Cape Peninsula
University of Technology

A REVIEW OF THE QUALITY ASSESSMENT PROCESS WITHIN MANAGED HEALTH CARE

by

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Thesis submitted in fulfilment of the requirements for the degree

Master of Engineering in Quality

in the Faculty of Engineering and the Built Environment

at the Cape Peninsula University of Technology

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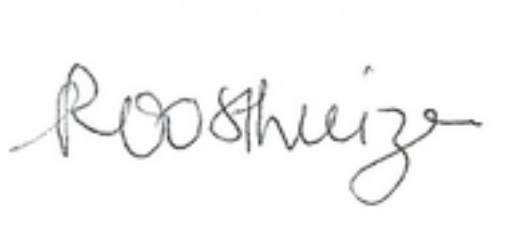
Bellville
30 November 2020

DECLARATION

I, Reney Oosthuizen, declare that the contents of this thesis represent my own unaided work, and that the thesis has not previously been submitted for academic examination towards any qualification. Furthermore, it represents my own opinions and not necessarily those of the Cape Peninsula University of Technology.

Signed  Date: 30 November 2020

ABSTRACT

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Degree:	Master of Engineering in Quality
Title:	A Review of the Quality Assessment Process Within Managed Health Care
University or Institution:	Cape Peninsula University of Technology
Faculty:	Engineering and the Built Environment
Department:	Industrial and Systems Engineering
Supervisor:	Prof Stephen Bosman
Date:	30 November 2020
Key words:	Disease Management Programme; HIV/AIDS; Human Error; Managed Health Care Organisation; Quality Assessment Process; Quality Assessment Questionnaire; Quality Tools; Sample Size; Sampling Methodology; South Africa; Health Care FMEA™ (HFMEA™)

The research study was conducted in an HIV Disease Management Programme within a Managed Health Care Organisation in Gauteng, South Africa.

This Managed Health Care Organisation provides Managed Care services to Medical Scheme beneficiaries who have been exposed to HIV/AIDS by registering them onto the HIV Disease Management Programme (DMP). This is to ensure adequate clinical care, education and support are provided to the affected beneficiaries to promote their quality of life, whilst managing the financial risk of the Medical Scheme.

The study focused on the non-clinical aspect of the HIV Disease Management Programme, namely the Quality Assessment function. The Quality Assessment process evaluates the quality of the Managed Care services rendered to the enrolled beneficiaries and Service Providers by the employees of the Managed Care Organisation.

The objectives of this study were the following:

- To examine the current Quality Assessment process sampling activities from a service quality perspective, identify best practice, and recommend improvements;
- To ascertain if the Quality Assessment Questionnaire (the process input) contains the correct quality parameters to identify the critical errors to be addressed; and

- To determine if the monthly Quality Assessment reports (the process output) contain the essential quality elements and tools to effectively demonstrate the quality of the services rendered.

The research methods used in this research study included both qualitative and quantitative methods. The research identified international and national best practice related to the Quality Assessment process, specifically in the South African Managed Care environment. The research methodology is within the ambit of an archival research.

ACKNOWLEDGEMENTS

I wish to thank:

- The Management of the Medical Scheme and Managed Care Organisation for the permission to conduct this research study;
- My Colleagues, specifically Dr Venessa Timmerman and Sharna Ziervogel, for their assistance and expert input;
- My Family, for their unwavering patience, support and encouragement;
- My Research Supervisor for his time and guidance.

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

ABBREVIATIONS AND ACRONYMS

Abbreviation / Acronym	
Admin	Administrative
AF	AutoFail, a synonym for Auto Zero
AIDS	Acquired Immunodeficiency Syndrome
ART	Antiretroviral Therapy
ARV	Antiretroviral (medication)
Asst	Assistant
Auth	Authorisation; Authorise(d)
AZT	Azidothymidine, renamed Zidovudine (antiretroviral medication)
CC	Critical Clinical (type of Error)
CM	Case Manager
CMS	Council for Medical Schemes
CNC	Critical Non-Clinical (type of Error)
Comms	Communication(s)
Dept.	Department
DMP	Disease Management Programme
DOB	Date of Birth
DoH	Department of Health
DSP	Designated Service Provider
EDD	Estimated Date of Delivery (birth)
FBC	Full Blood Count (blood test)
FFS	Fee For Service rates charged for health care services
FMEA	Failure Mode and Effect Analysis

Abbreviation / Acronym

GEMS	Generic Error Modelling System
HFMEA™	Health Care Failure Mode and Effect Analysis™
HIV	Human Immunodeficiency Virus
HMO	Health Maintenance Organisation
HPCSA	Health Professions Council of South Africa
ID	Identity (Number)
IFA	International Federation of Accountants
IOM	Institute of Medicine
IPAC	International Association of Providers of AIDS Care
ISO	International Organization for Standardization
IT	Information Technology
LFT	Liver Function Test (blood test)
LSL	Lower Specification Limit
MCO	Managed (Health) Care Organisation
n.d.	No date
n/a	Not Applicable
NCPS	National Center for Patient Safety
NHI	National Health Insurance
No.	Number
NPSF	National Patient Safety Foundation
NVD	Normal Vaginal Delivery (birth)
NVP	Nevirapine (antiretroviral medication)
PDCA	Plan Do Check Act, the steps of the PDCA Cycle or the Deming's Quality Cycle

Abbreviation / Acronym	
PEP	Post-exposure Prophylaxis
PMB	Prescribed Minimum Benefits
PMCTC / PMTCT	Prevention of Mother-To-Child Transmission or Transfer of HIV (also known as prevention of vertical transmission, PMTCT)
POPIA	Protection of Personal Information Act, Act No. 4 of 2013
PPO	Preferred Provider Organisation
PrEP	Pre-exposure Prophylaxis
QA	Quality Assessor or Quality Assessment
RPN	Risk Priority Number (used in FMEA)
SANC	South African Nursing Council
SAPC	South African Pharmacy Council
SIPOC	Suppliers, Inputs, Processes, Outputs, Customer
SLA	Service Level Agreement
SMS	Short Message Service
SRK	The skill-, rule- and knowledge-based (SRK) human behaviour
Stdev	Standard Deviation
TAT	Test And Treat
TB	Tuberculosis
TDF	Tenofovir Disoproxil Fumarate (antiretroviral medication)
UN	Unknown
USL	Upper Specification Level
VA	Veterans Association
VHA	Department of Veterans Health Administration
VL	Viral Load (pathology test)

Abbreviation / Acronym	
WHO	World Health Organisation

GLOSSARY

Term	
Agent	Employee
ART	Antiretroviral Therapy is a combination of antiretroviral medications that treat HIV. The drugs do not kill the virus or cure HIV, but they prevent the growth of the virus. By keeping the virus count low, the person's immune system can strengthen to prevent infections (International Association of Providers of AIDS Care 2014).
AutoFail	A Quality Assessment score of zero given if the specific AutoFail quality requirement is not met, irrespective if the employee adheres to the rest of the Quality Questionnaire requirements. It usually is related to a critical error. It is also known as an Auto Zero (**Source**: Own source).
AZT	Azidothymidine (renamed Zidovudine) is an antiretroviral drug prescribed to treat HIV (Shiel 2018).
Beneficiaries	Members of the Medical Scheme and their registered dependants (**Source**: Own source).
Care Plan	A care plan is a comprehensive list of medical services for which an enrolled beneficiary is entitled to, to keep their medical condition under control. Services would typically include blood tests, Doctor visits and a medicine regime (**Source**: Own source).
Case Manager (CM)	In the context of the Managed Care Organisation, this is a Registered Nurse or Pharmacist who co-ordinates and authorises the necessary health care services for enrolled beneficiaries to ensure optimal care (**Source**: Own source).
CD4 Count	A blood test that indicates the amount of CD4 (Cluster of Differentiation 4) cells present. If the count is high, it is an indication that the body's immune system is working well. If the count is low, the person's immune system is compromised. Antiretroviral treatment (ART) is given to HIV/AIDS infected people to boost their immune systems to prevent secondary infections (WebMD 2005-2019).

Term	
Clinical protocols / Practice guidelines	"Clinical or Practice guidelines are systemically-developed statements to assist practitioners and patients in making decisions about appropriate health care for specific clinical circumstances. Attributes of good guidelines include validity, reliability, reproducibility, clinical applicability, clarity, multidisciplinary process, review of evidence and documentation" (Health Resources and Services Administration 2011, p. 1).
Council for Medical Schemes (CMS)	The Council for Medical Schemes is a statutory body established by the Medical Schemes Act (Act No. 131 of 1998) to provide regulatory supervision of private health financing through Medical Schemes (CMS n.d., home page).
Creatinine Clearance	A blood test to determine how well a person's kidneys are functioning (WebMD 2005-2019). As some HIV medications negatively affect the working of the kidneys, monitoring is needed.
DMP	Disease Management Programme, which in the context of this study is also known as the HIV Programme or the Managed Care Programme (**Source**: Own source).
DPP	Dual Path Platform, which is a type of HIV test using saliva or a finger prick blood sample to diagnose HIV. The test can be used anywhere as the specimen does not need to be sent to a laboratory for testing (WHO 2016).
ELISA	Enzyme-linked Immunosorbent Assay is a blood test to identify if a person is HIV positive (AIDSinfo 2019).
Enrolled Beneficiaries	Beneficiaries of Medical Schemes and their dependants who are registered on a Managed Care or Disease Management Programme (DMP) (**Source**: Own source).
HIV Programme	A Managed Care Programme that aims to co-ordinate care, services and interventions through "ongoing monitoring and counseling" of HIV positive beneficiaries. This is "to ensure compliance to treatment plans and required behaviour modifications" to prevent complications and improve clinical outcomes (CMS 2014b, pp. 7-8).
HIV/AIDS	Acquired Immunodeficiency Syndrome (AIDS) is a chronic, potentially life-threatening condition caused by the human immunodeficiency virus (HIV) (Mayo Clinic n.d.). These terms are often used interchangeably.

Term	
HPCSA	The Health Professions Council of South Africa is the statutory body established under the Health Professions Act for the regulation of registered health professions e.g. Medical and Dental Practitioners.
ICD-10	International Classification of Diseases and Related Health Problems (10th revision). "It is a coding system developed by the World Health Organisation (WHO), that translates the written description of medical and health information into standard codes, e.g. J03.9 is an ICD-10 code for acute tonsillitis (unspecified)" (CMS n.d., ICD-10 Codes).
LFT	A Liver Function Test is a combination of blood tests that assesses a person's kidney and liver functions (Lab Tests Online Australasia 2019).
Managed (Health) Care	"'Managed health care' means clinical and financial risk assessment and management of health care, with the view to facilitating appropriateness and cost-effectiveness of relevant health care services within the constraints of what is affordable, through the use of rule-based and clinical management-based programmes" (South Africa, Medical Schemes Act 1998, section 15). For this research study, the term Managed Care is used.
Managed (Health) Care Organisation	The organisation that is contracted by one or more Medical Schemes to provide Managed Health Care Services to the beneficiaries of the Medical Schemes (**Source**: Own source).
Paediatric / Paeds / Paed	A field of medicine that specialises in the treatment of children between the ages of 1 and 14 years (Department of Health 2012).
PEP	Post-exposure prophylaxis means taking antiretroviral medicines (ART) after being potentially exposed to HIV to prevent becoming infected. PEP should only be used in emergency situations and must be started within 72 hours after a recent possible exposure to HIV (AIDSFree 2018).
PMCTC / PMTCT	Prevention of Mother-To-Child Transmission or Transfer of HIV (also known as prevention of vertical transmission, PMTCT), refers to interventions to prevent the spread of HIV from an HIV-positive mother to her baby during pregnancy, labour, delivery, or breastfeeding (AIDSFree n.d.).

Term	
POPI(A)	Protection of Personal Information Act, Act No. 4 of 2013. POPIA is South Africa's data protection law. The purpose of the Act is to protect peoples' privacy and personal information, which is a fundamental human right. The Act sets out conditions for when it is lawful to process someone else's personal information and how it must be protected (Michaelsons n.d.).
Quality Questionnaire	In the context of this study, the HIV DMP's Quality Questionnaire is the checklist or quality scorecard of all the quality requirements that is used to evaluate the quality of the interactions the employees have with the enrolled beneficiaries (**Source**: Own source).
SANC	The South African Nursing Council is the statutory body established under the Nursing Act for the regulation of Registered and Enrolled Nurses.
SAPC	The South African Pharmacy Council is the statutory body established under the Pharmacy Act for the regulation of Pharmacists and Pharmacist Assistants.
Script	A medical prescription of a treatment plan prescribed by a qualified health care practitioner, usually the treating Doctor. It most often only contains the medication regime required according to the enrolled beneficiary's health status and/or diagnosis (**Source**: Own source).
Service Providers	Hospitals, Pharmacies, treating Medical Practitioners (Doctors) are examples of facilities and medically trained health care professionals that provide health care to Medical Scheme beneficiaries (**Source**: Own source).
SLA	Service Level Agreement, which are the service levels contractually agreed between the Managed Care Organisation and the Medical Scheme (**Source**: Own source).
SRK	The skill-, rule- and knowledge-based (SRK) human behaviour categories of Rasmussen's taxonomy (Whittingham 2004, pp. 15-23).
TDF	Tenofovir Disoproxil Fumarate (antiretroviral medication)
Workflow	A process flow which is driven by an electronic record keeping system which prompts the employees of the Managed Care Organisation to work on a beneficiary's case (**Source**: Own source).

CHAPTER 1: SCOPE OF THE RESEARCH

This chapter provides a brief introduction, motivation and background to this research study.

The research process is explained, followed by the research problem statement, the research question and supporting investigative questions. The primary research objectives are also stipulated.

1.1 Introduction

Managed Care Organisations provide Managed Care services to Medical Scheme beneficiaries. This is accomplished by enrolling beneficiaries with certain health conditions onto the relevant disease management programmes. This ensures appropriate management of the enrolled beneficiaries' medical condition, and support to ensure an optimal clinical outcome, whilst managing the financial risk for the Medical Scheme. Focus is placed on adequate care, education and support of enrolled beneficiaries to empower them with the skills and knowledge to manage their condition.

The Managed Care Organisation used in this study, is the sole provider of the HIV Disease Management Programme (DMP) to one of the ten largest Medical Schemes in South Africa (CMS 2018, p. 167). The specific focus for this study is the Quality Assessment process of the HIV DMP. This process evaluates the quality of the Managed Care services rendered to the enrolled beneficiaries and Service Providers, by the employees of the Managed Care Organisation. The process also evaluates the associated transactional data captured on the electronic record keeping system.

The intention of this research study is to identify best practice relating to the critical aspects of the current Quality Assessment process, and to make recommendations for improvement. The three crucial quality aspects in this research study comprise the activities of the Quality Assessment process itself (including sampling), the Quality Questionnaire parameters used to identify errors, and the reporting of the results of the Quality Assessment process.

1.2 Motivation for the Research

The main objectives of the HIV DMP are to identify and interact with high risk beneficiaries exposed to HIV/AIDS. This is to ensure the affected beneficiaries' access to appropriate care, and improved quality of life. It is crucial that these Managed Care services are of a high standard to prevent spiralling treatment costs and early mortality. The Quality Assessment

process is key to identify any aspects of poor quality of the HIV DMP Managed Care services that need to be addressed.

Although an abundance of quality related healthcare literature is available, most of it is focused on the accessibility, payment and quality of medical or nursing clinical care (relating to diagnosis, treatment and clinical outcomes of care), and not the quality assessment and continual improvement of managed care interventions. (Lohr 1990, pp. 345-348; Shortell, O'Brien, Carman, Foster, Hughes, Boerstler & O'Connor 1995, p. 379). Hughes (2008, chapter 44) acknowledges that many organisations have realised quality improvement efforts, but not necessarily published their work, especially in peer-reviewed literature.

The Medical Scheme and the Managed Care Organisation will benefit from this research study by the evaluation and identification of appropriate national and international quality best practice, quality theories and Quality Tools that can be applied to the HIV DMP Quality Assessment process. Recommendations for improvement are identified to enhance this process, which in turn should lead to an improved customer experience.

1.3 Background to the Research Problem

The purpose of this research is to investigate how the Quality Assessment process at a South African Managed Care Organisation can be improved. The research study was carried out in the HIV Disease Management Programme provided by that Managed Care Organisation.

Various employee categories are employed by the Managed Care Organisation to render the HIV DMP to the enrolled beneficiaries. The employees include Case Managers (Registered Nurses and Pharmacists) and Treatment Counsellors (who have undergone specific HIV counselling training). They are all located in the organisation's Gauteng office, with some employees working in the Western Cape office.

Administrative Assistants (Admin Asst) capture beneficiary data onto the electronic record keeping system to speed up the enrolment process. This supports the Case Managers so they can attend to the various clinical functions to ensure the appropriate care and medication is approved for payment.

In addition, Quality Assessors are employed by a third party provider to perform the Quality Assessment activities. Results are reported to the management of both the Medical Scheme

and Managed Care Organisation. The Assessors have a clinical background, with additional auditing or assessment training and experience.

The HIV DMP's Quality Questionnaire comprises all the quality requirements or assessment criteria and is used to evaluate the quality of the interactions the employees have with the enrolled beneficiaries and Service Providers. Interactions are mainly telephonic (never face to face), but can also be an electronic data capturing function only from faxed or e-mailed enrolment forms, pathology results or medical prescriptions (referred to as 'scripts'). The Quality Questionnaire is an electronic document on an off-the-shelf telephone management system which automatically calculates the score for each assessment completed. The Questionnaires were developed in-house according to the Medical Scheme's quality scorecard requirements and criteria.

