #P7 Interview_2023-04-03 edit.docx 8 #P8 Interview_2023-03-23.docx 10 #10 Interview 2023 11 #11 Interview 2023 13 #W4 Free State Workshop.docx 14 #W1 KZN Workshop Observations.docx

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○ **Fleet Management**

Used In Documents:
2 #P2 Interview Quality in EMS _2023-03-09.docx 4 #P4 Interview_Edit.docx 8 #P8 Interview_2023-03-23.docx 10 #10 Interview 2023 11 #11 Interview 2023 13 #W4 Free State Workshop.docx 14 #W1 KZN Workshop Observations.docx 15 #W2 NWP EMS WORKSHOP.docx 16 #W5 Northern Cape.docx 17 #W6 Western Cape Workshop.docx

○ **Focus on quality**

Used In Documents:
6 #P6 Interview _2023-03-28 edit.docx 7 #P7 Interview_2023-04-03 edit.docx 9 #P9 Interview_2023-03-24.docx

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○ **Formal education**

Used In Documents:
1 #P1 Interview_2023-03-03.docx

○ **Formal education (2)**

Used In Documents:
14 #W1 KZN Workshop Observations.docx

○ **Frustration**

Used In Documents:
7 #P7 Interview_2023-04-03 edit.docx 8 #P8 Interview_2023-03-23.docx

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○ **Geographic location levels**

Used In Documents:
3 #P3 Interview_2023-04-05 edit.docx

○ **Goal-oriented**

Used In Documents:
5 #P5 Interview_2023-03-27 edit.docx

○ **Healthcare management and quality assurance**

Used In Documents:
1 #P1 Interview_2023-03-03.docx 3 #P3 Interview_2023-04-05 edit.docx 5 #P5 Interview_2023-03-27 edit.docx 6 #P6 Interview _2023-03-28 edit.docx 7 #P7 Interview_2023-04-03 edit.docx 8 #P8 Interview_2023-03-23.docx

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○ **Healthcare management and quality assurance: Department of Health**

Used In Documents:
5 #P5 Interview_2023-03-27 edit.docx

○ **Healthcare management and quality assurance: EMS management**

Used In Documents:
6 #P6 Interview _2023-03-28 edit.docx

○ **Healthcare management and quality assurance: Healthcare**

Used In Documents:
5 #P5 Interview_2023-03-27 edit.docx

○ **Healthcare management and quality assurance: Healthcare administration**

Used In Documents:
8 #P8 Interview_2023-03-23.docx

○ **Healthcare management and quality assurance: Healthcare quality standards**

Used In Documents:
1 #P1 Interview_2023-03-03.docx 5 #P5 Interview_2023-03-27 edit.docx

○ **Healthcare management and quality assurance: Medical training**

Used In Documents:
7 #P7 Interview_2023-04-03 edit.docx

○ **Healthcare management and quality assurance: Quality improvement**

Used In Documents:
5 #P5 Interview_2023-03-27 edit.docx 7 #P7 Interview_2023-04-03 edit.docx

○ **Healthcare management and quality assurance: Quality Improvement (QI) Plans**

Used In Documents:
5 #P5 Interview_2023-03-27 edit.docx

○ **Healthcare management and quality assurance: Quality management**

Used In Documents:
1 #P1 Interview_2023-03-03.docx

○ **Healthcare management and quality assurance: Quality of care**

Used In Documents:
3 #P3 Interview_2023-04-05 edit.docx

○ **Healthcare management training**

Used In Documents:
6 #P6 Interview _2023-03-28 edit.docx 9 #P9 Interview_2023-03-24.docx

○ **Healthcare quality standards**

Used In Documents:
14 #W1 KZN Workshop Observations.docx

○ **Healthcare system**

Used In Documents:
3 #P3 Interview_2023-04-05 edit.docx 5 #P5 Interview_2023-03-27 edit.docx 8 #P8 Interview_2023-03-23.docx 9 #P9 Interview_2023-03-24.docx 10 #10 Interview 2023

○ **healthcare system knowledge**

Used In Documents:
11 #11 Interview 2023

○ **Historical context**

Used In Documents:
8 #P8 Interview_2023-03-23.docx 14 #W1 KZN Workshop Observations.docx

○ **Historical Negative Practices**

Used In Documents:
1 #P1 Interview_2023-03-03.docx 3 #P3 Interview_2023-04-05 edit.docx 4 #P4 Interview_Edit.docx

○ **Historical Positive Practices**

Used In Documents:
2 #P2 Interview Quality in EMS _2023-03-09.docx 3 #P3 Interview_2023-04-05 edit.docx 4 #P4 Interview_Edit.docx 7 #P7 Interview_2023-04-03 edit.docx

○ **Historical practices**

Used In Documents:
3 #P3 Interview_2023-04-05 edit.docx 8 #P8 Interview_2023-03-23.docx 9 #P9 Interview_2023-03-24.docx

○ **HR Issues in EMS**

Used In Documents:
2 #P2 Interview Quality in EMS _2023-03-09.docx 3 #P3 Interview_2023-04-05 edit.docx 4 #P4 Interview_Edit.docx 8 #P8 Interview_2023-03-23.docx 9 #P9 Interview_2023-03-24.docx 12 #W3 Gauteng Workshop.docx 13 #W4 Free State Workshop.docx 14 #W1 KZN Workshop Observations.docx 15 #W2 NWP EMS WORKSHOP.docx 16 #W5 Northern Cape.docx 17 #W6 Western Cape Workshop.docx

○ **Ideal EMS Tool**

Used In Documents:
12 #W3 Gauteng Workshop.docx 14 #W1 KZN Workshop Observations.docx

○ **Imported comment**

Used In Documents:
1 #P1 Interview_2023-03-03.docx 12 #W3 Gauteng Workshop.docx

○ **Improvement**

Used In Documents:
8 #P8 Interview_2023-03-23.docx

○ **Indifference**

Used In Documents:
1 #P1 Interview_2023-03-03.docx

○ **Inefficiency**

Used In Documents:
14 #W1 KZN Workshop Observations.docx

○ **Infrastructure**

Used In Documents:
2 #P2 Interview Quality in EMS _2023-03-09.docx 3 #P3 Interview_2023-04-05 edit.docx 4 #P4 Interview_Edit.docx 6 #P6 Interview _2023-03-28 edit.docx 7 #P7 Interview_2023-04-03 edit.docx 8 #P8 Interview_2023-03-23.docx 9 #P9 Interview_2023-03-24.docx 11 #11 Interview 2023 16 #W5 Northern Cape.docx

○ **Infrastructure Standards**

Used In Documents:
15 #W2 NWP EMS WORKSHOP.docx

○ **Infrastructure challenges**

Used In Documents:
3 #P3 Interview_2023-04-05 edit.docx 5 #P5 Interview_2023-03-27 edit.docx 7 #P7 Interview_2023-04-03 edit.docx 8 #P8 Interview_2023-03-23.docx 9 #P9 Interview_2023-03-24.docx 12 #W3 Gauteng Workshop.docx 13 #W4 Free State Workshop.docx 14 #W1 KZN Workshop Observations.docx 15 #W2 NWP EMS WORKSHOP.docx 16 #W5 Northern Cape.docx

○ **Infrastructure challenges: Bureaucracy**

Used In Documents:
7 #P7 Interview_2023-04-03 edit.docx 8 #P8 Interview_2023-03-23.docx

○ **Infrastructure challenges: Compliance with regulations**

Used In Documents:
8 #P8 Interview_2023-03-23.docx

○ **Infrastructure challenges: Everyday life**

Used In Documents:
8 #P8 Interview_2023-03-23.docx

○ **Infrastructure challenges: Facilities**

Used In Documents:
8 #P8 Interview_2023-03-23.docx

○ **Infrastructure challenges: Financial Challenges**

Used In Documents:
8 #P8 Interview_2023-03-23.docx

○ **Infrastructure challenges: Financial constraints**

Used In Documents:
8 #P8 Interview_2023-03-23.docx

○ **Infrastructure challenges: Government policy**

Used In Documents:
5 #P5 Interview_2023-03-27 edit.docx

○ **Infrastructure challenges: Infrastructure challenge**

Used In Documents:
8 #P8 Interview_2023-03-23.docx 12 #W3 Gauteng Workshop.docx 13 #W4 Free State Workshop.docx 14 #W1 KZN Workshop Observations.docx 15 #W2 NWP EMS WORKSHOP.docx 16 #W5 Northern Cape.docx

○ **Infrastructure challenges: Legal issues**

Used In Documents:
3 #P3 Interview_2023-04-05 edit.docx

○ **Infrastructure challenges: Logistical challenges**

Used In Documents:
8 #P8 Interview_2023-03-23.docx

○ **Infrastructure challenges: National Core Standards**

Used In Documents:
5 #P5 Interview_2023-03-27 edit.docx

○ **Infrastructure challenges: Partnerships**

Used In Documents:
5 #P5 Interview_2023-03-27 edit.docx

○ **Infrastructure challenges: Political factors**

Used In Documents:
9 #P9 Interview_2023-03-24.docx

○ **Infrastructure challenges: Regulations**

Used In Documents:
5 #P5 Interview_2023-03-27 edit.docx 7 #P7 Interview_2023-04-03 edit.docx

○ **Infrastructure challenges: Restricted autonomy**

Used In Documents:
8 #P8 Interview_2023-03-23.docx

○ **Infrastructure challenges: Technology issues**

Used In Documents:
8 #P8 Interview_2023-03-23.docx

○ **Infrastructure Compliance with regulations**

Used In Documents:
15 #W2 NWP EMS WORKSHOP.docx

○ **Infrastructure Facilities**

Used In Documents:
14 #W1 KZN Workshop Observations.docx 15 #W2 NWP EMS WORKSHOP.docx

○ **Infrastructure Financial constraints**

Used In Documents:
14 #W1 KZN Workshop Observations.docx 15 #W2 NWP EMS WORKSHOP.docx

○ **Infrastructure Partnerships**

Used In Documents:
13 #W4 Free State Workshop.docx 14 #W1 KZN Workshop Observations.docx 15 #W2 NWP EMS WORKSHOP.docx

○ **Initiative**

Used In Documents:
4 #P4 Interview_Edit.docx 7 #P7 Interview_2023-04-03 edit.docx 8 #P8 Interview_2023-03-23.docx

○ **innovative solution**

Used In Documents:
6 #P6 Interview _2023-03-28 edit.docx 13 #W4 Free State Workshop.docx 17 #W6 Western Cape Workshop.docx

○ **Interfacility Transfer (IFT)**

○ **Internship for ECP**

Used In Documents:
4 #P4 Interview_Edit.docx

○ **Knowledge Hub**

Used In Documents:
3 #P3 Interview_2023-04-05 edit.docx

○ **Lack of management support**

Used In Documents:
8 #P8 Interview_2023-03-23.docx 14 #W1 KZN Workshop Observations.docx

○ **Lack of resources**

Used In Documents:
8 #P8 Interview_2023-03-23.docx 13 #W4 Free State Workshop.docx 14 #W1 KZN Workshop Observations.docx 17 #W6 Western Cape Workshop.docx

○ **Lack Professionalism**

Used In Documents:
2 #P2 Interview Quality in EMS _2023-03-09.docx 3 #P3 Interview_2023-04-05 edit.docx 6 #P6 Interview _2023-03-28 edit.docx 8 #P8 Interview_2023-03-23.docx 10 #10 Interview 2023 14 #W1 KZN Workshop Observations.docx

○ **Leadership**

Used In Documents:
8 #P8 Interview_2023-03-23.docx

○ **Leadership abilities**

Used In Documents:
1 #P1 Interview_2023-03-03.docx 4 #P4 Interview_Edit.docx 7 #P7 Interview_2023-04-03 edit.docx 10 #10 Interview 2023 11 #11 Interview 2023

○ **Limit to consultation**

Used In Documents:
1 #P1 Interview_2023-03-03.docx 5 #P5 Interview_2023-03-27 edit.docx

○ **Limited education and training opportunities**

Used In Documents:
9 #P9 Interview_2023-03-24.docx

○ **Maintenance**

Used In Documents:
2 #P2 Interview Quality in EMS _2023-03-09.docx 8 #P8 Interview_2023-03-23.docx 15 #W2 NWP EMS WORKSHOP.docx

○ **Management**

Used In Documents:
5 #P5 Interview_2023-03-27 edit.docx 8 #P8 Interview_2023-03-23.docx 11 #11 Interview 2023 17 #W6 Western Cape Workshop.docx

○ **Management (2)**

Used In Documents:
14 #W1 KZN Workshop Observations.docx 15 #W2 NWP EMS WORKSHOP.docx

○ **Management (2): Decision making**

Used In Documents:
14 #W1 KZN Workshop Observations.docx 15 #W2 NWP EMS WORKSHOP.docx

○ **Management methods**

Used In Documents:
7 #P7 Interview_2023-04-03 edit.docx 8 #P8 Interview_2023-03-23.docx 11 #11 Interview 2023

○ **Management processes**

Used In Documents:
1 #P1 Interview_2023-03-03.docx 2 #P2 Interview Quality in EMS _2023-03-09.docx 3 #P3 Interview_2023-04-05 edit.docx 4 #P4 Interview_Edit.docx 8 #P8 Interview_2023-03-23.docx 9 #P9 Interview_2023-03-24.docx 11 #11 Interview 2023

○ **Management qualification**

Used In Documents:
6 #P6 Interview _2023-03-28 edit.docx

○ **Management responsibilities**

Used In Documents:
4 #P4 Interview_Edit.docx

○ **Management structure incomplete**

Used In Documents:
6 #P6 Interview _2023-03-28 edit.docx

○ **Management support**

Used In Documents:
2 #P2 Interview Quality in EMS _2023-03-09.docx 4 #P4 Interview_Edit.docx 10 #10 Interview 2023 11 #11 Interview 2023

○ **Management: Capacity building**

Used In Documents:
5 #P5 Interview_2023-03-27 edit.docx

○ **Management: Decision making**

Used In Documents:
8 #P8 Interview_2023-03-23.docx

○ **Management: Future planning**

Used In Documents:
11 #11 Interview 2023 17 #W6 Western Cape Workshop.docx

○ **Management: Operational challenges**

Used In Documents:
8 #P8 Interview_2023-03-23.docx

○ **Management: Organizational policy**

Used In Documents:
8 #P8 Interview_2023-03-23.docx

○ **Management: Organizational structure**

Used In Documents:
5 #P5 Interview_2023-03-27 edit.docx 8 #P8 Interview_2023-03-23.docx

○ **Management: Process management**

Used In Documents:
5 #P5 Interview_2023-03-27 edit.docx

○ **Management: Task delegation**

Used In Documents:
8 #P8 Interview_2023-03-23.docx

○ **Manager intervention**

Used In Documents:
8 #P8 Interview_2023-03-23.docx 14 #W1 KZN Workshop Observations.docx

○ **Manager training**

Used In Documents:
1 #P1 Interview_2023-03-03.docx 2 #P2 Interview Quality in EMS _2023-03-09.docx 3 #P3 Interview_2023-04-05 edit.docx 4 #P4 Interview_Edit.docx 7 #P7 Interview_2023-04-03 edit.docx 9 #P9 Interview_2023-03-24.docx 10 #10 Interview 2023 11 #11 Interview 2023 14 #W1 KZN Workshop Observations.docx

○ **Manager's Medical Qualification**

Used In Documents:
1 #P1 Interview_2023-03-03.docx 4 #P4 Interview_Edit.docx 10 #10 Interview 2023

○ **Managers role in QI**

Used In Documents:
6 #P6 Interview _2023-03-28 edit.docx

○ **Medical equipment (2)**

Used In Documents:
7 #P7 Interview_2023-04-03 edit.docx 8 #P8 Interview_2023-03-23.docx 14 #W1 KZN Workshop Observations.docx 17 #W6 Western Cape Workshop.docx

○ **Medical treatment**

Used In Documents:
8 #P8 Interview_2023-03-23.docx

○ **MedicoLegal implications**

Used In Documents:
3 #P3 Interview_2023-04-05 edit.docx

○ **Mentor experience**

Used In Documents:
8 #P8 Interview_2023-03-23.docx 11 #11 Interview 2023

○ **Mistrust**

Used In Documents:
8 #P8 Interview_2023-03-23.docx

○ **Moral and ethical values**

Used In Documents:
7 #P7 Interview_2023-04-03 edit.docx

○ **National Plan**

Used In Documents:
15 #W2 NWP EMS WORKSHOP.docx

○ **Need for change**

Used In Documents:
8 #P8 Interview_2023-03-23.docx

○ **Need for change (2)**

Used In Documents:
14 #W1 KZN Workshop Observations.docx

○ **Negative example**

Used In Documents:
3 #P3 Interview_2023-04-05 edit.docx 4 #P4 Interview_Edit.docx 7 #P7 Interview_2023-04-03 edit.docx 10 #10 Interview 2023 11 #11 Interview 2023

○ **NGO funded management development**

Used In Documents:
9 #P9 Interview_2023-03-24.docx 11 #11 Interview 2023 17 #W6 Western Cape Workshop.docx