Monthly reports contain the results of each employee's Quality Assessment accuracy scores and other quality related data. All monthly Quality Assessment reports over a period of twenty one months were scrutinized. This is the period that the outsourced service provider was initially contracted, until the start of this research study. Only one report for this period was not available, namely the July 2017 report. However, most data for July was included in subsequent reports so it did not negatively impact the study.

The information in all the monthly reports from March 2017 to December 2018 (Managed Care Organisation Monthly Reports 2017-2018), is summarised in Appendix A, Table A.1. The following aspects were noticed:

- There seems to be a challenge to meet the sample size stipulated by the Medical Scheme due to the high volumes of work to be evaluated;
- It is not indicated that all sub-processes of the HIV DMP are assessed by the Quality Assessment team (not scripts and results);
- The Quality Assessment errors are listed in the reports per Service Level Agreement (SLA) and/or process per employee category. It is not clear if all critical errors are identified and quantified;
- Only one histogram is used, whilst the rest of the report consists of written paragraphs and tabulated information which does not clearly demonstrate the quality or improvement of the Managed Care services rendered month to month; and
- The reports contain quantitative and qualitative data. This data consists of both raw data (where it has not been processed at all or very little), and compiled data (data that has been selected or summarised) (Saunders, Lewis & Thornhill 2009, p. 258). This makes the reports laborious to read and difficult to compare to the previous month's performance. Thus the quality status of the HIV DMP is not clearly demonstrated.

Upon further investigation, it was ascertained that the evaluation samples were extracted from the population, but no description of the population or sampling methodology could be provided. These samples are then evaluated to identify errors using a Quality Questionnaire. It is not clear if all critical errors are included in the Quality Questionnaires and assessed.

It is evident from the information in Table A.1, that the only Quality Tool used when reporting the outcomes of the Quality Assessment process, is one histogram. Even though factors contributing to errors, actions and recommendations to improve are noted in these reports, no evidence of formal root cause analysis or other methods could be provided.
When scrutinising the content of all the monthly reports, it also seems that the same errors recur to a varying degree. This could be speculated that it is due to ineffective root cause analysis, incorrect actions identified or carried out, and/or irregular follow through of corrective and preventive measures to eliminate errors permanently. Therefore continual improvement of the quality of the HIV DMP and the services rendered, is not clearly demonstrated.

This research study investigates the Quality Questionnaire parameters or quality requirements used to identify errors, the Quality Assessment process activities regarding the sampling, and the possibility of using several Quality Tools and techniques to maximize the benefits of the monthly reporting.

1.4 The Research Process

Effective scientific research is a process consisting of a number of activities or stages. Kothari (2004, p. 12) indicates that the research activities “overlap continuously rather than following a strictly prescribed sequence”. Thus the research process activities for this study listed below, were not necessarily carried out in the specific order they are listed.

The process adhered to for this research study is adapted from Welman, Kruger and Mitchell (2005, pp. 12-13), and Kothari (2004, p. 12). This study was planned and carried out as follows:

- Identification of the research topic (identification and clear formulation of the specific problem to be investigated);
- Obtaining the necessary approval to access the Medical Scheme and Managed Care Organisation’s information for the study;
- Collecting the research data;
- Compiling the Topic Approval for submission and approval;
- Defining the research questions and setting the research objectives;
- Reviewing of the literature;
- Determining how to conduct the study (preparing the research design);

- Writing and submission of the research proposal for approval; and
- Analysis and interpretation of the research data and literature.

The writing of the research study and submission for interim reviews to the Research Supervisor, was continuous from the beginning of the research process until its completion. The final step was the submission of the final report for scrutiny and examination.

1.5 Statement of the Research Problem

The research problem forms the primary focus of this research study, and reads as follows:
The HIV DMP targets the high risk beneficiaries exposed to HIV to ensure improved quality of life, access to appropriate care, and health care cost containment. It is crucial that these Managed Care services are of a high standard to prevent early mortality and spiralling treatment costs. The Quality Assessment process is key to identify any aspects of poor quality services rendered by the Managed Care Organisation's employees that need to be addressed.

If any of the following aspects of the Quality Assessment process are unsuitable, the findings or results of the Quality Assessment process could be inaccurate and possibly unreliable:

- Sample sizes used are not representative of the entire population of Managed Care services rendered; and/or
- The sampling method is incorrectly carried out or inappropriate for the data type; and/or
- The critical errors are not included or correctly identified in the Assessment Questionnaires; and/or
- The monthly reports do not meaningfully reflect the critical quality components to be improved.

These factors could directly and negatively impact the assessment of the quality of services rendered to the beneficiaries enrolled on the HIV DMP. This could mean that the quality of the service rendered and the health information provided, can negatively impact the health of the beneficiaries. Consequently, the results and possible improvements to be actioned to enhance the service, will not be identified nor realised. Medical costs can increase, without necessarily improving the health outcomes of the beneficiaries. All these factors are further explained in section 2.6 (Possible consequences of poor quality service in managed care).

1.6 The Research Questions

1.6.1 The Primary Research Question

The primary research question to be answered in this research study reads as follows:

How can the HIV DMP Quality Assessment process input, activities and reporting be improved?

1.6.2 The Investigative Research Questions

The investigative sub-questions researched in support of the primary research question, are the following:

- What is best practice for the current Quality Assessment process sampling activities from a service quality perspective?
- Are the correct quality parameters used in the Assessment Questionnaire to identify the critical quality errors that must be addressed?
- Do the monthly Quality Assessment reports provided to management, identify the essential quality elements to demonstrate the quality of the services provided?
- What recommendations can be made regarding interventions for improving the Quality Assessment process?

1.7 The Primary Research Objectives

The research objectives considered in this research study are listed below:

- To examine the current Quality Assessment process sampling activities from a service quality perspective, identify best practice, and recommend improvements;
- To ascertain if the Quality Assessment Questionnaire (the process input) contains the correct quality parameters to identify the critical errors to be addressed; and
- To determine if the monthly Quality Assessment reports (the process output) contain the essential quality elements and tools to effectively demonstrate the quality of the services rendered.

1.8 Chapter Outline

The following chapters are applicable to this research study:

- **Chapter 1: Scope of the Research**
  This chapter provides the introduction, motivation and background to this research study. The research process is explained, followed by the research problem statement, the research question and supporting investigative questions. The primary research objectives are also stipulated, together with the research process followed.
- **Chapter 2: A Holistic Overview of the Research Environment**
  This chapter provides historical background and holistic view of Managed Care internationally and in South Africa, with the legislative framework in which the Managed

Care Organisation operates and the HIV DMP services rendered. The current Quality Assessment process is described, as well as possible consequences of poor quality service within the Managed Care environment.

- **Chapter 3: Literature Review: The Quality Assessment Process**
  Textbooks, peer reviewed journals and articles were examined and used to answer the research questions. The international and national experience, guidelines, best practice and views were found in libraries and the Internet.
- **Chapter 4: Research Design and Methodology**
  The strategy for the research design and methodology is discussed and the most appropriate research methods explained. The data collection methodology used is reviewed, with the specific data validity and reliability considerations related to this study. Ethical considerations, research assumptions and constraints are also described. The method that the data was collected, collated, sorted, and scrutinized in preparation for the data analysis, is explained.
- **Chapter 5: Data Analysis and Interpretation of Results**
  The process of analysing the data is described, and the interpretation of the results is provided.
- **Chapter 6: Conclusion and Recommendations**
  The research is concluded and the recommendations for improvement are provided. Recommendations for future research are also presented.

1.9 Conclusion

This chapter gave an overview of the scope of this research study. Chapter 2 expands on the research environment, providing further context to the research problem.

CHAPTER 2: A HOLISTIC OVERVIEW OF THE RESEARCH ENVIRONMENT

2.1 Introduction

This chapter gives a complete overview of the research environment related to the research problem. It includes a historical overview of the origins of managed health care in the United States.

A synopsis of the Managed Care industry in South Africa and its legislative framework is presented, with details of the Managed Care Organisation and the HIV DMP where the research study was conducted. The Quality Assessment process is described and the possible effects or consequences of poor quality service in the Managed Care industry is outlined.

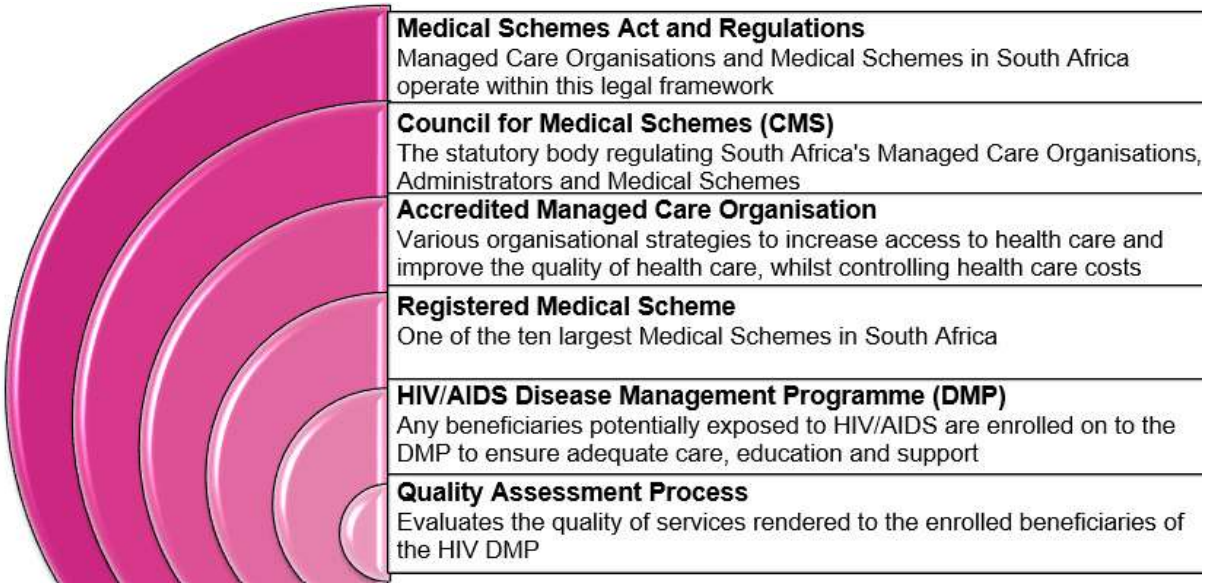


Figure 2.1: Overview of the research environment
(**Source:** Own source)

These topics are discussed in this section:

- A historical overview of the origins of Managed Care;
- Managed Care in South Africa and its legislative framework;
- The HIV DMP within the Managed Care Organisation;
- The Quality Assessment process within the HIV DMP; and
- Possible consequences of poor quality service within Managed Care.

2.2 A Historical Overview of the Origin of Managed Care in America

The origin of Managed Care is documented by Kongstvedt (2013, pp. 3-14) as starting in the latter half of the 19th century in the United States. Insurance policies were implemented to cover costs related to workplace injuries and disabilities. Since then, the health care industry has constantly evolved to find ways to limit the increase of health care costs, whilst ensuring that the quality of care is not compromised. Major events like the Great Depression between 1929 and 1939, and World War 2 between 1939 and 1945 (History 2019), have also influenced the changes over the years to contribute to the Managed Care model in place today.

In Table 2.1, the main events influencing the changes in health care models, has been summarised. The period covered is from inception around 1910 until the mid-1990s, when Managed Care was introduced in South Africa (Matuszek 2002, pp. 7-8). The American Managed Care model, data and systems were introduced and adapted to South African conditions, in an effort to curb increasing health care costs.

Table 2.1: Historical timeline of changes in health care models which formed the current Managed Care system
(**Source:** Kongstvedt 2013, pp. 3-14)

Year	America's Health Care Model Transition
1910	The Western Clinic in Tacoma, Washington, agreed to offer lumber mill owners and their workers comprehensive medical services for a fee of 50 cents per member per month. A certain Dr. Bridge started a clinic in Tacoma based on a similar principle, which later grew to 20 locations in Oregon and Washington.
1929 The Great Depression	Dr. Michael Shadid started a rural farmer's co-operative health plan in Elk City, Oklahoma. This plan provided discounted medical care for the farmers that bought shares at 50 dollars each to fund a new hospital. Drs. Donald Ross and H. Clifford Loos launched a prepaid medical plan with Doctor and in-hospital care for the workers at the Los Angeles Department of Water and Power. The Blue Cross Plan was created by the Baylor Hospital in Texas agreeing to provide 1500 teachers with a prepaid hospital plan.
1934	The Farmer's Union took control of the hospital and the farmer's co-operative health plan in Elk City, Oklahoma, which originated in 1929.
1937	Dr. Sidney Garfield began the Kaiser Foundation Health Plan in Washington at the request of the Kaiser Construction Company, to pay for clinic and hospital care for their employees and their families. The Home Owner's Loan Corporation initiated the Group Health Association in Washington, D.C., due to many mortgages going into default because of the owners' significant medical expenses.
1939	The Pacific Northwest lumber and mining companies started to pay Doctors a monthly fee to provide medical care for their injured workers. The states' medical societies followed suit, resulting in the foundation of the country's Blue Shield Plan. Services expanded to hospitals, agreeing to pay set fees per procedure.
1942 World War 2	The Stabilization Act enacted by the U.S. Congress, permitted tax breaks on certain employee benefit plans, which included a health benefit plan. This led to growth in the membership of health plans.

Year	America's Health Care Model Transition
1950s	Health Maintenance Organisations (HMOs) emerged, contracting with Doctors in private practice to provide medical services at Fee For Service (FFS) rates.
1960s	President John F. Kennedy's administration recommended Medicare, a plan for payment of hospital services using governmental taxes. After his assassination in 1963, his successor President Lyndon B. Johnson approved Medicare for the elderly (age 65 and over), and Medicaid for certain low income groups. Later, Medicare Plan A was approved which covered hospital services, and Plan B, for Doctors' services.
1970s – 1990s	Health Care costs continued to rise. There was an increase in the number of HMOs due to the HMO Act of 1973, which made state funds available for new HMOs, and for the development of existing ones. Preferred Provider Organisations (PPOs) were established, comprising hospitals, Doctors and other medical providers, who agreed to discounted fees to be part of a network. Members of certain medical plans would be motivated to go to these network providers to avoid co-payments levied when non-network providers were utilised. Access to medical treatment from other medical providers was furthermore not restricted if the member was referred by a network provider. PPOs also agreed to hospital pre-authorisation and concurrent review processes, which, amongst other cost-saving initiatives, led to modification of provider behavior over time. Out-patient care was preferred to more costly in-hospital care, and the length of stay in hospitals decreased. Other payment methods were instituted as well, for example per diem fees (a fixed amount payable per medical condition irrespective of the length of hospital stay).
1996	Sanlam Health established its Quality Reference Centre in Cape Town, Western Cape, which was the first Managed Care Organisation in South Africa. It was based on the American model of Managed Care in place at that time.

The 1990s model of Managed Care outlined in Table 2.1, set the foundation for the current Managed Care systems in place in many countries, including South Africa. Although Managed Care has evolved and the health industry consolidated, South African legislative oversight has increased to ensure that the Medical Scheme beneficiaries' quality, affordability and accessibility to medical care, remains the principal focus (CMS 2011, p. 1).

2.3 Managed Care in South Africa and its Legislative Framework

South African health care, and especially Managed Care Organisations, are governed by many different laws. An explanation of the legislative framework of this highly regulated industry is provided in this section, as it cannot be disregarded when discussing the research environment of this study.

2.3.1 South Africa's Legislative Framework

The main law in South Africa is the Constitution of the Republic of South Africa, Act No. 108 of 1996. It forms the legal basis of governmental structure and specifies the rights and duties of South African residents, specifically in Chapter 2, the Bill of Rights (Lutchman 2018).

Parliament, as the highest national legislative authority, passes all regulatory legislation. These laws include relevant acts to regulate aspects of Medical Schemes and Managed Care Organisations. Some examples of these laws include the:

- National Health Act (Act No. 61 of 2003);
- Medical Schemes Act (Act No. 131 of 1998);
- Companies Act (Act No. 71 of 2008);
- Consumer Protection Act (Act No. 68 of 2008); and
- Protection of Personal Information Act (Act No. 4 of 2013).

In Appendix B, Table B.1, a full list of all South Africa's current legislation applicable to Medical Schemes and Managed Care Organisations, is provided (Acts Online n.d.). The objective of each Act is quoted from the relevant Act for informational purposes.

More recently, the Medical Schemes Amendment Bill, the Competitions Amendment Bill, and the National Health Insurance (NHI) Bill, were all introduced in 2018 as drafts. These Bills may potentially impact and change the current South African health care legislative landscape and industry substantially. Finalisation of the legislation and promulgation dates must still be published.

2.3.2 Statutory Bodies

The Council for Medical Schemes (CMS) is the statutory body established by the Medical Schemes Act (1998). Its Registrar and Board are appointed by the Minister of Health to regulate the private Medical Scheme industry in terms of Chapter 3 of the Act (South Africa, pp. 111; 113; 115).