○ **No consequences for poor performance**

Used In Documents:
1 #P1 Interview_2023-03-03.docx 3 #P3 Interview_2023-04-05 edit.docx 10 #10 Interview 2023

○ **No support from exec management**

Used In Documents:
8 #P8 Interview_2023-03-23.docx 10 #10 Interview 2023

○ **Non compliance**

Used In Documents:
3 #P3 Interview_2023-04-05 edit.docx 6 #P6 Interview _2023-03-28 edit.docx

○ **NQIP/OHSC**

Used In Documents:
3 #P3 Interview_2023-04-05 edit.docx 5 #P5 Interview_2023-03-27 edit.docx

○ **Obedient Staff**

Used In Documents:
3 #P3 Interview_2023-04-05 edit.docx

○ **Obstetric ambulances**

Used In Documents:
13 #W4 Free State Workshop.docx 16 #W5 Northern Cape.docx

○ **Officer Rank**

Used In Documents:
3 #P3 Interview_2023-04-05 edit.docx 8 #P8 Interview_2023-03-23.docx

○ **OHCA**

Used In Documents:
9 #P9 Interview_2023-03-24.docx

○ **OHS complaince**

Used In Documents:
8 #P8 Interview_2023-03-23.docx 11 #11 Interview 2023

○ **OHSC and DOH Collaboration**

Used In Documents:
5 #P5 Interview_2023-03-27 edit.docx 6 #P6 Interview _2023-03-28 edit.docx 7 #P7 Interview_2023-04-03 edit.docx

○ **Optimization**

Used In Documents:
4 #P4 Interview_Edit.docx

○ **Organizational Challenges**

Used In Documents:
1 #P1 Interview_2023-03-03.docx 4 #P4 Interview_Edit.docx 5 #P5 Interview_2023-03-27 edit.docx 6 #P6 Interview _2023-03-28 edit.docx 8 #P8 Interview_2023-03-23.docx 14 #W1 KZN Workshop Observations.docx 17 #W6 Western Cape Workshop.docx

○ **Organizational Challenges: Government inefficiencies**

Used In Documents:
6 #P6 Interview _2023-03-28 edit.docx

○ **Organizational Challenges: Inadequate training**

Used In Documents:
4 #P4 Interview_Edit.docx

○ **Organizational Challenges: Ineffectiveness**

Used In Documents:
6 #P6 Interview _2023-03-28 edit.docx

○ **Organizational Challenges: Inefficiency**

Used In Documents:
1 #P1 Interview_2023-03-03.docx 8 #P8 Interview_2023-03-23.docx

○ **Organizational Challenges: Inefficient staff**

Used In Documents:
8 #P8 Interview_2023-03-23.docx

○ **Organizational Challenges: Lack of discipline**

Used In Documents:
8 #P8 Interview_2023-03-23.docx

○ **Organizational Challenges: Lack of management support**

Used In Documents:
8 #P8 Interview_2023-03-23.docx

○ **Organizational Challenges: Lack of oversight**

Used In Documents:
8 #P8 Interview_2023-03-23.docx

○ **Organizational Challenges: Lack of structure**

Used In Documents:
1 #P1 Interview_2023-03-03.docx

○ **Organizational Challenges: Lack of succession planning**

Used In Documents:
8 #P8 Interview_2023-03-23.docx 17 #W6 Western Cape Workshop.docx

○ **Organizational Challenges: Logistics problems**

Used In Documents:
8 #P8 Interview_2023-03-23.docx

○ **Organizational Challenges: Non-existent environment**

Used In Documents:
1 #P1 Interview_2023-03-03.docx

○ **Organizational Challenges: Poor documentation**

Used In Documents:
8 #P8 Interview_2023-03-23.docx

○ **Organizational Challenges: Unclear language**

Used In Documents:
5 #P5 Interview_2023-03-27 edit.docx

○ **Organizational Challenges: Understaffing**

Used In Documents:
8 #P8 Interview_2023-03-23.docx 14 #W1 KZN Workshop Observations.docx

○ **Organizational factors**

Used In Documents:
4 #P4 Interview_Edit.docx 5 #P5 Interview_2023-03-27 edit.docx 7 #P7 Interview_2023-04-03 edit.docx 8 #P8 Interview_2023-03-23.docx 9 #P9 Interview_2023-03-24.docx

○ **Organizational factors: Control**

Used In Documents:
8 #P8 Interview_2023-03-23.docx

○ **Organizational factors: Delay**

Used In Documents:
7 #P7 Interview_2023-04-03 edit.docx

○ **Organizational factors: Education**

Used In Documents:
5 #P5 Interview_2023-03-27 edit.docx

○ **Organizational factors: Experience**

Used In Documents:
8 #P8 Interview_2023-03-23.docx

○ **Organizational factors: Government**

Used In Documents:
5 #P5 Interview_2023-03-27 edit.docx

○ **Organizational factors: Hierarchy**

Used In Documents:
8 #P8 Interview_2023-03-23.docx

○ **Organizational factors: Implementation**

Used In Documents:
5 #P5 Interview_2023-03-27 edit.docx

○ **Organizational factors: Management**

Used In Documents:
5 #P5 Interview_2023-03-27 edit.docx 8 #P8 Interview_2023-03-23.docx 9 #P9 Interview_2023-03-24.docx

○ **Organizational factors: Organization**

Used In Documents:
8 #P8 Interview_2023-03-23.docx

○ **Organizational factors: Policy**

Used In Documents:
5 #P5 Interview_2023-03-27 edit.docx

○ **Organizational factors: Progress**

Used In Documents:
4 #P4 Interview_Edit.docx

○ **Organizational factors: Reporting**

Used In Documents:
8 #P8 Interview_2023-03-23.docx

○ **Organizational factors: Support**

Used In Documents:
4 #P4 Interview_Edit.docx

○ **OSD (Occupation Specific Dispensation)**

Used In Documents:
12 #W3 Gauteng Workshop.docx 13 #W4 Free State Workshop.docx 14 #W1 KZN Workshop Observations.docx

○ **Overtime Abuse**

Used In Documents:
13 #W4 Free State Workshop.docx 14 #W1 KZN Workshop Observations.docx

○ **Paradigm shift**

Used In Documents:
7 #P7 Interview_2023-04-03 edit.docx

○ **Paramedic skills**

Used In Documents:
9 #P9 Interview_2023-03-24.docx

○ **Paramilitary discipline**

Used In Documents:
3 #P3 Interview_2023-04-05 edit.docx

○ **Patient Centred service**

Used In Documents:
3 #P3 Interview_2023-04-05 edit.docx

○ **Patient handover**

Used In Documents:
4 #P4 Interview_Edit.docx 13 #W4 Free State Workshop.docx 14 #W1 KZN Workshop Observations.docx

○ **Patient Report Forms (PRF)**

Used In Documents:
3 #P3 Interview_2023-04-05 edit.docx 4 #P4 Interview_Edit.docx 6 #P6 Interview _2023-03-28 edit.docx 7 #P7 Interview_2023-04-03 edit.docx 8 #P8 Interview_2023-03-23.docx 9 #P9 Interview_2023-03-24.docx 11 #11 Interview 2023

○ **Patient Rights**

Used In Documents:
2 #P2 Interview Quality in EMS _2023-03-09.docx 9 #P9 Interview_2023-03-24.docx 11 #11 Interview 2023

○ **Performance Agreements**

Used In Documents:
3 #P3 Interview_2023-04-05 edit.docx 9 #P9 Interview_2023-03-24.docx

○ **Performance review**

Used In Documents:
9 #P9 Interview_2023-03-24.docx

○ **Perseverance**

Used In Documents:
7 #P7 Interview_2023-04-03 edit.docx 9 #P9 Interview_2023-03-24.docx

○ **Planning**

Used In Documents:
5 #P5 Interview_2023-03-27 edit.docx

○ **Pockets of excellence**

Used In Documents:
1 #P1 Interview_2023-03-03.docx 3 #P3 Interview_2023-04-05 edit.docx 4 #P4 Interview_Edit.docx 11 #11 Interview 2023

○ **Political Interference**

Used In Documents:
1 #P1 Interview_2023-03-03.docx 2 #P2 Interview Quality in EMS _2023-03-09.docx 3 #P3 Interview_2023-04-05 edit.docx 6 #P6 Interview _2023-03-28 edit.docx 7 #P7 Interview_2023-04-03 edit.docx 8 #P8 Interview_2023-03-23.docx 9 #P9 Interview_2023-03-24.docx 10 #10 Interview 2023 11 #11 Interview 2023 12 #W3 Gauteng Workshop.docx 13 #W4 Free State Workshop.docx 14 #W1 KZN Workshop Observations.docx