The CMS' role includes regulating Managed Care Organisations who render Managed Care services to beneficiaries of Medical Schemes. The Council enforces compliance with their accreditation standards (CMS 2011, p. 1) to ensure that Managed Care Organisations meet the regulatory requirements to provide these services. Accreditation is renewable every two years, and the process includes an evaluation of the Managed Care Organisation, its facilities and infrastructure. Managed Care Organisations are only allowed to provide services or programmes approved by the CMS, which is stated on the organisation's accreditation certificate and on the CMS website.

Other statutory bodies regulate the registration and scope of practice of different health service professions through various Acts. Health Care Professionals employed by Managed Care

Organisations are required to be registered with their respective councils (SouthAfrica.info n.d.). These include the following:

- The South African Nursing Council (SANC) for Registered and Enrolled Nurses;
- The South African Pharmacy Council (SAPC) for Pharmacists and Pharmacist Assistants; and
- The Health Professions Council of South Africa (HPCSA) for Medical and Dental Practitioners, amongst others.

2.3.3 Managed Care Programmes

According to the Council for Medical Schemes (CMS 2011, p. 1), the term 'Managed Care' refers to various organisational strategies targeting health care cost control, whilst increasing access to health care and improving health care quality to South African Medical Scheme beneficiaries.

There are various Managed Care programmes provided by Managed Care Organisations. The programme definitions and classification is set out in the CMS' Circular 13 of 2014 (CMS 2014a, pp. 4-11).

Briefly, the programme classifications are as follows:

- Hospital Benefit Management Services (management of hospital benefits);
- Pharmacy Benefit Management Services (management of medicine benefits);
- Active Disease Risk Management Services (management of specified chronic disease benefits, including HIV);
- Disease Risk Management Support Services (management of specified chronic disease benefits where a full disease management programme is not provided in the Active Disease Risk Management Services category above);
- Dental Benefit Management Services (management of dentistry benefits);
- Managed Care Network Management Services and Risk Management (management of health provider networks e.g. General Practitioner Network); and
- Health Care Services (Risk Transfer in capitation agreements).

These are the only accredited Managed Care service categories allowed. However, the Managed Care Organisations can market their programmes under different names.

In the Managed Care Organisation where this research was conducted, the HIV DMP falls within the Active Disease Risk Management Services category. The organisation is only accredited by CMS to provide this Disease Management Programme.

2.3.4 Prescribed Minimum Benefits (PMBs)

Regulations 7 and 8, together with Appendix A of the Medical Schemes Act (1998), were promulgated in October 1999. It sets out the minimum benefits and treatment for which Medical Schemes must pay.

Regulation 7 defines what the minimum benefits are regarding the diagnosis, treatment and care costs of certain medical conditions and all emergency medical conditions. Regulation 8 stipulates that all the PMB medical conditions must be paid in full without co-payment, for any beneficiary on any benefit option offered by a Medical Scheme.

Coverage includes any emergency treatment, 270 medical conditions, as well as 25 chronic diseases (Health24 2015). In Issue 10 of the CMScript (CMS 2014b), the scope of HIV as a PMB condition is set out with all the mandatory diagnostic, treatment and care components that must be paid by Medical Schemes. In Table 2.2, these minimum requirements are listed, as stated in the Public Sector's national HIV/AIDS guidelines.

Table 2.2: HIV/AIDS PMB level of care including diagnosis and treatment
(**Source:** CMS 2014b)

PMB Level of Care for HIV/AIDS
HIV voluntary counselling and testing
Post-exposure prophylaxis (PEP) following occupational exposure or sexual assault
Prevention of mother-to-child transmission of HIV (PMCTC)
Screening and preventative therapy for TB
Diagnosis and treatment of sexually transmitted infections
Treatment of opportunistic infections
Medical management and medication (anti-retroviral therapy, Co-trimoxazole as preventative therapy) with ongoing monitoring for medicine effectiveness and safety
Pain management in palliative care

2.4 The HIV Disease Management Programme

The Managed Care Organisation used in this study, only provides the HIV Disease Management Programme (DMP) to one Medical Scheme.

As mentioned in section 1.3 (Background to the Research Problem), the employees rendering the HIV DMP consist of:

- Case Managers (Registered Nurses and Pharmacists);
- Treatment Counsellors who have undergone specific HIV counselling training; and

- Administrative Assistants to capture beneficiary data onto the electronic record keeping system.

The activities of Management (including Team Leaders), were not included in this study.

The programme uses various electronic data capturing and reporting systems. These compromise the following:

- A custom built in-house Information Technology (IT) electronic record keeping system for employees to capture their Managed Care interactions, and which interfaces with the Medical Scheme beneficiary and scheme data system;
- An off the shelf telephonic system that manages the call workflows through automated call distribution, enables sharing or re-routing of phone lines across different regions, and records calls;
- An internal web-based system where reports can be obtained to identify transactions and services for monitoring and review.

Furthermore, scanned hard copy correspondence and faxes are received electronically and routed to the electronic record keeping system as input into various workflows.

The telephone contact centre provides the Medical Scheme beneficiaries easy access to telephonic assistance and support. The telephone line is a 'share-call' number, which means that the caller only pays for the cost of a local telephone call. The fax line is free to the user. In addition, cell phone users can send a 'Please Call Me' SMS (short message service) at no cost to them, and the HIV DMP employees will call them back.

The call centre operating hours are Mondays to Fridays 08h00-17h00 excluding Public Holidays. All eleven official South African languages are catered for.

2.5 The Quality Assessment Process

The focus of this study are the activities of the Quality Assessors who assess the work done by the Case Managers, Treatment Counsellors and Administrative Assistants.

The call centre performance parameters are not included in the Quality Assessment process. For example, the time taken to answer the call and to conclude the notes, or the number of abandoned calls. These targets are monitored by the call centre Team Leaders and Management.

The Quality Assessment activities compromise the listening in of live or recorded calls, and assessing the information captured on the electronic record keeping system. Thus the quality of the interaction with the caller and the information shared, is assessed.

The recording and listening to calls is the standard way of monitoring the performance of call centre agents. The mere fact that the employee knows that the call is recorded and could be listened to and checked, could bring about improved performance. In other words, it is more likely that they will adhere to the required processes and guidelines than diverge from them. Donabedian (1983, p. 372) refers to this potential result of quality monitoring as the “Sentinel Effect”. He notes that this effect is not easily detectable unless specific measures are put in place. Consequently, it is possible that the Quality Assessment results could be poorer should there no recording or monitoring taking place.

The Quality Questionnaires used for the Quality Assessments, and the monthly reports were described in section 1.3 (Background to the Research Problem).

2.6 Possible Consequences of Poor Quality Service in Managed Care

The main focus of Managed Care is to ensure enrolled beneficiaries receive the right care at the right place, at the right time, and at the most cost effective price (Llewellyn, 2017). CMS indicates that providing Managed Care services and the financing thereof, should be well co-ordinated, ensuring that the care provided is affordable, accessible, and of good quality (CMS 2011, p. 1).

Dahlgaard, Pettersen and Dahlgaard-Park (2011, p. 674) affirm the health care industry’s challenge of attaining all three these quality parameters simultaneously – namely that of good care, accessibility of services, and affordable price. If any of these goals are not met, it would affect the overall quality of the Managed Care services rendered. They further declare that the theories, principles, tools and methods of Quality Management, can be very useful in the health care industry to facilitate continuous improvement.

Further to these three health care goals, Prodan, Prodan, and Purcarea (2015, p. 481) point out that it is commonly recognised that organisations need to focus on three important factors for successful quality improvement. These are people, process and technology (or sometimes referred to as systems). Forming a triangle, it is also referred to as the golden triangle (Banks 2016). Applying only one or two factors to improve a quality management system, would not be as effective as using all three in unison.

Different errors made by the employees, and/or due to poor processes or inadequate systems, will have different consequences. Varying consequences of poor quality could include rework, poor customer experience, not meeting the Medical Scheme's Service Level Agreements (SLAs), or dire health outcomes for the enrolled beneficiaries.

Some effects of poor quality in this particular HIV DMP environment could include the results and consequences listed in Table 2.3. The potential errors are not listed in any specific order.

Table 2.3: Potential errors and their possible consequences in Managed Care
(**Source:** Own source)

Potential Errors	Possible Consequences
Medication or medical care not approved on time or at all. E.g. pathology tests, Doctor visits, medicines.	Receiving no medical care, the incorrect medical care, or delayed care, could cause HIV/AIDS spiralling out of control and the beneficiary needing more expensive treatment or possibly hospitalisation.
Approval and dispensing of incorrect medication and/or dosages according to gender, age, etc.	Severe side effects (short or long term), or even death.
Medication and medical treatment provided outside of approved clinical best practice protocols.	Exorbitant costs to the Medical Scheme due to expensive treatment, or beneficiaries being financially liable for treatment which should be covered by the Medical Scheme according to law.
Information, advice or health education that is not given at all, or is incorrect, confusing or conflicting.	No or poor adherence to health and medication regimes, distrustful or unmotivated beneficiaries, which could lead to poor control of HIV/AIDS disease and resulting complications.
Breaches of confidentiality by not verifying that the correct beneficiary or Service Provider is contacted (phone, fax, post or e-mail); and/or incorrect, incomplete or no contact details on the electronic record keeping system.	Major negative legal implications due to violation of the beneficiary's constitutional right to privacy (Buys n.d.), costs of legal advice or litigation, and reputational damage to the Medical Scheme and/or Managed Care Organisation.
Incorrect disease codes (ICD-10 codes) or medicine codes (Nappi codes) captured and authorised on the electronic record keeping system.	Negative impact on the payment of beneficiaries' claims – either non-payment making the beneficiaries liable, incorrect payment, or paid from the incorrect scheme benefit category.
Not meeting contractual service level agreement (SLA) parameters. E.g. turnaround time to process applications and follow ups.	Financial penalties being imposed by the Medical Scheme, leading to the Managed Care Organisation's financial loss.

Some errors may have a negligible effect, whilst other errors could lead to catastrophic consequences. Dire outcomes could include the beneficiary not getting the right treatment or access to the necessary health services, in turn causing the disease escalating out of control which could lead to health complications and early mortality.

Potential losses due to errors in health care could have a myriad of other financial and non-financial consequences. Financial losses could include the extra cost of medical care required, litigation costs both for the beneficiary and the organisation. Non-financial losses could include indirect costs like loss of trust, customer dissatisfaction, physical and psychological discomfort, loss of employee productivity and poor school attendance (IOM 2000, pp. 2-3).

It is thus clear that the Quality Assessment process in the HIV DMP is vital to identify any form of poor quality service within the shortest period of time to prevent any form of inconvenience, or disastrous effects. The possible consequences of errors monitored and measured in the HIV DMP, are examined further and discussed in more detail in Chapter 5.

2.7 Conclusion

This chapter discussed the context of the research study which included a review of the historical origins of Managed Care. The legislative framework in which the South African health care industry operates was examined, including the aspects affecting the Managed Care Organisation and the HIV DMP. The Quality Assessment process within the HIV DMP was explained. And lastly, possible consequences of poor quality service within Managed Care was considered. The next chapter provides an overview and analysis of the relevant literature related to the investigative research questions.

CHAPTER 3: LITERATURE REVIEW - THE QUALITY ASSESSMENT PROCESS

3.1 Introduction

This chapter endeavours to answer the research questions by examining national and international literature, including guidelines and best practice. Several types of media were scrutinized for this literature review, including the Internet, books (electronic and hard copy), and peer-reviewed journals.

These topics are discussed in this literature review:

- Quality definitions and concepts related to this study;
- Sampling methods and sample sizes;
- Understanding errors in Health Care; and
- Quality tools and techniques that can be utilised for reporting.

3.2 Quality Definitions and Concepts

In conducting the literature review and considering appropriate publications, this researcher noted that some quality terminology was not used consistently, which could cause confusion. So for clarity, in the context of this research study, the definitions related to quality are discussed and explained.

3.2.1 Quality within the Context of Managed Care Services

The concepts of quality and continuous quality improvement was originally applied in the manufacturing industry, but has gradually evolved and become associated with the service industry, and particularly with health care (Barr & Dowding 2009, p. 183).

Rust and Oliver (1994, pp. 2-3) point out that service quality is a subjective perception or experience. Thus understanding how the customer perceives service quality is vital for its effective management. Three specific concepts associated with the customer's perception of service quality, are their ultimate satisfaction after service delivery, the actual measurement of the service quality, and the value the service brings (perceived or actual value). Aspects of managing service quality involve the design of the service, the service setting, and the actual service delivery activities.

Service delivery is further explained by Rust and Oliver (1994, p. 13) to be seen by customers as their experience of an expected series of events, and their expectations of the role played

by the supplier. How the service was provided at a specific instance, also affects the customer's perception of service quality (Rust & Oliver 1994, p. 3).

These definitions and dimensions of quality fit in with Nattras (1992), as cited in Kemp and Richardson (1995, p. 17), indicating that quality in health care has three dimensions. The dimensions include the primary focus on the external and internal customer's needs and expectations, analysing and improving processes, and meeting requirements which are measurable and agreed upon.

Continuous quality improvement in health care is defined by McLaughlin and Kaluzny (2013, p. 4) as the organisational process whereby employees plan and carry out identified improvements continuously, to ensure the health care quality "meets or exceeds expectations".

Quality and continual improvement is important to the Managed Care Organisation to ensure good customer experience, and to constantly improve the quality of the services. According to Barr and Dowding (2009, p. 183), these are vital to business success and sustainability.

3.2.2 The Three Spheres of Quality

Foster (2013, pp. 17-18) identifies three spheres of quality which are necessary to manage quality, providing the quality definitions for this study. The three overlapping spheres are Quality Management, Quality Control, and Quality Assurance, as depicted in Figure 3.1.

Figure 3.1: The three spheres of quality
(**Source**: Foster 2013, p. 18)

3.2.2.1 Quality Management

A quality system is defined by Manghani (2011, pp. 34-35) as the “organizational structure, responsibilities, processes, procedures and resources for implementing quality management”. Manghani also asserts that both Quality Control and Quality Assurance form part of Quality Management. Foster (2013, p. 435) reiterates this concept stating that Quality Management are those management functions and processes that “overarch and tie together quality control and quality assurance”.

The International Organization for Standardization’s (ISO) international quality standard for “*Quality management systems — Fundamentals and vocabulary*” (ISO 9000:2015), supports Foster’s statement above regarding Quality Management (2013, p. 435). ISO’s definition of quality management states that “Quality management can include establishing quality policies and quality objectives, and processes to achieve these quality objectives through quality planning, Quality Assurance, Quality Control, and quality improvement”.

Foster (2013, p. 18) advocates that quality is the responsibility of all management, and not only that of the Quality Manager. Quality management activities include the planning and design of processes and interaction of all the electronic systems that support quality and quality improvement. Furthermore, leadership should support and create a quality culture at all levels, recognising employees, providing training and ensuring effective communication throughout the organisation.

3.2.2.2 Quality Control

The second sphere for discussion is that of Quality Control, which ISO 9000:2015 defines as “part of quality management focused on fulfilling quality requirements”.

Manghani (2011, pp. 34-37) points out that Quality Control is focused on operational activities carried out during the process, to ensure the process outputs fulfil the intended quality requirements. Juran and Godfrey (1999, p. 41.18) indicate that Quality Control ideally includes daily checks to ensure that the quality problems are identified in-process, and that appropriate action is taken to eliminate them. Foster (2013, p. 435) defines Quality Control as the process of collecting and analysing process data to ascertain whether the process displays “non-random variation”. Quality Control is meant to proactively prevent quality issues.

Foster (2013, p. 18) articulates that Quality Control activities could include any of the following actions:

- “monitoring process capability and stability;
- measuring process performance;
- reducing process variability;
- optimizing processes to nominal measures;
- performing acceptance sampling;
- developing and maintaining control charts”.

3.2.2.3 Quality Assurance

Quality Assurance is the other quality sphere which Manghani (2011, p. 35) states is ideally a separate department, frequently carrying out quality audits or reviews independently from the operational teams. These assurance activities focus on providing confidence that quality requirements are met, for example legislative and legal requirements, standard operating procedures, etc.

Foster (2013, p. 18) defines Quality Assurance as “activities associated with guaranteeing the quality of a product or service”, which is often associated with the overall process, product or service design, not the operational activities. Quality Assurance is described by Bergdahl *et al.* (2007, p. 63) as the total review of the production performance on a regular basis. ISO 9000:2015 affirms that Quality Assurance is “part of quality management focused on providing confidence that quality requirements will be fulfilled”.

Quality Assurance activities could include having a project management team focusing on electronic system design and enhancements, testing any proposed changes off-line before implementation on the live electronic systems, and improvement of processes.

3.2.3 Quality Assessment

Quality Assessment is defined by Catapult Consultants (2010, p. 6) as a separate action that confirms compliance or adherence to the required process specifications, standards and performance indicators. Using objective criteria that are measurable and detectable are essential to assess the quality of the service delivery.

Owing to the real-time transactional nature of the services provided by the HIV DMP in a call centre environment, it is not practical to assess or measure all aspects of the process performance during the process as it is performed in the manufacturing industry. Some quality parameters that can be measured in-service, are time taken to answer an incoming call, number of calls answered, or time spent on an intervention.

In the context of the Managed Care Organisation and delivery of Managed Care programmes, Quality Assessment is the process that evaluates the interactions and transactions after the service has been provided or delivered, to identify any errors or omissions. The Quality Assessment process activities conducted in the HIV DMP, consist of a set of objective measures in the form of a checklist (the quality scorecard or Quality Questionnaire) which identifies and records any omissions or errors identified. The results are shared with the individual employees so that they are aware of the aspects they need to improve.