○ **Poor communication**

Used In Documents:
6 #P6 Interview _2023-03-28 edit.docx 16 #W5 Northern Cape.docx

○ **Poor Discipline**

Used In Documents:
2 #P2 Interview Quality in EMS _2023-03-09.docx 3 #P3 Interview_2023-04-05 edit.docx 8 #P8 Interview_2023-03-23.docx 9 #P9 Interview_2023-03-24.docx 10 #10 Interview 2023 14 #W1 KZN Workshop Observations.docx

○ **Poor Staff Communication**

Used In Documents:
14 #W1 KZN Workshop Observations.docx

○ **Poorly trained EMS staff**

Used In Documents:
14 #W1 KZN Workshop Observations.docx

○ **Poorly trained staff**

Used In Documents:
11 #11 Interview 2023

○ **Positive example**

Used In Documents:
3 #P3 Interview_2023-04-05 edit.docx 4 #P4 Interview_Edit.docx 7 #P7 Interview_2023-04-03 edit.docx 8 #P8 Interview_2023-03-23.docx 9 #P9 Interview_2023-03-24.docx 10 #10 Interview 2023 16 #W5 Northern Cape.docx 17 #W6 Western Cape Workshop.docx

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○ **PPT (Planned Patient Transport)**

Used In Documents:
2 #P2 Interview Quality in EMS _2023-03-09.docx 7 #P7 Interview_2023-04-03 edit.docx 10 #10 Interview 2023 11 #11 Interview 2023 12 #W3 Gauteng Workshop.docx 13 #W4 Free State Workshop.docx 14 #W1 KZN Workshop Observations.docx 15 #W2 NWP EMS WORKSHOP.docx 16 #W5 Northern Cape.docx 17 #W6 Western Cape Workshop.docx

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○ **Private EMS**

Used In Documents:
1 #P1 Interview_2023-03-03.docx 3 #P3 Interview_2023-04-05 edit.docx 7 #P7 Interview_2023-04-03 edit.docx 10 #10 Interview 2023 11 #11 Interview 2023 12 #W3 Gauteng Workshop.docx 14 #W1 KZN Workshop Observations.docx 15 #W2 NWP EMS WORKSHOP.docx 17 #W6 Western Cape Workshop.docx

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○ **Problem-solving**

Used In Documents:
8 #P8 Interview_2023-03-23.docx

○ **Public concern about EMS**

Used In Documents:
9 #P9 Interview_2023-03-24.docx

○ **Public Service EMS**

Used In Documents:
4 #P4 Interview_Edit.docx

○ **Quality**

Used In Documents:
1 #P1 Interview_2023-03-03.docx 2 #P2 Interview Quality in EMS _2023-03-09.docx 3 #P3 Interview_2023-04-05 edit.docx 4 #P4 Interview_Edit.docx 5 #P5 Interview_2023-03-27 edit.docx 6 #P6 Interview _2023-03-28 edit.docx 7 #P7 Interview_2023-04-03 edit.docx 8 #P8 Interview_2023-03-23.docx 9 #P9 Interview_2023-03-24.docx 10 #10 Interview 2023 11 #11 Interview 2023

○ **Quality Focus**

Used In Documents:
1 #P1 Interview_2023-03-03.docx 2 #P2 Interview Quality in EMS _2023-03-09.docx 3 #P3 Interview_2023-04-05 edit.docx 6 #P6 Interview _2023-03-28 edit.docx

○ **Quality Improvement (QI) Plans**

Used In Documents:
14 #W1 KZN Workshop Observations.docx

○ **Quality Improvement Training**

Used In Documents:
1 #P1 Interview_2023-03-03.docx 2 #P2 Interview Quality in EMS _2023-03-09.docx 3 #P3 Interview_2023-04-05 edit.docx 4 #P4 Interview_Edit.docx 5 #P5 Interview_2023-03-27 edit.docx 6 #P6 Interview _2023-03-28 edit.docx 14 #W1 KZN Workshop Observations.docx

○ **Quick wins**

Used In Documents:
7 #P7 Interview_2023-04-03 edit.docx

○ **Regional geography**

Used In Documents:
8 #P8 Interview_2023-03-23.docx

○ **Require supervision**

Used In Documents:
8 #P8 Interview_2023-03-23.docx

○ **Rescue Service**

Used In Documents:
9 #P9 Interview_2023-03-24.docx 13 #W4 Free State Workshop.docx 14 #W1 KZN Workshop Observations.docx 15 #W2 NWP EMS WORKSHOP.docx

○ **Research**

Used In Documents:
6 #P6 Interview _2023-03-28 edit.docx

○ **Resistance to change**

Used In Documents:
11 #11 Interview 2023

○ **Resource management**

Used In Documents:
1 #P1 Interview_2023-03-03.docx 4 #P4 Interview_Edit.docx 5 #P5 Interview_2023-03-27 edit.docx 6 #P6 Interview _2023-03-28 edit.docx 7 #P7 Interview_2023-04-03 edit.docx 8 #P8 Interview_2023-03-23.docx 9 #P9 Interview_2023-03-24.docx 10 #10 Interview 2023 17 #W6 Western Cape Workshop.docx

○ **Resource management (2)**

Used In Documents:
13 #W4 Free State Workshop.docx 14 #W1 KZN Workshop Observations.docx 15 #W2 NWP EMS WORKSHOP.docx

○ **Response Times**

Used In Documents:
2 #P2 Interview Quality in EMS _2023-03-09.docx 3 #P3 Interview_2023-04-05 edit.docx 9 #P9 Interview_2023-03-24.docx 10 #10 Interview 2023 13 #W4 Free State Workshop.docx 14 #W1 KZN Workshop Observations.docx 16 #W5 Northern Cape.docx 17 #W6 Western Cape Workshop.docx

○ **Rural provinces/districts**

Used In Documents:
2 #P2 Interview Quality in EMS _2023-03-09.docx 3 #P3 Interview_2023-04-05 edit.docx 4 #P4 Interview_Edit.docx 7 #P7 Interview_2023-04-03 edit.docx 8 #P8 Interview_2023-03-23.docx 9 #P9 Interview_2023-03-24.docx 10 #10 Interview 2023 11 #11 Interview 2023 13 #W4 Free State Workshop.docx 14 #W1 KZN Workshop Observations.docx 15 #W2 NWP EMS WORKSHOP.docx 16 #W5 Northern Cape.docx 17 #W6 Western Cape Workshop.docx

○ **Safety**

Used In Documents:
3 #P3 Interview_2023-04-05 edit.docx 6 #P6 Interview _2023-03-28 edit.docx 8 #P8 Interview_2023-03-23.docx 9 #P9 Interview_2023-03-24.docx 11 #11 Interview 2023 14 #W1 KZN Workshop Observations.docx

○ **Sense of pride**

Used In Documents:
7 #P7 Interview_2023-04-03 edit.docx

○ **Sharing best practices**

Used In Documents:
15 #W2 NWP EMS WORKSHOP.docx

○ **Skill migration of paramedics**

Used In Documents:
1 #P1 Interview_2023-03-03.docx 4 #P4 Interview_Edit.docx 16 #W5 Northern Cape.docx

○ **SMS system**

Used In Documents:
13 #W4 Free State Workshop.docx

○ **SOPs**

Used In Documents:
3 #P3 Interview_2023-04-05 edit.docx 6 #P6 Interview _2023-03-28 edit.docx 8 #P8 Interview_2023-03-23.docx 9 #P9 Interview_2023-03-24.docx 17 #W6 Western Cape Workshop.docx

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○ **Staff qualification mix**

Used In Documents:
14 #W1 KZN Workshop Observations.docx 15 #W2 NWP EMS WORKSHOP.docx

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○ **Strategic approach to implementation**

Used In Documents:
7 #P7 Interview_2023-04-03 edit.docx

○ **Strategic approach to implementation (2)**

Used In Documents:
14 #W1 KZN Workshop Observations.docx

○ **Supply chain management**

Used In Documents:
8 #P8 Interview_2023-03-23.docx 12 #W3 Gauteng Workshop.docx 13 #W4 Free State Workshop.docx 17 #W6 Western Cape Workshop.docx

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○ **Support**

Used In Documents:
1 #P1 Interview_2023-03-03.docx 2 #P2 Interview Quality in EMS _2023-03-09.docx 3 #P3 Interview_2023-04-05 edit.docx 4 #P4 Interview_Edit.docx 5 #P5 Interview_2023-03-27 edit.docx 6 #P6 Interview _2023-03-28 edit.docx 10 #10 Interview 2023 11 #11 Interview 2023

○ **Survival mode**

Used In Documents:
8 #P8 Interview_2023-03-23.docx

○ **Taxi service**

Used In Documents:
11 #11 Interview 2023 16 #W5 Northern Cape.docx

○ **Teamwork**

Used In Documents:
8 #P8 Interview_2023-03-23.docx

○ Technology

Used In Documents:
8 #P8 Interview_2023-03-23.docx 17 #W6 Western Cape Workshop.docx

○ Trade Union Influence

Used In Documents:
10 #10 Interview 2023 18 #W7 Eastern Cape Workshop.docx

○ Training

Used In Documents:
2 #P2 Interview Quality in EMS _2023-03-09.docx 3 #P3 Interview_2023-04-05 edit.docx 4 #P4 Interview_Edit.docx 5 #P5 Interview_2023-03-27 edit.docx 6 #P6 Interview _2023-03-28 edit.docx 7 #P7 Interview_2023-04-03 edit.docx 8 #P8 Interview_2023-03-23.docx 9 #P9 Interview_2023-03-24.docx 10 #10 Interview 2023 11 #11 Interview 2023 17 #W6 Western Cape Workshop.docx

○ Transformation post 1994

Used In Documents:
1 #P1 Interview_2023-03-03.docx 3 #P3 Interview_2023-04-05 edit.docx

○ Trouble shooting problems

Used In Documents:
11 #11 Interview 2023

○ User pickup points

Used In Documents:
3 #P3 Interview_2023-04-05 edit.docx

○ Vehicle Tracking

Used In Documents:
8 #P8 Interview_2023-03-23.docx 13 #W4 Free State Workshop.docx 14 #W1 KZN Workshop Observations.docx 16 #W5 Northern Cape.docx 17 #W6 Western Cape Workshop.docx

○ Vision

Used In Documents:
10 #10 Interview 2023

○ Waste management

Used In Documents:
2 #P2 Interview Quality in EMS _2023-03-09.docx 7 #P7 Interview_2023-04-03 edit.docx 11 #11 Interview 2023

○ **Way forward**

Used In Documents:
1 #P1 Interview_2023-03-03.docx 3 #P3 Interview_2023-04-05 edit.docx 4 #P4 Interview_Edit.docx 6 #P6 Interview _2023-03-28 edit.docx 7 #P7 Interview_2023-04-03 edit.docx 10 #10 Interview 2023 11 #11 Interview 2023

○ **Well balanced**

Used In Documents:
7 #P7 Interview_2023-04-03 edit.docx

○ **Western Cape**

Used In Documents:
2 #P2 Interview Quality in EMS _2023-03-09.docx 3 #P3 Interview_2023-04-05 edit.docx 5 #P5 Interview_2023-03-27 edit.docx 6 #P6 Interview _2023-03-28 edit.docx 7 #P7 Interview_2023-04-03 edit.docx 9 #P9 Interview_2023-03-24.docx 10 #10 Interview 2023 11 #11 Interview 2023 14 #W1 KZN Workshop Observations.docx

○ **White Manager**

Used In Documents:
3 #P3 Interview_2023-04-05 edit.docx 9 #P9 Interview_2023-03-24.docx

○ **Work environment**

Used In Documents:
7 #P7 Interview_2023-04-03 edit.docx

○ **Work family**

Used In Documents:
7 #P7 Interview_2023-04-03 edit.docx

○ **Work independently**

Used In Documents:
8 #P8 Interview_2023-03-23.docx

○ **Workplace ethics**

APPENDIX J: TAPR article

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QUALITY IMPROVEMENT IN EMERGENCY MEDICAL SERVICES: SHARED EXPERIENCES OF SOUTH AFRICA WITH PRE-WAR UKRAINE

In the Republic of South Africa (RSA) healthcare quality including Emergency Medical Services (EMS) is impaired by scarce resources and variable governance and management. The National Health Quality Improvement Plan (NHQIP) seeks to transform health care quality through standards setting.

In RSA EMS managers monitor and adjust quality to comply with the Regulations Relating to Standards for EMS. EMS management training is deficient, and it is unknown how prepared they are to meet quality standards.

Object of research: How can the knowledge, attitude, and practice (KAP) of EMS managers be transformed to comply with the standards regulations for EMS.

A mixed methods explanatory sequential design was conducted in two phases. Phase one consisted of a KAP quantitative survey (n=352). Phase two included the non-participant observations (N-PO) at country-wide management workshops (n=7 provinces) and interviews (n=11) with key informants/power brokers. The data was analyzed to develop themes to deepen the understanding of the survey data.

Fragmentation of EMS into districts; ineffective workforce management; poor fleet management; poorly trained dispatchers, underutilization of information communication technology and vehicle tracking are factors that compromises the access, safety and contribute to ineffective and inefficient EMS. The World Health Organization (2020) report on EMS in Ukraine identified similar challenges.

EMS quality challenges in RSA are not unique, and sharing common challenges, experiences and solutions may benefit EMS organizations in other developing countries such as Ukraine.

Keywords: *emergency medical services (EMS), EMS management, quality improvement, standards setting, South Africa, Ukraine.*

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1. Introduction

The quality of healthcare is a global concern as the ideal that underpins universal health coverage, together with equity and health justice. Healthcare quality is undermined unless quality improvement becomes central to the health and social agenda of governments across the world [1]. It is important to gauge the quality of Emergency Medical Services (EMS) as this component of the health system is a key entry point for patients needing urgent care [2, 3]. At the Seventy-second World Health Assembly, member states, including the Republic of South Africa (RSA), agreed that a functional emergency care system saves lives, increases the impact, reduces costs and is essential for universal health coverage [4].

The WHO recognizes the six dimensions of quality healthcare services as being: safety, timeliness effectiveness, efficiency, equity, and patient-centred [5, 6]. Provision of high-quality health care in South Africa is impacted primarily by the 2020 COVID-19 pandemic, the quadruple burden of disease, the racial, spatial and urban-rural inequalities, high unemployment, crime, poor management, a lack of ethical leadership and accountability [7]. Improving the quality of health care is central to the proposed health care reforms in South Africa [8]. This article will present the findings of the RSA EMS study in quality which will be discussed in relation to the quantitative and qualitative analysis of Ukraine's Emergency Medical Services 2020 report from Luhansk and Donetsk Oblasts (administrative regions).

Authors of paper [9] suggest that in LMICs, EMS is viewed as the transportation wing of the healthcare system and there is little focus on the quality of pre-hospital care delivered to patients. An effective emergency medical system should have as its primary purpose to provide emergency care to all who need it regardless of circumstances that may render the patient vulnerable [9]. However, even with the best resources, delivering effective and safe emergency

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care is a challenge as the prehospital environment is uncontrolled and unpredictable. There is no direct clinical oversight or supervision and access to patient history and information is often limited [10]. Although no study has specifically investigated the consequences of pre-hospital medical errors [11], emergency care is prone to clinical error given the unpredictable nature of the pre-hospital environment and that those cognitive errors do compromise patient safety and the provision of effective emergency care. Authors of paper [12] suggest that quality improvement measures can reduce diagnostic error in clinical practice.

As part of the literature review, the authors reviewed the WHO report entitled: Emergency Medical Services (EMS) in Ukraine, Current Capacities and Opportunities for Future Development [5] that aimed to improve the overall quality of EMS in Ukraine. A study of the report revealed that EMS in RSA and Ukraine faced similar challenges. Developing a quality improvement framework for EMS in RSA and Ukraine as an Upper-Middle-Income-Country (UMIC) and Low-to-Middle-Income Country (LMIC) respectively, that share common challenges and experiences will likely improve the quality of EMS.

The EMS in Ukraine was based on the German-Franco model, common in Europe, in which ambulances were staffed by physicians [13]. Reforms by the Ministry of Healthcare of Ukraine in 2017/18 aimed to improve emergency medical care by introducing the western-based EMS system with Emergency Medical Technicians and Paramedic qualifications, a central dispatch system and standardized evidence-based guidelines [14]. The unprovoked Russian invasion of Ukraine has led to Ukraine's healthcare system being overburdened in the eastern region of the country as healthcare staff fled the war-torn region to seek safety while the burden on the health system increased as a result of war casualties [15].

Russia's onslaught has seen thousands of civilians and soldiers killed and injured. Many hospitals and other health facilities have been destroyed by Russian missile attacks and seemingly indiscriminate shelling. The medical neutrality that the Geneva convention is meant to safeguard, has been violated adding to physical and mental trauma [16]. There is no sign of the end of war and the immediate priority of the health system is preservation of life and alleviation of suffering for millions of Ukraine's citizens. When the conflict does eventually abate, Ukraine will require international assistance to reconstruct the damage done to the health system. The EMS will likely play a pivotal role in facilitating access to the health system. The quality of a post-war EMS must be championed to pre-war conditions or better.