Once the errors and their root causes have been identified, then a Quality Assurance activity like process improvement or electronic system design can (again) be implemented. Quality Control will consist of the daily checks to identify problems proactively, or at the point or time of service delivery.

3.2.4 Conclusion

The different quality terms used in the context of the Managed Care Organisation where the research was conducted, was clarified and described in this section. This ensures that there is no confusion when these terms are used in the literature reviews and analysis of the three research questions following hereafter.

3.3 Sampling

This section clarifies the term population, and investigates the sampling design requirements, the different sampling methods and sample sizes that can be used to ensure representative sampling and valid results for the HIV DMP Quality Assessment process.

McLaughlin and Kaluzny (2013, pp. 102; 346) point out that the intention of collecting data for quality improvement, is to analyse it for variation and to help identify root causes of problems or errors. The data collection requirements must be identified upfront, which include the sampling strategy and analytical approaches to be applied.

3.3.1 Data Population

A population is expressed by the U.K.'s National Audit Office (2001, pp. 6; 18) simply as the quantity of items from which the sample is drawn. ISO 3534-2:2006 defines a population as the "totality of items under consideration".

The items in the population can consist of the various fields that are captured or data that is imported into the record keeping systems used (electronic or paper-based). An example would be electronic Service Provider claims submitted for payment.

From this database (the population), specific data parameters can be extracted by running electronic report instructions specially created according to business monitoring or reporting requirements. It stands to reason that the electronic reports created, are limited to the parameters available in the database. It is thus crucial when the systems are initially designed (or purchased), that the monitoring and reporting requirements are detailed in the system specifications, namely the design and development input as defined by ISO (ISO 9001:2015, p. 11).

The likelihood that a population (the database) and the resulting extracted sample, will be perfectly accurate in all ways, is unlikely. No matter what the data owner(s) may claim, most data will have some defects. There are counteractive measures that can be taken to make the sample more suitable. This could include amending the IT report instructions, extracting a larger sample, removing items that do not qualify, using substituted or estimated data, or taking data from various sources (National Audit Office 2001, p. 6).

It is not realistic that all work can be assessed for quality if the population is large. Assessment would be too time consuming, take too much effort or manpower, and thus be too expensive (McColl, 2019). As it is not practical to assess all work (the population), quality is estimated based on samples. Barreiro and Albandoz (n.d., p. 3) asserts that it is essential that samples are chosen in an appropriate way so that conclusions for the whole population can be obtained. Or as ISO 3534-2:2006 expresses it, the definition of a representative sample **"**indicates that the sample is a mirror image or a miniature of the population".

The "*International Standard on Auditing 530"* (IFA n.d., p. 445), states the following audit sampling requirements:

- Sample design: take into consideration and define the objective or purpose of the audit (assessment), as well as the population's attributes or characteristics;
- Sample selection or sampling method: items selected for the sample must be chosen in such a manner so that "each sampling unit in the population has a chance of selection";
- Sample size: to ensure that the sampling risk is at the lowest acceptable level, the sample size must be adequate.

Figure 3.2 summarises these sampling requirements.

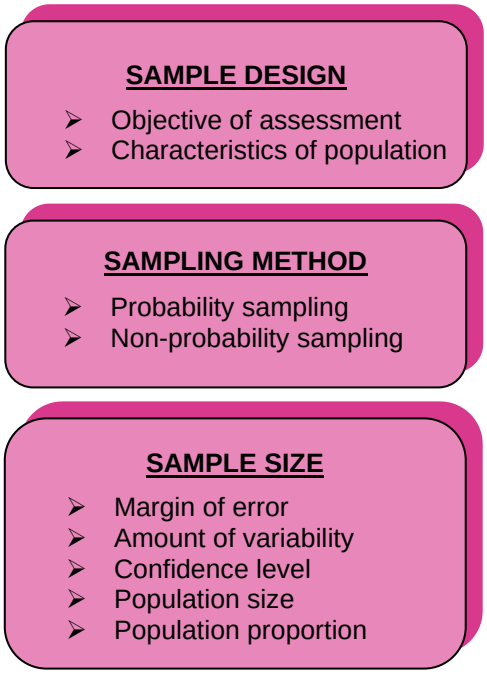


Figure 3.2: Factors influencing representative sampling and valid results
(**Source**: Own source)

3.3.2 Sample Design

On examination of the first aspect of sample design, namely the purpose of the Quality Assessment process (IFA n.d., p. 445), the main objective is to identify any clinical, legislative, financial or reputational risks emanating from any errors or omissions. Other organisational objectives to be included are those related to monitoring and measurement. These performance measures must be available and extractable from the organisational database. If not, measures to make them accessible need to be taken.

The second requirement of sample design is to define the population's attributes or characteristics (IFA n.d., p. 445). Because of the nature of the services provided by the HIV DMP, an attribute of the population is that it is not fixed with a known distribution (Perla, Provost & Murray 2013, p. 37).

Note 3 to ISO's definition of a population (ISO 3534-2:2006), states that "a population can be the result of an ongoing process that may include future output", which is compatible to the characteristics of the data from the service delivery process. As a call centre receiving inbound calls and electronic applications or supporting documentation, the service and customer (internal and external) drive the process. Thus the population's data is continually being generated by the service delivery process, and cannot be accurately predicted or controlled (Perla *et al.* 2013, p. 36). At the time a report is generated from the database, it is only a

snapshot of the data at that time, which would have changed by the time the next report is provided.

Due to these factors, the population's variables are also less controllable (Perla *et al.* 2013, p. 36). For example, influencing who calls, when they call, how long the call will take, what kind of service is expected, is not possible. The service delivery is in real time, which means that the activities cannot be rescinded. If the wrong information was given or the employee was rude for example, it can only be rectified retrospectively, and only partially at that.

All of the characteristics of the HIV DMPs sample design expounded above, will need to be taken into consideration to ensure representative sampling and valid results for the HIV DMP Quality Assessment process.

The other two deciding aspects to be considered when choosing samples, namely the sampling method (how samples are selected from the population), and the sample size (how many samples from the population are needed), are explicated in the subsequent sections.

3.3.3 Sample Selection or Sampling Method

There are many different ways in which a sample can be selected. Barreiro and Albandoz (n.d., p. 4) indicate three types of sampling.

- Probability sampling, where each element of the population has the same chance of being chosen. It ensures that the sample is representative of the population, and sampling errors can be estimated. These are all statistical methods.
- Purposive or non-probability sampling, when sample selection is done in a non-random way, so each element of the population does not have the same chance of being chosen. Whoever is selecting the sample, is the one who attempts to make the sample representative, and that depends on their opinion or purpose for the sample's selection. In other words, these are non-statistical methods of sampling.
- No-rule sampling, where no rules are applied when the sample is selected. This sample will only be representative if there is no biased selection with a homogeneous population. As the HIV DMP population is diverse with much variation, this type of sampling will not be considered in this research study.

A fourth way of determining sample sizes of populations, is using pre-populated tables corresponding to the sample's required parameters in different combinations (e.g. margin of error, confidence level, and the estimate of proportion). These sample sizes do not include any disqualified items, for example a survey questionnaire sent but not received, or a telephone

call that is too short to assess. These items are usually replaced to ensure the sample size is maintained. In smaller populations, if the data is not distributed normally or near normal, it may be necessary to assess the whole population (Israel 2012). An example of a pre-populated table for selecting the sample size, can be found in Table 3.1.

One way ideal samples sizes can be determined, is by using pre-populated tables where the formulas have been calculated. All the sample's attributes are pre-defined, namely the size of the population, related to a specific margin of error, and the required confidence level. It is assumed that the population is normally distributed. One such set of tables is shown below in Table 3.1 (Israel 2012).

Table 3.1: Sample sizes (n) for Population sizes (N) from 100 to >100 000 where the Confidence Level is 95%; Precision Levels (e) or Margins of Error are ±3%, ±5%, ±7%, and ±10%; and the Proportion of the Population (P) = 0.5
(**Source**: Israel 2012)

Size of Population (N)	Sample Size (n) for Precision (e) of:			
	±3%	±5%	±7%	±10%
100	entire population	81	67	51
125	entire population	96	78	56
150	entire population	110	86	61
175	entire population	122	94	64
200	entire population	134	101	67
225	entire population	144	107	70
250	entire population	154	112	72
275	entire population	163	117	74
300	entire population	172	121	76
325	entire population	180	125	77
350	entire population	187	129	78
375	entire population	194	132	80
400	entire population	201	135	81
425	entire population	207	138	82
450	entire population	212	140	82
500	entire population	222	145	83
600	entire population	240	152	86
700	entire population	255	158	88
800	entire population	267	163	89
900	entire population	277	166	90
1,000	entire population	286	169	91
2,000	714	333	185	95
3,000	811	353	191	97
4,000	870	364	194	98
5,000	909	370	196	98
6,000	938	375	197	98
7,000	959	378	198	99
8,000	976	381	199	99
9,000	989	383	200	99
10,000	1,000	385	200	99

Size of Population (N)	Sample Size (n) for Precision (e) of:			
	±3%	±5%	±7%	±10%
15,000	1,034	390	201	99
20,000	1,053	392	204	100
25,000	1,064	394	204	100
50,000	1,087	397	204	100
100,000	1,099	398	204	100
>100,000	1,111	400	204	100

Figure 3.3 depicts the two main types of sampling methods examined for this study, namely probability sampling and non-probability sampling. Each method has different ways to select samples, depending on various factors.

For random sampling, one of the probability sampling methods, there are two types. The one type is simple random sampling or random sampling with replacement, If there are any unsuitable items in the sample, it will be replaced with another item from the population. Thus the sample size stays static. The other type is random sampling without replacement.This is when an item is selected for a sample, but not returned to the population again. The item can, therefore, only occur in the sample once.

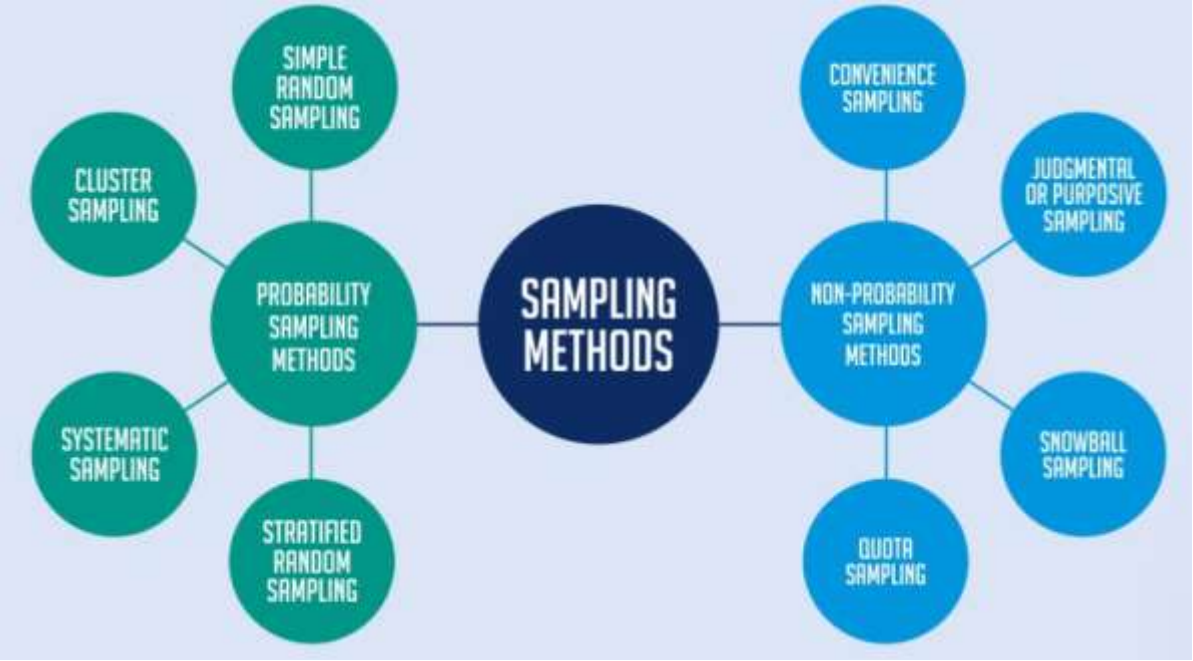


Figure 3.3: Types of sampling methods
(**Source**: Bhat 2019)

Tables 3.2 and 3.3 set out more details regarding probability sampling and non-probability sampling. Each method is defined and explained, with their advantages (or uses) and disadvantages (or limitations), and an example.

Table 3.2: Probability methods of sampling
(**Sources**: Westfall, 2012; National Audit Office 2001, pp. 11-12; Barreiro & Albandoz, n.d.:pp. 4-11; Dudovskiy, n.d.)

PROBABILITY SAMPLING METHODS			
Definition / Explanation	**Advantages / Uses**	**Disadvantages / Limitations**	**Examples**
Sampling Method: Random Sampling			
- Items are selected in a random manner. - Each item in the population has an equal possibility of being selected.	- Justifiable population estimates and sampling error is generated. - Straightforward sample design and analysis.	- Population must be complete and accurate. - For small and homogenous populations. - Not all elements or subgroups of the population may be in a sample. - If small sample size, then high sampling error.	- All new application forms that were received on a specific day. Randomly choose x amount to assess the completeness and accuracy of capturing by Admin Assistants. All Admin Assistants might not be included in the sample.
Sampling Method: Cluster Sampling			
- Items in the population can be found in groups (clusters) that share a common factor. - Samples of groups are randomly chosen, then all items within each group are evaluated.	- Time efficient. - Cost effective. - Less effort. - Population information does not have to be complete.	- Greater sampling error than other random sampling methods which may need a larger sample size to compensate.	Assessment of: - All inbound calls of a certain duration; - Each category of employee (e.g. Counsellor); - Type of work e.g. capture / counsel; - Time of day / days of week / weeks of month / months of year; - All new employee's work for first 3 months after training.
Sampling Method: Stratified Sampling			
- When the whole population is divided into homogenous strata (subgroups) and sampling (random or systemic) is done on each of the strata. - Strata can, but do not have to be, of equal size. - Can randomly select the same number of items from each subgroup (e.g. 10 inbound calls from each of the three employee categories) or in the same proportion the subgroup has in the population	- As items from each subgroup of the population are included, it is more representative of the population. - The sampling error rate should be reduced. - Different sampling methods can be applied to each subgroup as they are "mini" populations.	- Population information must be good. - Calculations are complicated.	All the inbound and outbound calls for the day are divided according to employee category e.g. Admin Asst, Counsellor, Case Manager Registered Nurse, Case Manager Pharmacist.

PROBABILITY SAMPLING METHODS			
Definition / Explanation	**Advantages / Uses**	**Disadvantages / Limitations**	**Examples**
(e.g. 40 items selected from the population, of which 10% are group A, 60% group B, 25% group C and 5% group D. Thus 4 from group A, 24 from group B, 10 from group C and 2 from group D would be chosen).			
Sampling Method: Systematic Sampling			
- Starting point randomly selected from a list between 1 and *n* (but not the first item on the list), then every *n*th item is selected where *n* = population size divided by sample size.	- Time efficient. - Cost effective. - Less effort. - Items selected come from all over the population.	- Not to be used if there is periodicity in the population (when the cycle period used is the same as the sampling interval). - Population must not be ordered in any way before choosing the items as the objective is not to compare certain factors in the population with each other.	An Excel report of all the inbound and outbound calls for the day totals 1000 (total population). 6% of all calls need to be assessed. Thus 6% of 1000 = 60 which is the sample size. *n* = 1000 divided by 60 = 16.7 = 17. Thus every 17th line on the report must be assessed starting from any of the lines between 2 and 16.

Table 3.3: Non-probability methods of sampling
(**Sources**: Westfall 2012; National Audit Office 2001, pp. 11-2; Barreiro & Albandoz n.d., pp. 4-11; Dudovskiy n.d.)

NON-PROBABILITY SAMPLING METHODS			
Definition / Explanation	**Advantages / Uses**	**Disadvantages / Limitations**	**Examples**
Sampling Method: Convenience or Haphazard Sampling			
- The most accessible data or people are used for the sample. - Should be randomly chosen.	- Appropriate for small sample sizes. - Time efficient.	- Predisposed to volunteer bias. - Results cannot be applied to the population as a whole.	Close eyes and point to a file or a line item in a report for assessment.
Sampling Method: Judgemental or Purposive or Deliberate Sampling			
- The person drawing the sample uses their own judgement, opinion, knowledge or experience in selection of items. - Reason for the assessment is taken into consideration.	- Appropriate for small sample sizes. - Must have well defined method for choosing the items. - Used for case studies or demonstrative examples. - Elements that do not fit the criteria are excluded from the sample.	- Predisposed to bias. - Sample size may be too small to be reliable. - Results cannot be applied to the population as a whole.	- Non compliances that were found before. - Tasks that have a high risk for errors. - Poor performers.