The task of the present study was to critique the public EMS managers' knowledge, attitude, and practices in RSA so as to strengthen the response to the national quality standards for EMS. The task is supported by research undertaken by authors of paper [3], which reported the poor knowledge of organizational specific quality systems and concluded that there was a need for a standardized quality system for EMS in South Africa. Similarly, the SA Lancet Commission stressed that mismanagement contributed to the poor-quality health care and suggested that health management training will help develop quality improvement measures aimed at addressing health care quality [7].

The aim of the study was to potentiate eligibility and compliance with the Department of Health quality standards for EMS. This study intended to recontextualize the quality improvement discourse through strengthening the public service EMS manager's response to the quality standards for EMS. In this paper we propose transferability to a post-war Ukraine.

2. Materials and Methods

A mixed method, convergent research design was applied as it involves the logic inquiry of induction, deduction, and abduction to answer the research questions. The methodological overview in Table 1 describes how both quantitative and qualitative data was collected, analyzed and integrated so as to get a deeper understanding of the research problem [17]. The methods were deliberately integrated in the discussion to draw on the strengths of each.

The mixed methods research approach is presented, followed by a discussion on the research methods for phase one and two, and the study population and sampling strategy methodology. The quantitative and qualitative data collection methods are discussed with an analysis that considers recontextualization for post-trauma contexts such as apartheid and ongoing interpersonal violence in RSA and the Russian invasion of Ukraine.

The quantitative data analysis was done using R® statistical software [18]. The qualitative findings were analyzed using ATLAS.ti® (Ver 23.1.1).

Table 1

Methodological overview

Study Tasks	Research Questions	Population	Methods	Analysis
Facilitate a quality self-audit of EMS Managers	What are the knowledge, attitudes and practices of EMS Managers that are quality champions, in the public EMS organizations in relation to Quality Improvement?	Public EMS managers from jurisdictional ambulance services in South Africa	Survey/Questionnaire	Statistical Analysis using R® statistical software
	What are the factors that motivate and foster Quality Improvement amongst EMS Managers within EMS organizations?			
Document the EMS Manager perspectives	How do EMS Managers perceive, interpret, and understand the OHSC quality standards for EMS?	EMS Workshop Participants	Non-Participant Observation	Qualitative Analysis using ATLAS Ti®
Document the EMS key stakeholder perspectives		Key EMS Stakeholders (knowledge brokers)	Interviews	
Develop Framework for change	What are the benefits and impediments to implementing Quality Improvement in EMS	Transferable beneficence from RSA to Ukraine and other conflict-ridden contexts	Literature Review and evidence appraisal	Guided by Theory, Trauma-informed

Ethical considerations and site approval. Site approval was granted by the South African National Department of Health for access to all nine provinces of South Africa. The research was conducted with due consideration to the Declaration of Helsinki and abided by all the rules and regulations of the Department of Health of South Africa. All primary data was from voluntary and informed consent. Institutional Ethical Approval was granted by the Cape Peninsula University of Technology, reference no.: 2021_FBMSREC 078.

3. Results and Discussion

3.1. Findings

The survey results of EMS managers from all jurisdictional ambulances in the country are presented in relation to User Rights; Clinical Support Services; Leadership and Governance; and Operational Management. Respondents could select the level of agreement from a 5-point Likert scale: Strongly Disagree, Disagree, Neutral, Agree, Strongly Agree.

3.1.1. User rights. User Rights refers to the rights of the patient. Given SA's history of human rights abuses, these rights are non-negotiable in the Batho Pele (meaning people first) principles and the Patient Rights Charter. The user has the right to access care, in a manner that is respectful of the user's dignity and in an environment that is safe. In Fig. 1 the EMS managers rated themselves, their workplace and organization highly in response to the questions under the User Rights domain. When assessing the average response to all four survey questions in this domain, 41.75 % (n=146) of the managers selected the Agree or Strongly Agree option on the five-point Likert scale.

3.1.2. Clinical Support Services. Clinical support is necessary to reduce medical errors, minimize waste and ensure medical equipment is managed effectively. In Fig. 2, on average 50.1 % selected either Agree or Strongly Agree to the three survey questions related to having safety protocols in relation to administration of medicines; efficient stock management processes; and an effective equipment management programme.

3.1.3. Leadership and governance. Leadership and governance are critical to the success of any human resource strategy. In Fig. 3, the response to the survey statement «Where I work, the Provincial Department of Health or parent company oversees and supports the EMS», 47 % (n=164) selected Agree and 9 % (n=23) said Strongly Agree. The response to the statement «My place of work has a functional governance structure in place», 44 % (n=153) said they Agree and 7 % (n=18) Strongly Agree.

3.1.4. Operational management. Operational management includes effective fleet management, human resources systems, disaster planning processes and response, occupational health and safety systems and a comprehensive safety programme. In Fig. 4, the response to the survey statement: «The vehicles used to transport patients are safe and well maintained», 49 % (n=172) choose Agree and 16 % (n=56) choose Strongly Agree, 20 % (n=70) were Neutral, 10 % (n=34) choose Disagree and 5 % (n=18) Strongly Disagree. The response to having a comprehensive safety programme that ensures the safety of the vehicle crew was negative as 30 % (n=104) were Neutral, 21 % (n=74) choose Disagree and 8 % (n=29) Strongly Disagree.

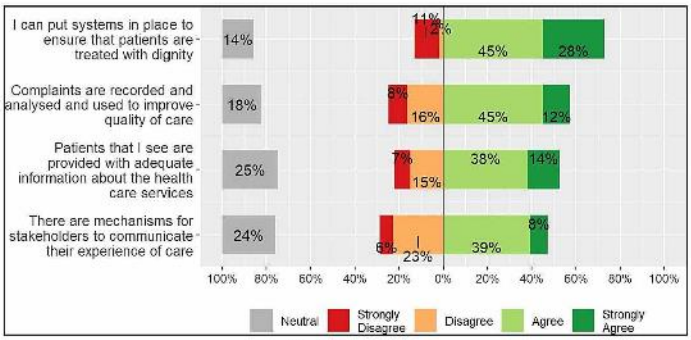

Fig. 1. User rights

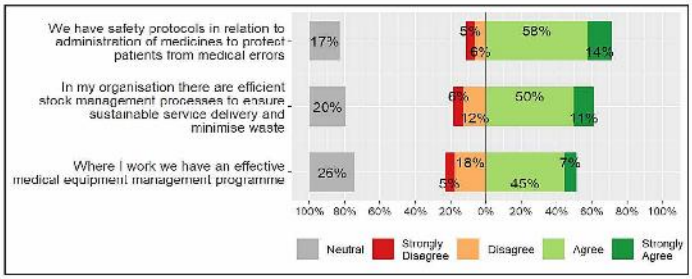

Fig. 2. Clinical support services

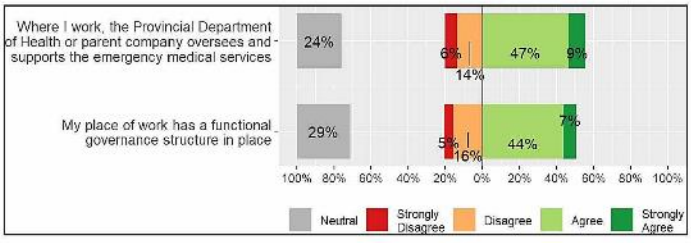

Fig. 3. Leadership and Governance

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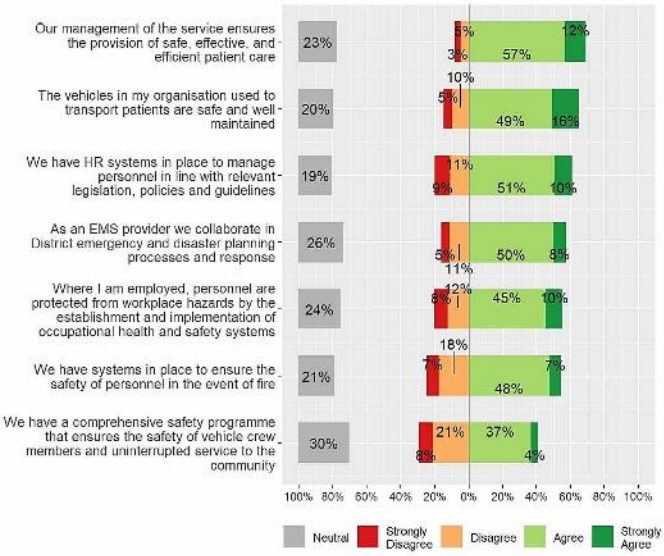

Fig. 4. Operational management

The qualitative findings that include key extracts from the non-participant observations and interviews are presented in Table 2. These quotes from the workshops and interview participants add to the depth and meaning of the survey data. The contrast between the EMS in RSA and Ukraine are tabulated in Table 3.

Table 2

Themes the emerge from workshop discussions and interviews

Category	Key Supporting Quote
User Rights: Is EMS meeting their constitutional obligations	«We have an issue with a red zone. We negotiated with the community to have the patients taken to the clinic and set up a green corridor for the ambulance to enter and exit the red zone area. We draw up the agreement with them and will pick up several patients at a time». #W6*
EMS Team factors that influence quality	«The crews below us were very obedient at that time, so we didn't have problems. We didn't have the problems that we face today. So, you know they were on track. They came to work on time. They did what they supposed to do, and they left, you know. So, I think that made it easier for us to supervise the staff». #P3*
Leadership and Governance in the EMS context	«They know nothing, they do nothing, all they care about is how they dress». #W3 «When EMS is working well as a provincial service somehow, they think well it's good let's start talking district and it's one of the worst things that can happen to EMS in the province». #W3 «EMS manages in my province are frustrated because the managers that they were reporting to don't understand the EMS. And so, the managers that they report to don't have an interest in EMS because most of those managers are nurses or whatever and they are more interested in what's happening in the clinic and what's happening in the sub-district hospitals and those type of things» #P2 «The unions have got more power than the managers. Unions have got better access to the top management than the managers themselves». #P2
EMS clinical governance and clinical care	«.. there was more focus on quality when I started there, I worked there from 1988 till about 1993, they had clinical governance. They even had a doctor that used to do clinical governance». #P2 «Your treatment had to be according to the protocols. Otherwise, you lost your badge». #P3
Infrastructure, EMS Fleet Management	«You know not having a proper communications tracking monitoring system that alone you know for me is the biggest gap in EMS, the biggest gap is that not having a CAD system». #P3 «…there's a lot of corruption in terms of computer aided dispatching systems, your ECC's, some provinces are spending now for the third time trying to get emergency control centres up and running». #P4 «In some places staff actually breaks this tracking systems and then we know that you know that not right» #W1 «You can wait two hours for an ambulance and it's a norm». #P2 «You speak about use of resources, and we have spare staff, because we don't have vehicles». «Some provinces have so many staff and no vehicles, so they sit or sleep at the station the whole night doing nothing». #W1
Quality improvement through education, training and collaboration	«…some of the provinces didn't share some of the good practices. And I think that they were just trying to hold the intelligence to themselves. And I think that was rather selfish. You know we we've picked up some of those things». #P7 «There is a well-structured partnership with fire department with joint rescue. Our focus now is about community engagement, not on response times. We don't have the budget and resources to provide an ambulance for every street block». #W6

Notes: #W – workshop number; #P – interview participant number

Table 3

Comparison between EMS in SA and Ukraine

Category	EMS South Africa	EMS in Ukraine [5]
User Rights	There is a threat of violence that places the ambulance crew at risk of attack due to crime or service delivery protests. User access to EMS is limited in «Red Zones» that require armed police escort	Access to health care for users in Ukraine has been impacted by the war with 1400 medical facilities damaged, 103 ambulances damaged, 250 destroyed and 125 seized by Russia [19]
The EMS Team	2019 Health Professions Council South Africa (HPCSA) registration statistics revealed that 5.8 % of the practitioners registered with the Professional Board for Emergency Care have Advanced Life Support qualifications. Although there are 56 894 registered EMS personnel in 2019, 76 % are Basic Ambulance Assistants [20]. There has been slow transformation of the EMS sector to address historical racial and gender under-representation. The Occupation Specific Dispensation that determines the salary structure and career path for EMS personnel has not been updated and the structure is outdated and that it refers to qualifications that no longer exist. EMS staff feel marginalized as they continue to be regarded as «ambulance drivers» and not as health professionals	Most (65 %) of EMS crews are feldsher (paramedic) led, usually consisting of two feldshers; 34 % are led by physicians with a feldsher; and 5 % are specialized teams, consisting mainly of cardiologists. The dissatisfaction is due to irrelevant legislation, poor working conditions, lack of safety, low prospects of future improvements and salaries. Concerns relate to low quality of ambulance crews, human factors, and the absence of infrastructure
EMS Education and Training	The National Emergency Care Education and Training (NECET) policy stopped emergency care short courses in 2019 and establishment a three-tiered emergency care qualification structure, on the higher education band, aligned to the National Qualifications Framework [21]. Authors of [22] reported that the migration plan in the NECET policy had not catered for the migration of thousands of short-course qualified EMS personnel who are employed in public and private EMS. The Council for Higher Education approved the provincial EMS colleges of emergency care to offer higher education programmes in emergency care. The colleges will expand the opportunities for in-service public EMS personnel to further their qualifications [20]	The Ministry of Health approved new professional categories for EMS, in accordance with the strategy for the development of EMS, in 2018. These include paramedics, emergency medical technicians (EMTs) and emergency dispatchers. The Ternopil Medical University and Cherkasy Medical Academy enrolled their first students in the three-year bachelor programme in paramedicine in 2018. In 2019, the Ministry of Health established the Feldsher to Paramedic Transition programme, which aims to upscale existing EMS feldshers to newly established paramedic standards of practice
Governance in EMS	Some provinces continue to decentralize EMS to the health districts despite the concerns that there was no sharing of resources within and between districts; ambulances were not permitted to cross the district boundaries to render assistance; different work shift systems were implemented in adjacent districts; EMS was not prioritized in the district budget allocation; and corruption and the abuse of funds was rife in some districts	There are 25 separate EMS, one for each administrative region, and they are governed by their respective regional health administrations
Clinical Governance	The HPCSA determines the capabilities scope of practice and clinical practice guidelines for each registration category of emergency care personnel	The USPCEMDM, which develops national EMS treatment protocols and publishes annual EMS statistics. In 2019, internationally recommended EMS protocols were translated and adopted by the Ministry of Health
Ambulance and EMS equipment	EMS uses the ideal EMS norm of 1 ambulance per 10 000 population to determine the number of ambulances per district, however in 2018 the public EMS had only 1971 vehicles. The demand for EMS far exceeds the supply with the shortage of vehicles impacting directly on the users having timely access to emergency medical care. The non-availability of the fleet included the appointment of incompetent fleet managers; delays in the turnaround times with authorization, maintenance, repair, and servicing of the vehicles; suspicion amongst some managers that there was theft and corruption associated with vehicle maintenance and repairs; and ambulances from rural areas had to be taken hundreds of kilometres to service centres in the city	The EMS fleet in Ukraine before the war consisted of 3118 ambulances (0.7 per 10 000 population), with most (92 %) being Type B (emergency ambulances) and the remaining type C (mobile intensive-care units (ICUs). Prior to the war services suffering most from underfunding are medicines and supplies, medical equipment, ambulance maintenance, human resource salaries, training simulation and logistics (repair of premises and garages). Ambulances and EMS staff are distributed in both oblasts based on population density (one brigade per 10 000 population). There were no national requirements for ambulance maintenance
Dispatching in EMS	Section 10 (2a) in the regulations relating to standards for EMS require EMS to have computer aided dispatch (CAD) or a paper-based system that facilitates vehicle allocation, routing and tracking. There is no standardized CAD system used across the SA. EMS managers complained because they are unable to monitor and track the physical location of the ambulances and the rest of the fleet, they cannot effectively manage and report on the resources	In 2019, only nine regions across Ukraine had some form of centralized, computerized dispatching system. The intention was to improve EMS dispatching and prioritization of calls. There were no algorithms for call prioritization and coding. There is no computer program in Luhansk for evaluating performance in full and no global positioning system (GPS) for ambulances. EMS does have a unified telephone number with an available backup number, but not caller-locater GPS
Response of EMS	It is not unusual for a user to wait two hours for an ambulance. The key factors identified as contributing to poor response times include the high call volume, availability of ambulance, and staff. Some of other contributing factors that are associated include the inappropriate use of EMS by the public, delayed turn-around times at hospitals, fleet unavailable due to maintenance and repairs, human resource capacity and long travel distances in rural areas	The Order of the Cabinet of Ministers of Ukraine #1119 states that the required EMS response time to urgent calls is 10 minutes in urban areas and 20 minutes in rural areas. Official statistics submitted to the Ministry of Health by the regional administrations suggest this requirement is met in 90 % of cases in urban areas and 85 % in rural territories. The absence of computerized dispatch recording systems, however, makes these numbers difficult to validate

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3.2. Discussion

The discussion considers both the quantitative survey data and the qualitative findings from non-participant observations at the EMS workshops and interviews with key stakeholders. The WHO report on the Ukraine EMS makes for a dyadic contrast.