NON-PROBABILITY SAMPLING METHODS			
Definition / Explanation	**Advantages / Uses**	**Disadvantages / Limitations**	**Examples**
Sampling Method: Snowball Sampling			
- An initial group of individuals or data is selected. These individuals indicate other potential subjects with similar characteristics to take part in the study.	- Used when target population is difficult to locate due to the sensitivity of the topic or status.	- Could be a very small sample. - Could take a lot of effort and time.	Surveys or studies where special populations are scrutinized e.g. HIV/AIDS positive people, Illegal immigrants.
Sampling Method: Quota Sampling			
- The population is divided into subsets fitting a pre-determined set of criteria that is representative of the population. Individual items are then chosen from that subset.	- Time efficient. - Cost efficient. - The sample should be representative of the population. - This may be the only sampling method available for the chosen criteria.	- Predisposed to bias. - Sample size may be too small to be reliable. - Need to know the population well. - Cannot calculate either the sampling error or confidence limits.	All inbound calls from which only the new employees' calls are assessed.

3.3.4 Sample Size

The U.K.'s National Audit Office sampling guide (2001, p. 7) identifies five factors that must be taken into consideration when deciding the appropriate sample size to achieve the best accuracy. These factors are:

- The margin of error;
- The confidence level;
- The amount of variability in the population;
- The proportion of the population; and
- The size of the population.

Each of these factors are discussed separately.

3.3.4.1 Margin of Error

The margin of error is also known as the margin of precision, the level of precision, or the sampling error. It is represented as 'e', and expressed as a ± percentage number.

This is the range of the possible difference between the sample estimate, and the true population value. The presumption is, that no sample will give the exact same measure as the actual true population's measure. The smaller the margin of error, the lower the confidence level.

For example: A Researcher finds a sample's value to be 75% with a precision level of ±5 percent. Thus it can be deduced that the true population measure is between 70% and 80%.

3.3.4.2 Confidence Level

The confidence level is also called the risk level. The information from the U.K.'s National Audit Office (2001, p. 7) and Israel (2012) is merged for the explanatory paragraphs below.

The confidence level is based on the Central Limit Theorem. This Theorem states that if one repeatedly takes a large enough quantity of unbiased or independent random samples (with replacement) of the same size from a population, at some point the distribution of the sample mean (i.e. the average) will be almost normally distributed.

This applies to normal as well as non-normal data sets. The population, which is distributed normally, will only need a few samples to validate the Theorem. Conversely, if a population is extremely non-normal, a large quantity of samples will be needed to confirm the Theorem.

Thus, in a normal distribution (or Bell Curve), 95 out of 100 samples (95%) will be within 2 standard deviations from the mean, which is the actual true value of the population. This means that at 95% confidence level, the risk of the sample not representing the actual true value of the population, is 5%.

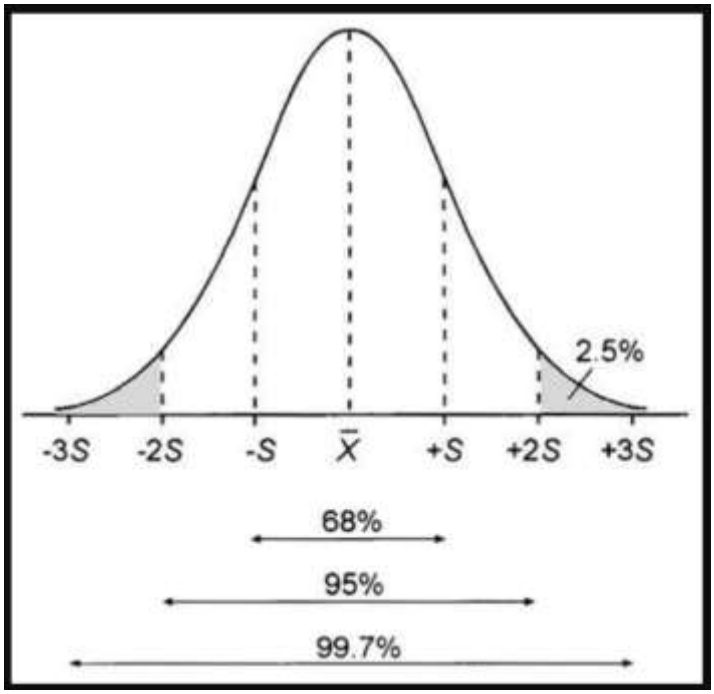


Figure 3.4: A normal distribution (Bell Curve) chart to demonstrate 95% Confidence Level
(**Source**: van Reeuwijk 2008)

There will always be some samples that will be greater than, or lesser than, the Bell Curve's two standard deviations from the mean. For 95% confidence level, if the sampling distribution is shaped as the Bell Curve (i.e. normal distribution), 2.5% of the samples will be above (+2S), and 2.5% below (-2S) two standard deviations from the mean. In Figure 3.4, the sum total of 5% is the addition of the two shaded areas on either side of the Bell Curve.

Usually a 95% confidence level is used to make valid conclusions. Levels of 99% (higher confidence, lower risk, larger sample size) or 90% (lower confidence, higher risk, smaller sample size) can be applied. It depends on the risk level that is acceptable to the organisation.

3.3.4.3 Amount of Variability in the Population

The range of values, the degree of variability, spread, dispersion and distribution, are all synonyms for the amount of variability in the parameters of the population that are being measured (Frost 2019; Israel 2012; National Audit Office 2001, p. 7). Variability relates to the width of the distribution of the population, or what distance the individual parameters of the population are from the mean. There are different ways to measure the amount of variability in the population, but not all are suitable for heterogeneous populations.

Some variation in the range of values in the population is expected – there will usually be a very small or large value in the population, and subsequently the same in the sample. Generally it does not cause a problem. However, if there are many such deviations in the population and samples (i.e. much variability in the data), it could affect the whole range of results, even if the deviations are uncommon. Using the range for sample sizes that differ, increases their unreliability, because larger samples will have larger ranges. Thus using only the range of values to assess the amount of variability, is not ideal.

The standard deviation is usually used as the measure of variability, which is the standard or usual difference between each data item and the mean. The smaller the standard deviation, the closer the items are to each other and vice versa. This is because the standard deviation's units are the same as the data's units. Therefore the interpretation of the data is simpler. Usually the standard deviation is not known and needs to be estimated.

The more the parameters of the population are the same (more homogenous), i.e. the less variable they are (more consistent), the smaller the sample needs to be as the estimated standard deviation will be more accurate. Or, the less the parameters of the population are the same (more heterogeneous), i.e. the more variable they are (less consistent), the larger the

sample needs to be for a specific level of precision (i.e. margin of error or sampling error), as the estimated standard deviation will be less accurate.

3.3.4.4 The Size of the Population

Population size (symbolised by 'N') does not usually affect the size of the sample. Normally the larger the population, the lower the proportion needed to be sampled to be representative. The population size only needs to be part of the formulae to calculate the sample size, if the intended sample size is more than 5% of the population.

3.3.4.5 The Proportion of the Population

The proportion is the fraction or percentage of the population that meets the characteristics that are being looked for (not if the average value is required). It is expressed in the form of a decimal number and can be estimated from what is known about the population. For example, the items in the population size of 1000 that meets the characteristics being looked for, is 70. Hence 70/1000 = 0.07.

However, the whole population is too large to know for certain that 70 is the correct number of items that meet these characteristics. So the data from the sample is used to estimate the proportion, as it will be the same for the sample and the population, and is determined in the same way.

The estimate of the proportion is represented by 'P'. If the proportion is unknown, P = 0.5 is used as this will provide the largest estimate of the sample size.

In section 5.2 (Sampling Methods and Sampling Sizes), these elements will be considered to identify the most suitable sampling methods and sample sizes to be used for the HIV DMP Quality Assessment process.

3.4 Understanding Errors in Health Care

To ensure high quality Managed Care services are provided, critical quality errors in the HIV DMP must be identified and addressed. This is ultimately the primary purpose of the HIV DMP's Quality Assessment process.

3.4.1 Introduction

The factors regarding the classification and grading of errors are outlined below, followed by a discussion of the errors in health care in the context of James Reason's human error theory. A possible solution for identifying and analysing errors will be explored, as well as factors preventing the reporting of errors. For the purposes of this study, patient and beneficiary are used as synonyms.

3.4.2 Error Classification

According to Ryan and Bernard (2003, p. 87), themes or categories are discovered when concepts are compared and seem to be related to a similar phenomenon. Concepts, when grouped together, are called a category or class.

Many different terms apply to themes. Ryan and Bernard (2003, pp. 87-88) found that themes can also be called categories, codes, labels, expressions, incidents, segments, thematic units, data-bits, chunks, units, concepts. It all depends on the context in which they are used. Themes come from the data being used, or from the user's prior experience and knowledge, and from literature or theories. Without thematic categories, comparisons are impossible.

McLaughlin and Kaluzny (2013, p. 315) explain that due to the diversity of activities carried out in a health care organisation's programme, classification systems can be very valuable to enable comparative analysis of health care quality problems. A common error classification system applied across processes or programmes, can facilitate quality comparisons, and assist in managing and sharing information.

Furthermore, a classification system for errors is needed before a systematic method for error responses and solutions can be developed. Associating categorised errors with related corrective and preventive actions can support management in their continual improvement efforts. After investigation of the error and being able to slot it into one of the recognised categories, conducting a full root cause analysis for every recurring error is not needed. Thus resources are used more effectively and efficiently.

Once classified, analysing all the error types across the organisation or programme may add more value to identifying common system, people and process problems than focusing on single events. This approach encourages the organisation to look at the many contributing factors that lead to or cause errors (McLaughlin & Kaluzny 2013, p. 328). This could result in

more varied and specific corrective and preventive actions, rather than just using vanilla responses like ‘coaching and training needed’.

Health Care Programmes are unique and complex. To enable comparison and identifying appropriate and effective actions for elimination of errors, discovering themes and subthemes, deciding which ones are key, and reducing them to a manageable few, is important (McLaughlin & Kaluzny 2013, p. 328; Ryan & Bernard 2003, p. 85).

3.4.3 Error Grading

Muppavarapu (2011, pp. 1; 4) states that traditional quality measurement systems have certain inherent deficiencies, one of which is the non-discrimination between errors of varying criticalities. Errors could consist of all non-critical errors, all extremely critical errors, or a combination of both.

The problem with this non-discrimination, is that all defects or errors identified are deemed to be equal with each other, which could lead to skewed analysis. Thus less critical and more critical errors are penalised the same. Or a critical error is not penalised as much as it should be.

Muppavarapu (2011, p. 4) provides an example of a car instruction manual as illustration that considering all errors equally critical, is not the most suitable method for measuring quality. The example used, is as follows:
If a page of the manual consists of ninety-eight words and two diagrams, realistically “there are one hundred opportunities for error on that page”. However, an error in one of the diagrams “could be extremely critical”. If the motorist gets stuck alongside the road as a result of the car breaking down, and the manual does not describe the part needing to be fixed correctly or adequately, it could lead to a major problem. One “missing punctuation mark” on that page, in contrast, will not be as critical as the one error in the diagram.

Health Care as a service, and a complex one at that, has many possibilities of critical errors that could have very negative outcomes as illustrated in section 2.6 (Possible Consequences of Poor Quality Service in Managed Care). Identifying these critical errors and marking them for urgent correction, specifically in the HIV DMP, could be useful in improving the quality of the Managed Care service.

In section 5.3, the quality requirements used in the Quality Assessment process, will be explored further to determine if all critical errors are included in the Quality Questionnaires.

3.4.4 Errors in Health Care

3.4.4.1 Definitions of Errors in Health Care

Errors occurring in health care are also referred to as adverse events, lack of patient safety, harm to patients, and making mistakes. The terms are used interchangeably within this study. These errors can occur at any point in the continuum of health care in any health setting, which includes Managed Care Organisations.

Definitions of error depend on the environment in which it occurs (Whittingham 2004, p. 3). The World Health Organization (WHO) defines patient safety (which is the opposite of patient harm) as follows:

> "The absence of preventable harm to a patient during the process of health care and reduction of risk of unnecessary harm associated with health care to an acceptable minimum.
> An acceptable minimum refers to the collective notions of given current knowledge, resources available and the context in which care was delivered weighed against the risk of non-treatment or other treatment" (WHO 2019).

According to the WHO's definition, error occurring in the process of delivering health care is preventable. And risks can never be eliminated completely, but may be reduced to a level that is acceptable when compared to the advantages of the care activity (Whittingham 2004, p. 11).

The American National Patient Safety Foundation (NPSF), released a report which contains three distinct definitions that could assist in clarifying the array of terms used for errors in the Managed Care Organisation. These definitions are as follows:

- **"Adverse event:** Any injury caused by medical care. Identifying something as an adverse event does not imply "error," "negligence," or poor quality care. It simply indicates that an undesirable clinical outcome resulted from some aspect of diagnosis or therapy, not an underlying disease process. Preventable adverse events are the subset that are caused by error.
- **Error:** An act of commission (doing something wrong) or omission (failing to do the right thing) that leads to an undesirable outcome or significant potential for such an outcome.
- **Harm:** An impairment of structure or function of the body and/or any deleterious effect arising therefrom, including disease, injury, suffering, disability and death, and may be physical, social, or psychological" (NPSF 2015, p. xii).

3.4.4.2 Classifications of Errors in Health Care

Many error classification systems are available. One widely used system is the Generic Error Modeling System (GEMS) which was developed by James Reason (McLaughlin & Kaluzny 2013, pp. 316-317). Reason's work has been widely used in many industries, and referred to in numerous noteworthy publications. Regarding American health care, amongst the most significant reports using his theory were published under the auspices of the Institute of Medicine (IOM) and Department of Veteran Affairs' (VA) National Center for Patient Safety (NCPS).

Reason's (1990) definition of human error, reads as follows:

> "A generic term to encompass all those occasions in which a planned sequence of mental or physical activities fails to achieve its intended outcome, and when these failures cannot be attributed to some chance agency" (as cited in Whittingham 2004, pp. 5-6).

Reason's determination if an error has occurred or not, doesn't focus on the action itself, but rather on the consequence(s) of the action. If the result is not what was originally intended, or another action was necessary to produce the intended result (an intervening action), it is classified as an error.

The severity of the error is also determined by its consequence. Some errors will have a negligible effect, whilst others may have a catastrophic effect as illustrated in Muppavarapu's (2011, p. 4) example of the errors in a car instruction manual in section 3.4.3 (Error Grading).

Furthermore, Reason classifies errors according to the intention of the person. Slips, lapses and mistakes, are regarded as unintentional, as one of two failures caused the error (IOM 2000, pp. 54-55):

- The actions did not happen as intended or planned, thus the desired outcome *may or may not* have been accomplished (an error of execution). These could be slips which can be observed (e.g. choosing an incorrect intervention category on the system), or lapses, that are not observable (e.g. forgetting).
- If the intended action was not the right action, the desired outcome *could not* be accomplished (an error of planning). Mistakes falls in this category.

A violation, on the other hand, is usually an intentional act, where a person consciously does not adhere to a rule or is non-compliant. It is, however, possible that the person committing the

violation, knows they are contravening a rule, but does not fully know what the consequences will be (Whittingham 2004, pp. 6; 26-27).

Reason based GEMS on Rasmussen's model explaining human performance in various circumstances (Whittingham 2004, pp. 15-23). Rasmussen's taxonomy distinguishes three categories of human behaviour, which is skill-, rule- and knowledge-based (SRK) behaviour. Skill-based behaviour includes slips and lapses. Mistakes are rule- and/or knowledge-based behaviour.

Figure C.1 in Appendix C gives a diagrammatical summary of Reason's GEMS' taxonomy of human error, and how Rasmussen's SRK taxonomy is integrated. The figure also gives more detail in which circumstances these errors occur, and what the root cause of the failure is for each type of error. All these errors could potentially cause harm to patients (IOM 2000, pp. 54-55). Using Reason's GEMS taxonomy, the fundamental causes of human error can be understood, and therefore assist management in deciding where improvement strategies could be targeted.

In Appendix D, Reason's Decision Tree for Determining Culpability of Unsafe Acts, is provided. Figure D.1 shows the questions that need to be asked to identify Reason's types of errors. It graphically demonstrates the concepts explained in this section: that of intention and planning, and their influence on the type of violation or error made (slip, lapse or mistake).

Hobbs (2008, pp. 46-52) sets out Reason's theory in detail and provides a guideline with step-by-step instructions to use Reason's Decision Tree, as it is not specifically explicated in Reason's 1997 book "*Managing the Risks of Organizational Accidents"*.

3.4.5 Seeking Solutions for Errors in Health Care

Awareness and investigations into the safety of patients in hospitals and other health care organisations, was a definitive topic in America during the early 1990s. A patient safety improvement handbook was published by the U.S. Veterans Health Administration (VHA) in 1998 (VHA 2011, p. 1). And in 1999, the National Center for Patient Safety (NCPS) was established.

In 2000, a significant document was published by the American Institute of Medicine's (IOM) Committee on the Quality of Health Care: "*To Err is Human – Building a Safer Health System*". This report was the result of collaborative research by the National Academies of Sciences and Engineering, and the IOM (IOM 2000, p. ii).

Referencing an extensive array of literature and data, the Committee established that there was a high incidence (and cost) of preventable medical errors occurring in American hospitals. Errors in other health care settings could not be corroborated at the time due to the scarcity of data. Identifying patient safety as a vital component of quality health care (IOM 2000, p. 18), many recommendations were made to improve safety in all health care settings, including health care organisations.

A follow up report, "*Crossing the Quality Chasm: A New Health System for the 21st Century*", was released in 2001 by the same committee (IOM 2001). The document set out a strategy with specific measures to improve the quality of health care throughout America's health care delivery system, not only in hospitals.