3.2.1. User rights. Section 10 of the Constitution of South Africa says: «Everyone has inherent dignity and the right to have their dignity respected and protected» [23]. The RSA Patient's Rights Charter acknowledges the violation of fundamental human rights during apartheid, including the right to health care service. The charter commits the Department of Health to ensuring that everyone's right to receive timely emergency care at any health care facility regardless of their ability to pay [24].

In RSA pick-up points have also become a feature associated with residential areas that are designated as «Red Zones». «Red Zones» are areas where there is a likely threat of violence that places the ambulance crew at risk of attack due to crime or service delivery protests. Author of [25] describes how the user waiting time for ambulances in Red Zones, which are in mainly low-income areas, has increased as the ambulance must wait for an armed police escort before entering the unsafe areas.

Whilst RSA suffers a relative «slow burn», access to health care for users in Ukraine has been impacted by the war with russia. By 2023, 1400 medical facilities in Ukraine were damaged by missiles and bombs. EMS also suffered with 103 ambulances damaged, 250 destroyed and 125 seized by russia [19].

3.2.2. The EMS team. The EMS workforce is arguably the most valuable asset of EMS organizations and therefore fundamental to the quality of the health services rendered. A key contributor to poor quality health care is the lack of appropriately qualified health care workers. In 2021, the Director for Human Resources for Health, reported that there were 22 000 vacancies in the public health sector [26] in RSA. The poor work environment leads to poor mental health, increase absenteeism and sick leave and migration of public health care workers to either the private health care sector or emigration to other countries [27].

In RSA, the low levels of professionalism in EMS led to the 2017 National Emergency Care Education and Training (NECET) policy. In response to NECET, the Health Professional Council of SA (HPCSA) stopped the short course qualifications and closed new entrants to these registers [22]. To replace the short courses, the NECET policy establishment a three-tiered emergency care qualification structure, on the higher education band, aligned to the National Qualifications Framework [21]. The analysis of the 2019 HPCSA registration statistics revealed that only 5.8 % of the practitioners registered with the HPCSA have Advanced Life Support qualifications.

In Ukraine, the Ministry of Health approved new professional categories for EMS in 2018 as is shown in Table 3. These include paramedics, emergency medical technicians (EMTs) and emergency dispatchers. Prior to this the EMS was manned by physicians supported by Feldsher (Russian equivalent to Paramedic). The Ternopil Medical University and Cherkasy Medical Academy enrolled their first paramedic students in the three-year bachelor programme in paramedicine in 2018. In 2019, the Ministry of Health established the Feldsher to Paramedic Transition programme, which aimed to upscale existing EMS feldshers to newly established paramedic standards of practice [14, 28].

3.2.3. EMS governance. Some provinces in RSA devolved EMS to the health districts. The District Health Service (DHS) model is endorsed by the WHO as a health service model to deliver Primary Health Care [29]. In RSA it has been poorly implemented with author of [30] highlighting that the ineffective and incompetent leadership and governance, at all levels of the health system, as the primary reason for the crisis in some health districts. During the workshops and interviews, the decision on decentralizing EMS by senior provincial management angered EMS managers. There was in strong opposition during workshops 2 and 3, and in the interviews with Participants 2, 8, and10 to EMS being fragmented and placed under the control of the DHS management team that had no prior EMS qualifications, knowledge, or experience.

In 2012 the Ukraine Parliament passed a law that restructured EMS. Whereas like in RSA it was fragmented under the local authorities of towns and districts, it is now governed under 25 separate regional health administrations where there is more coordination and overall improvement in the EMS coordination and response [14].

3.2.4. Ambulance and EMS equipment. In RSA the ideal EMS norm of 1 ambulance per 10 000 population determines the ideal number of ambulances per district. There should be approximately 5700 ambulances in the public EMS but in 2018 the number reported was 1971 [31]. EMS staff report for work and sit around doing nothing for the entire shift because there are no vehicles available. EMS managers expressed their frustration as they were held accountable for low number of operational ambulance when the shortage was due to factors outside their direct control.

The EMS fleet in Ukraine before the war consisted of 3118 ambulances (0.7 per 10 000 population), with most (92 %) being Type B (emergency ambulances) and the remaining type C (mobile intensive-care units). Prior to the war services suffering most from underfunding are medical equipment, ambulance maintenance, and repair of premises and garages. Ambulances and EMS staff are distributed in both Oblasts based on population density (one brigade per 10 000 population) [5].

3.2.5. Dispatching in EMS. The Emergency Communication Centre (ECC) is the first point of contact for persons requiring EMS. In developed countries the ECC use advanced Information Communication Technology (ICT), computer aided dispatch (CAD) and vehicle tracking systems to ensure that the right resources are sent to the right incident at the right time [32]. RSA has implemented 112 as the universal emergency telephone number which is the same for Europe.

The response to the survey regarding communications systems facilitating the provision of effective and appropriate emergency care was rated negatively after building infrastructure. Considering that the ECC is the hub of the EMS organization, that is intended to ensure the efficient and effective use of resources, the finding is alarming.

In Ukraine, nine regions have equipped their dispatch centres with central computerized systems. Despite these

improvements, there are no algorithms for call prioritization and coding. There is no computer program in Luhansk for evaluating performance in full and no global positioning system (GPS) for Ambulances. In Ukraine EMS have a unified telephone number with an available backup number, but not caller-locater GPS [5].

3.2.6. EMS response. Section 10 (2c) in the regulations relating to standards for EMS require an EMS to monitor response times for each stage of the call management and dispatch process. In the interviews Participant 9 pointed their approach is that we will send an ambulance when we have one available. Although Participant 9 said that the «Golden Hour» is important, Participant 2 said it is not unusual for a user to wait two hours for an ambulance. (The «Golden Hour» refers to the first hour following an incident within which definitive emergency treatment must be provided. The patient must be transported to a medical facility within the hour and receive definitive care at the facility to decrease the risk of death and disability [33]).

The managers acknowledged that there are various reasons for the poor response times. While it may appear to the lay person that adding more ambulance is the solution, there just is not enough funding and resources to compete with the rest of the world according to Participant 9. The key factors identified as contributing to poor response times include the high call volume, availability of ambulances, and staff. Some of other contributing factors that are associated with poor response times include the inappropriate use of EMS by the public, delayed turn-around times at hospitals, fleet being unavailable due to maintenance and repairs, human resource capacity and long travel distances in rural areas.

The Ukraine report, states that EMS response time to priority calls is 10 minutes in urban areas and 20 minutes in rural territories. Although the official statistics suggest this requirement is met in 90 % of cases in urban areas and 85 % in rural territories, the absence CAD systems, however, makes these numbers difficult to validate [5]. In areas where there is active combat, the expected EMS dysfunction (in terms of normal operations) may prevail.

3.2.7. Practical relevance. The quality systems of EMS organizations in LMICs and UMICs requires standards to measure and improve their effectiveness and efficiency of their services. The factors identified in this study that affect quality systems in EMS centre around healthcare leadership competencies. The transformation to improve quality of EMS organizations in low resource healthcare systems will require EMS managers to develop effective leadership competencies.

3.2.8. Research limitations. While healthcare and EMS systems in RSA face common challenges with the Ukraine health system there are significant differences that were beyond the scope of this study. The Ukraine data was retrieved from the available literature on the EMS organization whilst the findings from RSA was obtained a survey, non-participant observation at workshops and interviews with EMS managers.

3.2.9. Prospects for further research. Further research is required to define, describe, and evaluate the EMS manager competencies required for quality improvement in EMS. Measuring the EMS performance in relation to the established quality standards is needed to evaluate effectiveness and measure the true value proposition of EMS organizations.

4. Conclusions

The authors set out to critique the public EMS, and the EMS manager's knowledge, attitude, and practices in RSA in response to the national quality standards for EMS. The findings confirm that EMS managers are tasked with coordinating the provision of emergency healthcare services in an austere environment, with war being in the extreme. Delivering the right resources to the right user at the right time is a complex undertaking. Scarce resources and hostile environments compromise the provision of safe, effective, efficient implementation of healthcare services to the users in need of urgent emergency care. The EMS manager requires bespoke leadership competencies to meet the demands of this complex organization. The shared EMS experiences and trauma-informed lessons of both RSA and Ukraine can mutually develop and benefit the EMS in both countries.

Conflict of interest

The authors declare that they have no conflict of interest in relation to this research, whether financial, personal, authorship or otherwise, that could affect the research and its results presented in this paper.

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Data availability

The manuscript has no associated data.

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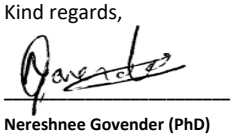

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