These two IOM reports were pivotal to bring the topic of patient safety to the fore, and to seek remedies to prevent errors causing harm to American patients in the whole continuum of health care (VHA 2011, p. 1).

After NCPS started addressing patient safety concerns, it was noted that only events that had already happened were evaluated. Looking to various other industries for Quality Tools to identify and reduce errors before they occurred, none of the existing tools in their current format were found to be suitable. This gave the VHA impetus to develop and implement an error analysis tool designed specifically for health care (DeRosier, Stalhandske, Bagian, & Nudell 2002). Several quality elements from various industries were used and some modified to create the Health Care FMEA™ (HFMEA™). Refer to Table 3.4 for a summary of the quality elements used from other industries, their origins, and which ones were modified for HFMEA™.

Table 3.4: HFMEA™ Components and their origins
(**Source:** DeRosier *et al.* 2002, p. 250)

Concepts Employed	HFMEA™	FMEA	HACCP	RCA
Team membership	•	•		•
Diagramming process	•	•	•	
Failure mode and causes	•	•		
Hazard Scoring Matrix	•			•
Severity and probability definitions	•	†		•
Decision Tree	•		•	
Actions and outcomes	•	†		•
Responsible person and management concurrence	•	†		•

* *HFMEA, Health Care Failure Mode and Effect Analysis; FMEA, Failure Mode and Effect Analysis; HACCP, Hazard Analysis and Critical Control Point; RCA, root cause analysis.*
† *Although these components are present in FMEA, they were substantially modified in the HFMEA™ model.*

3.4.6 Failure Mode and Effect Analysis (FMEA)

The 'traditional' Failure Mode and Effect Analysis (FMEA) is a standardised group of activities to identify and prevent errors or defects in a process or product (Ford Motor Company 2011, pp. 2-3; McDermott, Mikulak & Beauregard 2009, p. 1).

This error analysis tool was originally developed in the aerospace industry in the mid-1960s to prevent safety accidents. Later it was used by the automotive industry (amongst others) to continually improve their products and services.

The purpose of the ten step FMEA, is to analyse a process and identify all potential or possible failures at each process step. These failures are known as failure modes as illustrated in Figure 3.5. Each failure mode is risk rated using a ten point rating scale and three variables - severity, occurrence and probability. The final calculation is the Risk Priority Number (RPN) which is a risk rating per failure mode, and determines its prioritisation for action. After completing the improvement action(s), the RPN is re-calculated to identify if the actions were able to reduce the risk. If the RPN is unchanged or higher, the actions need to be modified and repeated until the risk has decreased to the organisation's acceptable level (McDermott *et al.* 2009, pp. 9-10; 23-40).

Figure 3.5: Depiction of a failure mode
(**Source:** Market Business News 2018)

Appendix E contains the following information regarding FMEA for processes:

- FMEA's ten steps (Table E.1);
- Severity rating criteria of the effect of failure on the product, process and customer (Table E.2);

- Process FMEA occurrence evaluation criteria (Table E.3); and
- Process FMEA probability of detection evaluation criteria (Table E.4).

Dhillon (2007, p. 62) indicates that there are numerous advantages for using FMEA. Some of these advantages include:

- Effective to identify safety issues;
- Simple to understand and use;
- An illustrative tool that management can use;
- It could lead to improved customer satisfaction;
- Beneficial to identify and prevent recurring errors; and
- A method which begins with the detail and progresses to the macro level.

It is noteworthy to add that the systemic approach to risk management in FMEA (and HFMEA™), is also applied in ISO 9001:2015 Standard's risk-based model.

3.4.7 Health Care Failure Mode and Effect Analysis™ (HFMEA™)

HFMEA™ uses the same principles as the process FMEA described in the previous section and set out in Appendix E, which is to proactively identify potential failures and improve those steps in the process.

The steps and rating scales used in HFMEA™ to determine the necessary actions to deal with the identified hazards in health care (Tables 3.5 to 3.8), are quoted in its entirety for informational purposes from DeRosier *et al.* (2002, pp. 264-267). These include the following:

- HFMEA™'s five steps (Table 3.5;
- The HFMEA™ Severity Rating Scale (Table 3.6);
- The HFMEA™ Probability Rating Scale (Table 3.7); and
- The HFMEA™ Hazard Scoring Matrix (Table 3.8).

Table 3.5 HFMEA™'s five steps
(**Source:** DeRosier et al. 2002, pp. 264-5)

Step 1	Define the HFMEA™ Topic
Step 2	Assemble the Multidisciplinary Team
Step 3	Graphically Describe the Process
Step 4	Conduct a Hazard Analysis (determine the severity and probability ratings, and look up the hazard score using the Hazard Scoring Matrix™)
Step 5	Determine Actions and Outcome Measures (actions to eliminate or control the failure mode, or accept the cause)

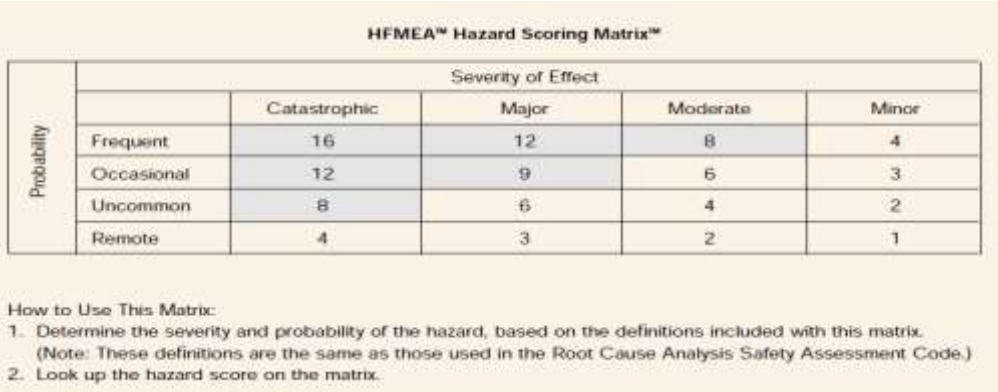
Table 3.6: The HFMEA™ Severity Rating Scale
(**Source:** DeRosier et al. 2002, p. 266)

Catastrophic Event *(Traditional FMEA rating of 10—Failure could cause death or injury.)*	**Major Event** *(Traditional FMEA rating of 7—Failure causes a high degree of customer dissatisfaction.)*
Patient Outcome: Death or major permanent loss of function (sensory, motor, physiologic, or intellectual), suicide, rape, hemolytic transfusion reaction, surgery/procedure on the wrong patient or wrong body part, infant abduction or infant discharge to the wrong family	***Patient Outcome:*** Permanent lessening of bodily functioning (sensory, motor, physiologic, or intellectual), disfigurement, surgical intervention required, increased length of stay for 3 or more patients, increased level of care for 3 or more patients
Visitor Outcome: Death or hospitalization of 3 or more visitors	***Visitor Outcome:*** Hospitalization of 1 or 2 visitors
Staff Outcome: A death or hospitalization of 3 or more staff	***Staff Outcome:*** Hospitalization of 1 or 2 staff or 3 or more staff experiencing lost time or restricted-duty injuries or illnesses
Equipment or facility: Damage equal to or more than $250,000	***Equipment or facility:*** Damage equal to or more than $100,000
Fire: Any fire that grows larger than an incipient stage	***Fire:*** Not applicable—See "Moderate" and "Catastrophic"
Moderate Event *(Traditional FMEA rating of 4—Failure can be overcome with modifications to the process or product, but there is minor performance loss.)*	**Minor Event** *(Traditional FMEA rating of 1—Failure would not be noticeable to the customer and would not affect delivery of the service or product.)*
Patient Outcome: Increased length of stay or increased level of care for 1 or 2 patients	***Patient Outcome:*** No injury nor increased length of stay nor increased level of care
Visitor Outcome: Evaluation and treatment for 1 or 2 visitors (less than hospitalization)	***Visitor Outcome:*** Evaluated and no treatment required or refused treatment
Staff Outcome: Medical expenses, lost time, or restricted-duty injuries or illness for 1 or 2 staff	***Staff Outcome:*** First aid treatment only, with no lost time or restricted-duty injuries or illnesses
Equipment or facility: Damage more than $10,000 but less than $100,000	***Equipment or facility:*** Damage less than $10,000 or loss of any utility without adverse patient outcome (eg, natural gas, electricity, water, communications, transport, heat/air conditioning).
Fire: Incipient stage or smaller	***Fire:*** Not applicable—See "Moderate" and "Catastrophic"

Table 3.7: The HFMEA™ Probability Rating Scale
(**Source:** DeRosier et al. 2002, p. 266)

Probability Rating Scale
Frequent – Likely to occur immediately or within a short period (may happen several times in 1 year).
Occasional – Probably will occur (may happen several times in 1 to 2 years).
Uncommon – Possible to occur (may happen sometime in 2 to 5 years).
Remote – Unlikely to occur (may happen sometime in 5 to 30 years).

Table 3.8: The HFMEA™ Hazard Scoring Matrix
(**Source**: DeRosier *et al.* 2002, p.267)



HFMEA™ Hazard Scoring Matrix™

Probability	Severity of Effect			
	Catastrophic	Major	Moderate	Minor
Frequent	16	12	8	4
Occasional	12	9	6	3
Uncommon	8	6	4	2
Remote	4	3	2	1

How to Use This Matrix:
1. Determine the severity and probability of the hazard, based on the definitions included with this matrix. (Note: These definitions are the same as those used in the Root Cause Analysis Safety Assessment Code.)
2. Look up the hazard score on the matrix.

The key differences and similarities between the FMEA and HFMEA™ processes are set out in Table 3.9 below.

Table 3.9: A comparison between FMEA and HFMEA™
(**Sources**: McDermott *et al.* 2009, pp. 9-10; 20; 23; 25-26; 36; DeRosier *et al.* 2002, pp. 248-267)

'Traditional' FMEA	HFMEA™
10-step process using a multidisciplinary team	**5-step** process using a multidisciplinary team
Evaluates a product / design or a process used to manufacture a product or equipment	**Evaluates** a health care process
Uses process flow diagrams and/or blueprints (or engineering drawings) of the product to identify potential failures	**Uses** process flow diagrams to identify potential failures
Failure affecting the manufacturing process or the product quality	**Failure affecting** a step in the process or sub-process, so the intended objective is not attained
A **failure occurs when** a product does not function as intended; the product malfunctions; the user makes a mistake (intentional or unintentional)	A **failure occurs when** adverse events, close calls or near misses have an effect on the patient's safety and health status
Ask: How can process failure affect the product, processing efficiency, or safety? The 5 elements of a process are used to identify how the process affects the quality of the product (people, materials, equipment, methods, and environment)	**Ask:** What would be the impact on patients or patient care if this should happen? Impacts could include increased health care costs, physical and psychological distress, injury or death
Severity is the potential consequence of the failure A 10 point ranking scale is used – 1 being the least severe/lowest and 10 the most severe/highest	**Severity** is the actual consequence of the failure and only applies to events that have already occurred 4 Severity categories are used – Catastrophic Event; Major Event; Moderate Event; Minor Event
Occurrence is the frequency or probability of the failure occurring A 10 point ranking scale is used – 1 being the lowest and 10 the highest	**Occurrence** is not used separately as all health care errors could cause harm in some way, and would thus be categorised as 10, which is the highest risk factor
Probability of detecting the failure before the impact is seen	**Probability** is the likelihood of the event happening

'Traditional' FMEA	HFMEA™
A 10 point ranking scale is used – 1 being the lowest, and 10 the highest	A 4 point ranking scale is used – Frequent; Occasional; Uncommon; Remote
The **Risk Priority Number** (RPN) is the final calculation of the risk score per failure mode RPN = **Severity** × **Occurrence** × **Detection** A 10 point ranking scale is used – 1 being the lowest, and 10 the highest	The **Hazard Scoring Matrix™** is used to determine the hazard score Hazard score = **Severity** and **Probability** scores on the matrix A 3 point ranking scale is used – 3 being the highest, and 1 the lowest
Evaluate if current **controls** are in place to identify (detect) a failure or its effect If there are no controls for prevention and detection, detection likelihood will be low with a high ranking	Evaluate if current **controls** are in place using the HFMEA Decision Tree™, whether the controls are critical or not (will the whole system fail if that control fails), and if the controls can identify (detect) a failure or its effect

3.4.8 Factors Preventing the Reporting of Health Care Errors

The National Patient Safety Foundation (NPSF) in America, published a report 15 years after the initial IOM reports of 2000 and 2001: "*Free from Harm – Accelerating Patient Safety Improvement Fifteen Years after to Err is Human*" (NPSF 2015, pp. 26-28). One of the recommendations (number 6), is to "support the health care workforce" to create a healthy workplace to enable employees to provide safe care to their patients.

Issues identified by the Lucian Leape Institute (2013, pp. 7-10) that are to be addressed in the work environment of health care workers, include:

- Physical harm, which could include bodily injury, workplace hostility, or any diseases induced by stress; and/or
- Emotional or Psychological harm which may comprise being treated with disrespect, being intimidated or bullied, not having the resources needed to accomplish the work, being ignored, humour at a colleague's detriment, verbal abuse, intimidation (direct or indirect), burnout, fatigue.

In instances where errors are made or detected, employees may find that they are not supported, or are scared they will be punished by their organisation or regulatory body, or face litigation. Thus they do not feel comfortable to report errors or near-misses (Meadows, Baker & Butler 2005). Dr Lucian Leape explains further that this punitive attitude of putting the blame on the employee, and focusing mostly on their improvement and discipline, is termed a 'blame culture' (Lucian Leape Institute 2013, pp. 7-10).

Meadows *et al.* (2005) indicate that the 'blame-free culture' encourages openness to report potential or actual errors. Blame is not assigned to the individual who has made the mistake, but rather focuses on the system issues and combination of the series of events causing the error. However, there must be a balance between the 'blame culture' and the 'blame-free

culture', namely a 'Just culture'. This is a culture where learning from mistakes is necessary for continual improvement, but where there is culpability, disciplinary or other suitable action must be taken.

Bogner (2004, pp. xii-xiii; 7-9) cautions that labelling all mistakes as human error and then not taking further action, does not help to reduce or eradicate errors. Enhancing system design to support the human components causing mistakes, could considerably decrease errors. There are many other systemic factors that could be contributing to the human components which need to be investigated further. These could include the equipment used, the working environment, standard operating procedures, management or operational processes, training, the employees' level of skills, or the electronic record keeping system itself. The root cause or source of the errors could thus be the system itself. If that is not improved, errors will recur and problems continue.

3.4.9 Conclusion

This section examined errors and human errors in health care in particular. The benefits of error classification and grading was demonstrated. Furthermore, the HFMEA™ analysis tool was explained, which is a possible solution to identify and manage errors in the Managed Care Organisation. Lastly, the possible barriers preventing the reporting of errors in organisations was discussed. In Chapter 5, these factors will be discussed further.

3.5 Quality Tools for Reporting

The objective of this section is to identify the most relevant and valuable Quality Tools that can be applied in the reports of the HIV DMP Quality Assessment process, to enhance the value of the reporting of results.

Fonseca, Lima and Silva (2015, p. 606) asserts that Quality Tools (e.g. process flow diagrams, Pareto Diagrams) can be used separately for a specific purpose. Quality techniques, on the other hand, are a set of tools that can be applied more extensively, for example a "statistical process control that uses histograms, process diagrams and control charts".

Pavletic, Sokovic and Paliska (2008, p. 297) indicate that the continuous quality improvement process assumes that Quality Tools are used in improvement activities and decision making processes. But although Quality Tools are easy to apply and interpret, and are invaluable for collecting and analysing data visually, they are not used as much as expected (Pavletic *et al.* 2008, p. 204).

Using Quality Tools in the continuous quality improvement process could enable the Managed Care Organisation to visually identify the key problems and their solutions through the improvement activities and decision making processes. These tools can be used in all phases of a process, from the product or service design and development phase, right through to the delivery of the Managed Care services and their support services (Pavletic *et al.* 2008, p. 297).

3.5.1 The Seven Basic Quality Tools

The process of continuous quality improvement is based on Deming's quality cycle or PDCA cycle. The PDCA cycle is a dynamic model where the completion of one cycle follows with the beginning of the next cycle (Pavletic *et al.* 2008, p. 200).

The seven basic Quality Tools identified by Ishikawa (Pavletic *et al.* 2008, p. 200), can be applied as follows in correlation with the steps in the PDCA-cycle:

- When identifying problems (PLAN): flow chart or process map, cause-and-effect diagram, check sheet, Pareto Diagram, histogram and control charts;
- For problem analysis (PLAN and CHECK): cause-and-effect diagram, check sheet, Pareto Diagram, scatter plot and control charts;
- Developing a solution for an analysed problem (PLAN and ACT): flow chart and scatter plot;
- Evaluation of achieved results (CHECK): check sheet, Pareto Diagram, histogram, scatter plot and control charts.

Foster (2013, p. 240) indicates that these seven basic Quality Tools could be used in a logical order, or in almost any order. Different tools may be more helpful in different stages of the PDCA cycle, depending on the improvement project undertaken (McLaughlin & Kaluzny 2013, p. 92). The suggested logical order for their use is shown in Figure 3.6.

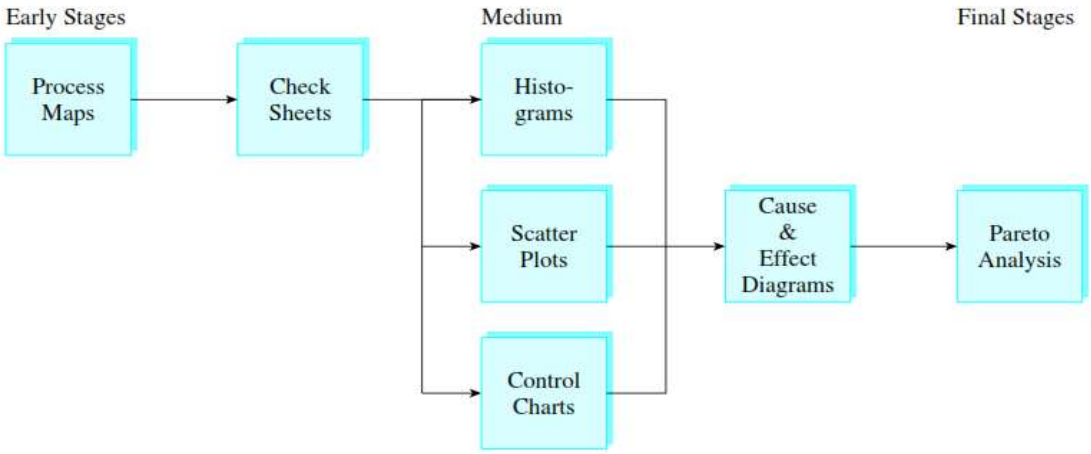


Figure 3.6: Logical map of the order of use for the basic seven (B7) tools
(**Source:** Foster 2013, p. 240)

The flowchart depicts the process flow schematically, so any wastes and improvements can be identified. It also helps to standardise the process. Checklists are used to collect process data, which can be analysed using either histograms, scatter plots, or control charts, depending on the type of data. The analysed data shows where problem areas are, which can be further investigated to identify root causes using the cause and-effect diagram. Once the root causes are ascertained, Pareto analysis can be used to focus on solving the causes which have the greatest negative effect on the service or production, which leads to continuous process and quality improvement. Each of the basic seven tools are explained in more detail below.

3.5.1.1 Process Map or Flow Chart

The process map describes the process and sequence of the steps in a picture format using standardised flowchart symbols. The most common symbols used are a rectangle representing an activity, a decision by a diamond, wait by a triangle, start and finish by an oval (Foster 2013, p. 241). Figure 3.7 shows an example of a process map.

Foster (2013, p. 242) also mentions a SIPOC diagram which is a specific type of process map. SIPOC is an acronym for Suppliers, Inputs, Processes, Outputs, and Customers. It clarifies all the detailed elements of a process map, also in a picture format.

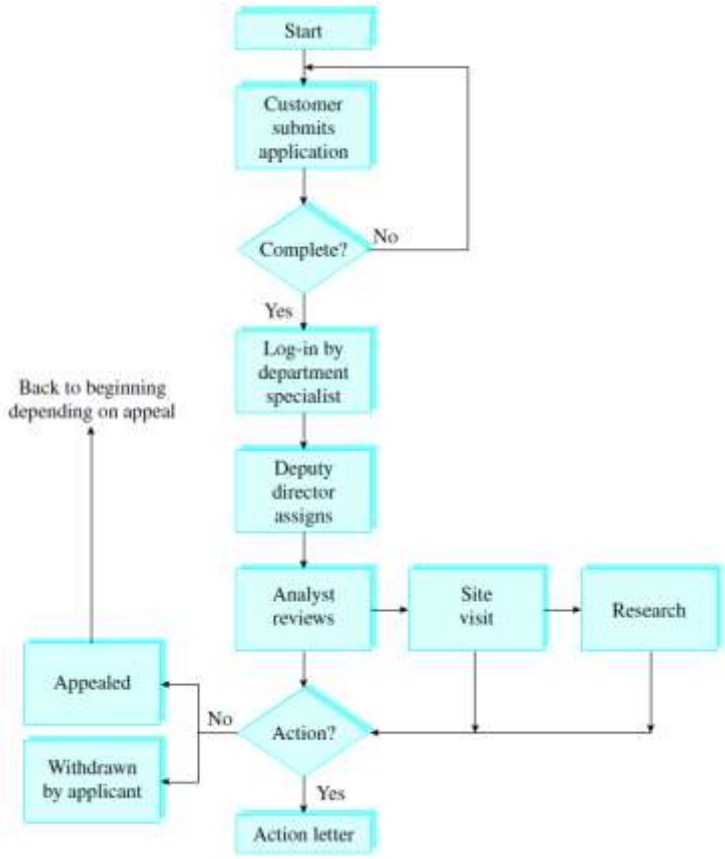


Figure 3.7: An example of a process map or flow chart
(**Source:** Foster 2013, p. 241)

3.5.1.2 Checklist or Check Sheet

A checklist is simply a list of possible defects that can occur in a process that need to be tested (Foster 2013, p. 246). A check mark is put on the sheet whenever a defect is found. Check sheets can be in a tabular, schematic or computer-based format as set out in Figure 3.8 below.

Problem Type	Monday	Tuesday	Wednesday	Thursday	Friday	Total
Setup routines not standardized						
Missing equipment for setup						
Failure to separate internal and external tasks						
Extensive machine resetting and paper change						
Other						

Figure 3.8: An example of a check sheet or checklist
(**Source:** Foster 2013, p. 246)

3.5.1.3 Histogram

A histogram is a graphical illustration of data in a bar graph format (Foster 2013, p. 247). The bar chart shows the data divided into bars of equal width, with the height of the bar showing the quantity (Catapult Consultants 2010, p. 5).

Juran and Godfrey (1999, p. AV.11) state that histograms, when compared with tables, are more useful for several reasons. A data set almost always shows variation, which forms a pattern. The pattern is easier to detect when the data is summarised visually in a histogram, than data organised in tables as depicted in Figure 3.9. Identifying the pattern of variation and identifying the reasons for the variation, is central to the data's interpretation.

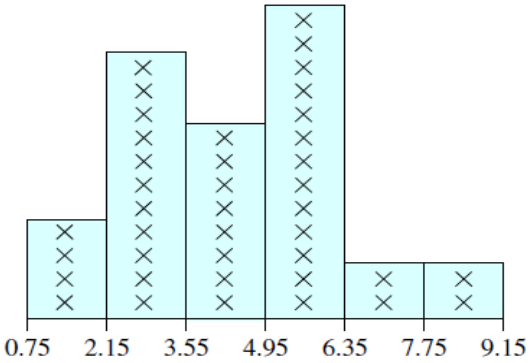


Figure 3.9: A sample histogram
(**Source:** Foster 2013, p. 247)

3.5.1.4 Scatter Plot or Scatter Diagram

The scatter plot (Figure 3.10) is used to investigate the relationships between variables (Foster 2013, pp. 248-249). Data is placed on a two dimensional plane to see if there is a relationship or correlation between the dependent variable (y) and the independent variable (x), which could prove that a cause-effect relationship exists or not (Juran & Godfrey 1999, p. AV.11).

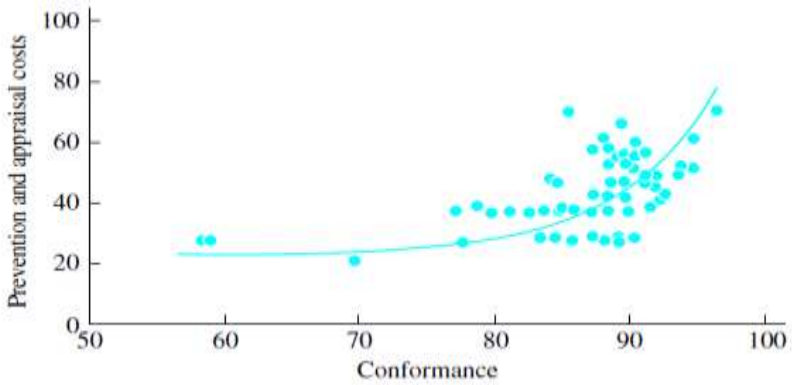


Figure 3.10: A sample scatter plot
(**Source:** Foster 2013, p. 249)

3.5.1.5 Control Chart or Process Chart

Statistical process control charts (Figure 3.11) are tools for monitoring process variation. Each control chart has its unique central line or mean, and upper and lower limits according to the process' specifications (Foster 2013, p. 281). Depending on the patterns detected from the plotted data, certain deductions can be made determining whether the process is in control or not. Action can then be taken to ensure the process is stable and within the specification limits required.

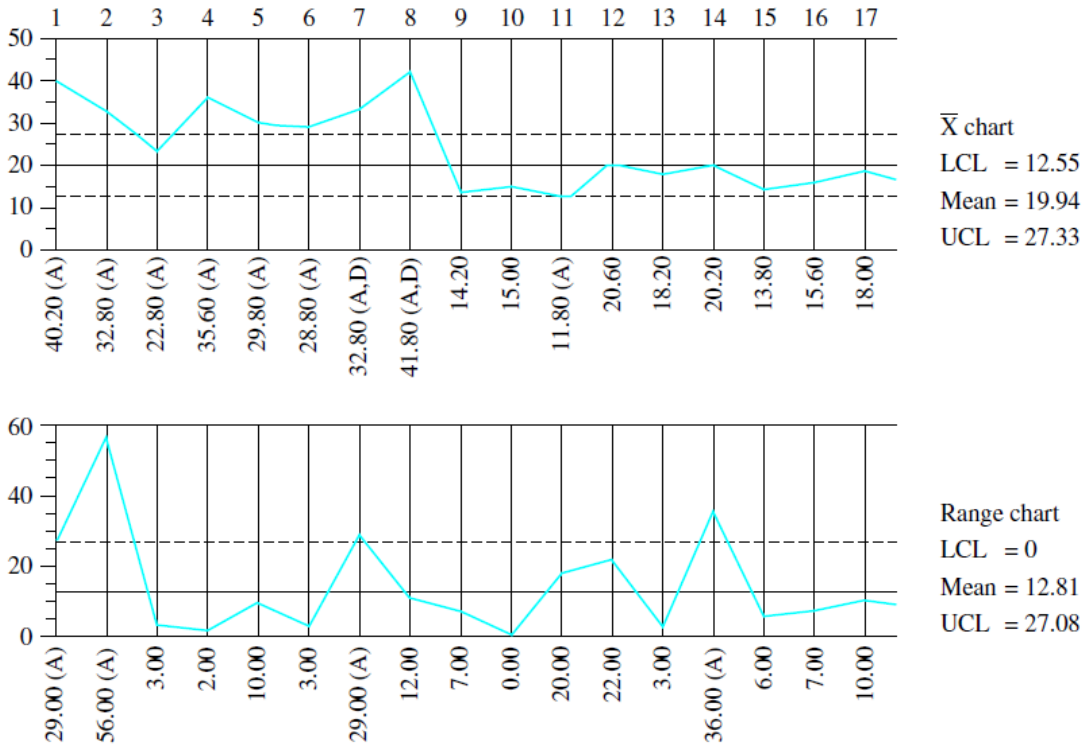


Figure 3.11: Sample control charts
(**Source:** Foster 2013, p. 251)

3.5.1.6 Cause-and-effect or Ishikawa or Fishbone Diagram

The cause-and-effect diagram (Figure 3.12) is used to analyse and find the root causes of a problem (Pavletic *et al.* 2008, p. 203).

Foster (2013, pp. 250-251) asserts that the diagram resembles the skeleton or bones of a fish. The head is the identified problem, with the ribs as the main sources of that problem, and the smaller rib bones possible contributors to the main problems. When brainstorming ideas, using the '6 M's' (man or manpower, machines, methods, materials, measurements, and Mother Nature or milieu) as the ribs can be useful in identifying the various causes of the problem.
To identify all the possible root causes of the problem, the '5 whys' method is then used, whereby asking 'why' up to five times for each possible cause and its sub-causes to get to the

source of the cause. The main causes are then identified and an action plan put into place to permanently eliminate the root cause(s) of the problem (Foster 2013, p. 251).

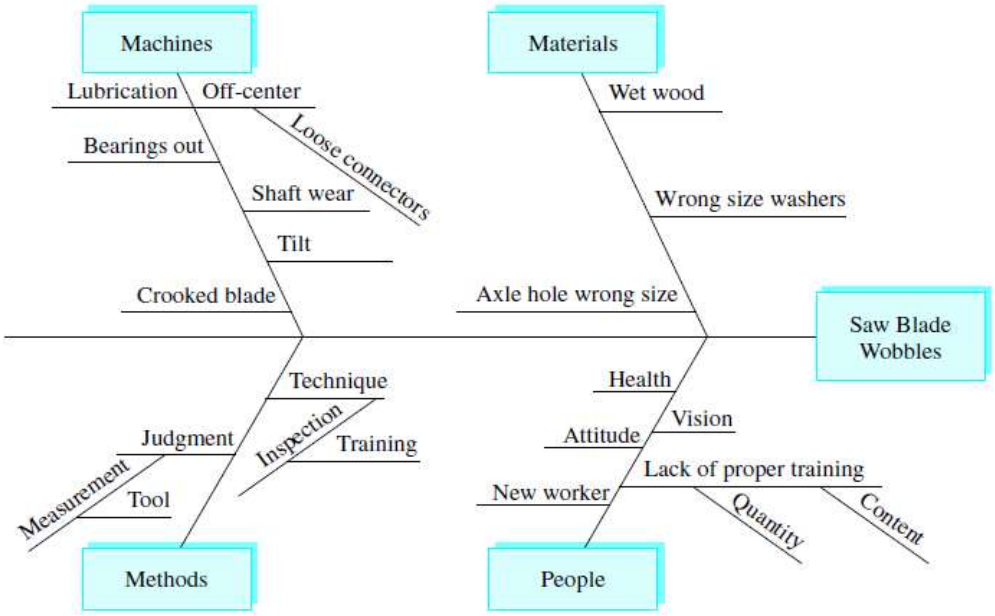


Figure 3.12: A sample Fishbone Diagram
(**Source:** Foster 2013, p. 252)

3.5.1.7 Pareto Diagram or Chart

Pareto charts identify and prioritise problems to be solved. The charts are based on Joseph Juran's 80/20 rule which was adapted from Vilfredo Pareto, an Italian economist's observations. The 80/20 rule states that approximately 80% of the problems are created by approximately 20% of the causes. Addressing these vital few causes first, eliminates most of the problems (Foster 2013, p. 252). An example can be found in Figure 3.13.

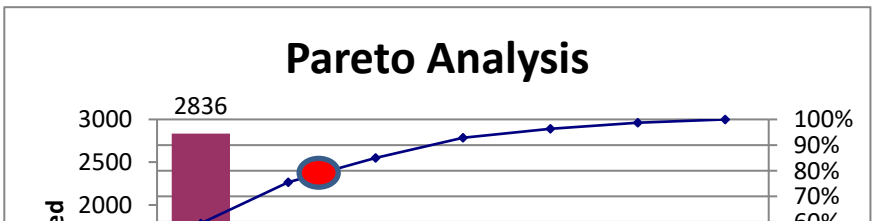


Figure 3.13: A sample Pareto Diagram
(**Source:** Own source)

3.5.2 Other Quality Tools

A team of Japanese scientists and engineers led by Shigeru Mizuno developed the "New seven Quality Management Tools" in 1998 (Fonseca *et al.* 2015, p. 607). Foster (2013, pp. 72; 177; 267-269; 337) mentions several other Quality Tools and methods that are also used to ensure quality.

Examples of the other Quality Tools available, are tabulated in Table 3.10. For the purpose of this study, only the Basic Quality Tools were considered. FMEA was discussed in section 3.4.6 (FMEA) as part of the review on error analysis. The new and other tools and methods were not taken into consideration for improvement for this research study. They are deemed to be more useful for lengthy projects where teams are used.

Table 3.10: Other Quality Management Tools and Methodologies
(**Sources**: Fonseca *et al.* 2015, p. 607; Foster 2013, pp. 72; 177; 267-269; 337)

Classification	Source	Tools
Basic Quality Tools	Ishikawa (1976)	• Process map • Check sheet • Histogram • Scatter plot • Control charts • Cause-and-effect diagram • Pareto Diagram

Classification	Source	Tools
New Seven Quality Management Tools	Shigeru Mizuno (1998)	• Affinity diagram • Arrow diagram • Matrix data analysis • Matrix diagram • Process decision program chart (PDPC) • Relation diagram or interrelationships diagram • Systematic diagram.
Other Quality Tools and Methodologies	Various	• Lean Six Sigma • ISO 9000; ISO 14000; etc. • Spider charts • Balanced scorecards • Dashboards

3.5.3 Conclusion regarding Quality Tools

McLaughlin and Kaluzny (2013, pp. 102; 348) specify that all the various Quality Tools, used in isolation or combination, can be used for continual quality improvement. When used effectively to present data results and analysis in a visual format, the tools can be very valuable and useful to motivate and initiate change, as well as monitoring the progress and results of the implemented changes.

3.6 Conclusion of Chapter 3

This chapter discussed relevant literature related to the quality definitions and concepts within the managed health care context as a foundation for this research study. Literature related to each of the three research questions, were presented to not only explain the quality concepts related to health care, but also in an attempt to find answers to these questions. The research design and methodology will be described in the next chapter.

CHAPTER 4: RESEARCH DESIGN AND METHODOLOGY

4.1 Introduction

This chapter describes how the research was conducted to answer the research problem and related questions. The strategy for the research design and methodology is discussed, and the most appropriate research methods explained. The data collection methodology that was used is reviewed, with data validity and reliability considerations. Ethical considerations, research assumptions and constraints are also described.

4.2 Research Design

Research design is the general plan of how the researcher will go about answering the research questions (Saunders *et al.* 2009, p. 136).

Creswell (2009, p. 4) affirms that there are three types of research designs:

- Qualitative (generating or using numerical data);
- Quantitative (generating or using non-numerical data like words); and
- Mixed methods (which incorporate elements of both qualitative and quantitative approaches).

For this research study, the most suitable design is that of mixed method or mixed-model research. This is a combination of qualitative and quantitative approaches relating to data collection and analysis (Saunders *et al.* 2009, p. 153).

The reasons for choosing the mixed method design described by Saunders *et al.* (2009, p. 154), include the following:

- Research questions were answered from different viewpoints - quantitative looking more at the macro aspects, and qualitative looking at the micro aspects of the research problem;
- Triangulation, to verify findings by using independent data sources or collection methods; and
- To assist with the interpretation of the data (using qualitative data to support the findings and explain the connections between quantitative data, and vice versa).

4.3 Research Methodology

The research methodology focuses on the research process and the kind of tools and procedures used e.g. analysis of existing (secondary) data and documents (van Wyk n.d., slide 13).

The most appropriate research strategy used for this research study, was that of historical or archival research. The definition Walliman (2001, pp. 88-109) quotes from Borg (1963) is “the systematic and objective location, evaluation and synthesis of evidence in order to establish facts and draw conclusions about past events”.

This research strategy used recent or historical administrative records and documents as the main source of data as noted by Saunders *et al.* (2009, p. 150). Even though this organisational data was originally collected for a different purpose (i.e. for operational management and reporting of Quality Assessment results to management), the data could be used and analysed because it is the results of daily Quality Assessment activities, and deemed to be part of the reality being researched. Using this historical data also assisted to shorten the time to complete this research study, as the data collection process did not have to be started from the beginning, and available data could be sourced directly.

The research approach is considered to be inductive as the theory is generated based on the study of specific cases (Welman *et al.* 2005, p. 34) and the collection and analysis of that data, and not the other way around (Saunders *et al.* 2009, p. 126).

4.4 Data Collection Methodology

The data population collected, consists of all the HIV DMP monthly Quality Assessment reports from March 2017 until December 2018. These reports were generated from the inception of the Quality Assessment process by the third party provider, until initiation of this research study.

The monthly reports contain both quantitative and qualitative data. This data consists of both raw data (data not processed at all or very little), and compiled data (selected or summarised data), as defined by Saunders *et al.* (2009, p. 258).

The quantitative data could be translated into narrative and evaluated qualitatively. And qualitative data could be coded numerically for analysis (Saunders *et al.* 2009, p. 153).

In addition, supplementary organisational documentation was obtained and analysed to assist in answering the research questions. These documents included quality plans, standard operating procedures, the Quality Assessment Questionnaires, and operational reports.

Together with the literature reviewed, the research questions were answered by collating and analysing the data sets described above.

Access to these confidential organisational records was approved by the management of both the Managed Care Organisation and the Medical Scheme. The contents of the reports were scrutinized, and even though the information may be incomplete or varying, it was deemed to be sufficient to be used for the purpose of this research study.

4.5 Data Validity and Reliability

Saunders *et al.* (2009, p. 157) defines validity as being concerned whether the findings are really what they appear to be about.

Three types of validity are explained by Creswell (2009, p. 149). They are:

- Validity of the content (do the elements measure what they were supposed to measure?);
- Validity of prediction (do the outcomes show a relation to previous results?); and
- Validity of construct (is the measurement tool used suitable?).

Reliability, on the other hand, refers to the degree to which the techniques used for the data collection or analysis will produce the same findings if carried out by someone else. Three questions can be asked to ensure reliability according to Easterby-Smith *et al.* (2008, p. 109), as noted in Saunders *et al.* (2009, p. 156). These questions are:

- Will the techniques produce the same results when duplicated at another time?
- Will others reach the same conclusions?
- Is the logic used to interpret and demonstrate the findings using the raw data, transparent?

Thiel (2014, p. 11) in his book "*Research Methods for Engineers"*, states that confidence in the reliability of the research methods utilised, is increased when the researcher uses and references peer reviewed journals, conference papers and other reported research material as evidence. Journal articles and papers resulting from new or recent research, adds further credibility to the methods used, as the newly published research is also objectively assessed by peers.

Sometimes there is no similar research available to reference. The researcher must then make sure that the research study is designed in such a way that there is robust evidence to substantiate the findings, either from the research itself, or from other published material (Thiel 2014, pp. 18-19).

In line with the statements above, the methods used to ascertain validity and reliability of the data for this study, was ensured by the researcher complying with the following guidelines:

- Reviewing and referencing relevant organisational data;
- Reviewing and referencing existing peer reviewed journals and other published material from scientifically recognised authors;
- Documenting and adhering to the analysis procedures rigorously;
- Being able to substantiate the analysis and resulting conclusions with evidence, and verifying the results with subject matter experts in the quality field and the Managed Care Organisation; and
- The fact that other researchers have and will also scrutinize the methods and conclusions reached.

4.6 Research Assumptions

Leedy and Ormrod (2016, p. 5) simply defines an assumption as a condition that is accepted as being true without evidence, and "without which the research study would be pointless". They also say that in research, any possible misunderstandings related to the research problem must be prevented by stating all of the assumptions without reserve.

These assumptions are applicable to this research study:

- The Quality Assessment process is adhered to as it is documented;
- Quality Assessors have the necessary skill, education, training and competence to carry out their work;
- The amount of work assessed (6% of total work done) is true;
- The accuracy scores were not influenced by subjective evaluation by the Quality Assessors and were correctly calculated;
- All relevant organisational documentation and data was shared with the researcher;
- All the Quality Questionnaires or checklists used for the HIV DMP's Quality Assessment process, were provided and up to date; and
- The researcher is independent and impartial to the operational environment in which the research was conducted.

4.7 Research Constraints

Research constraints are any factors that could hinder the research in any way. The constraints that may have impacted this research study, are discussed in this section, firstly by listing the de-limitations, and then the limitations.

4.7.1 De-limitations

Leedy and Ormrod (2016, p. 44) explain that the researcher's intention is stated in the research problem, whereas the de-limitations affirm what the researcher is not going to do.

De-limitations identified for this research study are the following:

- The research was confined to the Quality Assessment process of the HIV DMP of the chosen Managed Care Organisation;
- The Quality Assessment process starts with the selection of samples for assessment, includes the evaluation and scoring of the service interventions using the Quality Questionnaires, and ends with the monthly reporting of the Quality Assessment results;
- Services provided to the Medical Scheme and their beneficiaries by other associated providers, were not included (e.g. payment of claims by an accredited Administrator, or delivery of chronic medication by a courier pharmacy);
- The quality of the management or operational processes, or design of the electronic systems of the Managed Care Organisation, were not evaluated; and
- The research did not include the evaluation of the appropriateness or effectiveness of any clinical information. Should the criteria for quality measurement of the HIV DMP services have included clinical measurements (e.g. HIV/AIDS pathology results), these were included only as a quality parameter to measure the service quality rendered to the enrolled beneficiary.

4.7.2 Limitations

Limitations are weaknesses in the research study which could hinder its results and conclusions, and must be clearly stated according to Leedy and Ormrod (2016, p. 45).

The limitations that could have impacted this research study include:

- Quality and quality improvement is the focus of this research, and not any clinical aspect of the HIV DMP;
- There are few literature sources specifically dealing with Quality Assessment in a Managed Care Organisation, especially in a South African setting;

- The terms Quality Control, Quality Assessment, Quality Assurance and Quality Management are used interchangeably and inconsistently in the literature, which could lead to misunderstandings;
- The Quality Assessment reports may not contain the precise detailed information needed to answer the research questions; and
- The data in the monthly reports may be incomplete and varying.

4.8 Ethics

In the research environment, ethics refers to the researcher's responsibility to behave appropriately (honestly and with respect) to all who are affected by the research work itself, and those affected by the reporting of the results (Saunders *et al.* 2009, p. 183).

Welman *et al.* (2005, pp. 181-182) describe general ethical principles to be taken into consideration during research. These principles include honesty, respect for a person's (or animal's) rights, the protection of participants so that they are not harmed in any way, and that research subjects must participate voluntarily and on the basis of informed consent. Some studies require that research subjects are not aware that they are part of the research, as it could influence their response, and therefore skew the research results.

Other ethical issues pertaining to the use of information or data for research, are:
- Plagiarism, where others' data and ideas are used without acknowledgment or permission;
- Fabricating results or intentionally reporting distorted results; and
- Ensuring that the same research has not already been performed by conducting a thorough literature review.

In this study, the ethical aspects of confidentiality and anonymity, avoidance of conflicts of interest, and protection of personal information and intellectual property are particularly relevant as organisational and Medical Scheme information and data were used. To address these ethical considerations, access to the confidential organisational records was approved in writing by the management of the Medical Scheme and the Managed Care Organisation before the research was initiated. Codes were used to protect the identity of the organisations and their employees. Furthermore, the computer system used to collate, analyse and write the thesis, is encrypted and password protected, backed up to a secure server with anti-virus software.

Other ethical factors that were taken into consideration for this research study, was informed consent and plagiarism.

4.9 Data Collection and Preparation

The method of collection and preparation of the data used in chapter 5 for the data analysis and interpretation of results, is expounded in this section.

4.9.1 Data Summary and Preparation

All the Quality Assessment reports from the HIV DMP for the period March 2017 to December 2018 were obtained from the HIV DMP management and used for this study. The reports were compiled monthly, with one consolidated report for all categories of employees. Only one report could not be provided, namely the July 2017 report. However, the July results were included in subsequent reports, thus did not hamper the research study in any way.

Data regarding telephone call statistics were provided, including the different queues in place. Additional organisational documents were obtained, for example the Quality Questionnaires and quality plans.

All the documentation and information was anonymised. All names of employees were substituted with letters of the alphabet. All references to the names and logos of the Managed Care Organisation and the Medical Scheme were removed and replaced with the type of organisation, including the organisational documents referenced.

4.9.2 Qualitative Data

The qualitative data that was used, included the process map and the Fishbone Diagram to answer the research question related to demonstrating the use of the Quality Tools in the HIV DMP reporting.

To display the usefulness of the Fishbone Diagram in root cause analysis, the Error Description number 10 (data captured incorrectly*)* from Table 5.11 was used. It is a Critical Clinical Error Type, and can be described as follows:
The information from a caller or a document received (e.g. prescription; enrolment form; Doctor's motivation; pathology result, etc.), is either:

- Not captured into the system at all; or
- Not captured correctly (e.g. wrong dependant, ICD-10 code, dosage or medicine); or
- Not captured completely (e.g. pathology results were received, but not all the results received were captured).

For the process map example, the Administrative Assistant's process of enrolling a new beneficiary onto the HIV DMP was used. This is included in Appendix H.

The other set of qualitative data utilised, was the quality requirements from each of the Quality Questionnaires used as checklists to rate the quality of the employee interactions and telephone calls. This was used to answer the research question regarding the quality parameters used in the Quality Assessment Questionnaires to identify the critical quality errors that must be addressed.

The raw data used is tabulated in section 5.3.1 (Raw Data and Results: Error Types and Error Descriptions) and in Appendix G for the Error Types. Appendix F contains the Medical Scheme's generic telephonic Quality Questionnaire and all the Quality Questionnaires used for the HIV DMP.

4.9.3 Quantitative Data

The quantitative data used consisted of several system generated reports. These were used to demonstrate the histogram, scatter plot, control chart and the Pareto Diagram.

The data utilised consisted of the following:

- Monthly inbound telephone calls answered by Case Managers for September to November 2017 (this data with monthly quality scores for scatter plots in section 5.4.4 Scatter Plots);
- Case Managers' monthly quality scores for September to November 2017 (histogram in section 5.4.3 Histogram);
- The number of new enrolments per month for 2017 and 2018 (control chart in section 5.4.5 Control Chart); and
- Total monthly inbound telephone calls received per queue for January to October (Pareto Diagram in section 5.4.6 Pareto Diagram).

For the sample size calculations, the total of the monthly number of inbound calls and outbound calls for six months were used (section 5.2.4 Sample Size).

Minimal data preparation was necessary as the reports were received in Excel format. The preparation mainly consisted of extracting the relevant data from the whole data set provided, and adding up some of the numbers to get the totals needed. Some data was transposed in Excel for it to be in a suitable format for the analysis in SigmaXL®.

4.10 Conclusion

This chapter described the research design and methodology, assumptions and constraints, and ethical considerations of this research study. The collection of the data and its preparation for analysis was also explained. The next chapter discusses the data analysis and its interpretation.

CHAPTER 5: DATA ANALYSIS AND INTERPRETATION OF RESULTS

5.1 Introduction

This chapter presents the research findings using the historical data from the Quality Assessment processes of the HIV DMP. Appropriate data was selected to answer each of the different investigative sub-questions in support of the primary research question. Appendices are referred to where the raw data that was used, is provided, with the analysis process and results. The interpretation of the results and conclusions reached, are presented in this chapter.

5.2 Sampling

This section, together with the literature review in section 3.3 (Sampling), endeavours to answer the following research question:

- What is best practice for the current Quality Assessment process sampling activities from a service quality perspective?

The data population of the HIV DMP is described and illustrations provided of its sampling design requirements, the different sampling methods and sample sizes that can be used to ensure representative sampling and valid results for the HIV DMP Quality Assessment process.

5.2.1 Data Population

For the HIV DMP, the current database is hosted in the business' electronic record keeping system. Various fields contain data that is captured or imported into the system. IT report instructions are specified by the business requirements, dependent on the fields available in the database. The requested data parameters are extracted by running IT report instructions specially created according to business monitoring or reporting requirements. As most data will not be perfectly accurate in all ways, defects and limitations need to be identified and counteractive measures put into place to make the samples more suitable as discussed in section 3.3.1 (Data Population).

As the HIV DMP's population is large, quality assessment of all work is not realistic due to resource constraints (e.g. time, money, effort, manpower). Thus quality is estimated based on samples. Referring to Figure 3.2 (Factors influencing representative sampling and valid

results), the three factors related to the HIV DMP sampling are the sample design, the sampling method and the sample size. These factors are discussed below.

5.2.2 Sample Design

The sample design needs to consider and define the objectives or purpose of the assessment, as well as the population's attributes or characteristics (IFA n.d., p. 445).

The first aspect of sample design is the purpose of the HIV DMP's Quality Assessment process. As adapted from the Managed Care Organisation's internal document (2017a, pp. 6-7), the following objectives can be conveyed:

- Reporting to the Medical Scheme on the quality of the services rendered to the enrolled beneficiaries (e.g. compliance to legislation; the accuracy of the application of clinical protocols or Medical Scheme rules; if confidentiality was maintained);
- Identification of the quality indicators that require improvement (e.g. errors and/or omissions; minimum standards for telephone etiquette; accuracy of medical script authorisations);
- Identifying root causes of poor quality, providing the feedback to employees, advising them on the solutions to be actioned; and
- Ascertaining the degree of improvement (or deterioration) of the quality indicators (e.g. comparison of an individual or group's past quality performance to their current performance; error rate).

Examples of excluded Quality Assessment objectives, comprise the monitoring of service level agreement operational performance parameters (e.g. capturing done within two days of request received), clinical outcomes of programme interventions (e.g. decreased viral load), or clinical research. Those performance measures would require a different set of data.

According to the same internal document (Managed Care Organisation 2017a, p. 13), the population of the Quality Assessment process consists of three sets of HIV DMP activities as determined by the Medical Scheme. These sets, as samples of the population, consist of:

- All inbound and outbound calls;
- All new applications; and
- All medical scripts and pathology results.

Table 5.1 itemizes the attributes of these activities.

Table 5.1: The HIV DMP population's attributes corresponding to the three sets of HIV DMP activities
(**Source**: Own source)

HIV DMP Population Attributes		HIV DMP Activities		
		All inbound and outbound calls	**All new applications**	**All scripts and pathology results**
Recorded calls		√	√	√
Verification (membership & identification)		√	√	√
Call etiquette		√	√	√
Send correspondence		√	√	√
Workflow Trigger	Telephone call (inbound or transfer)	√	√	√
	Electronic workflow (fax, hard copy scan, e-mail, internal referral) which could require an outbound call	√	√	√
	Automated follow up prompt	x	x	√
Recordkeeping on system		√	√	√
Soft skills e.g. polite, empathy		√	√	√
Capture data		Admin Asst	Admin Asst	Admin Asst
Educate (topics & content, medication)		Counsellor	Counsellor	Case Manager & Pharmacist
Authorise treatment		Case Manager Registered Nurse	Case Manager Registered Nurse	Case Manager Registered Nurse & Pharmacist
Purpose	Enquiry	√		√
	Complaint	√		√
	New welcome	√	√	√
	Educate	√	√	√
	Follow up	√		√

The other two aspects for consideration when choosing samples, are the sampling method (how samples are selected from the population), and the sample size (how many samples from the population are needed). These are explicated in the subsequent sections.

5.2.3 Sample Selection or Sampling Method

The Medical Scheme's stipulated sampling requirements for the Quality Assessment of the HIV DMP's services is set out in the internal document of the Managed Care Organisation (2017b, pp. 13-14). The one requirement that was used to answer the research question, was the criteria of assessing 6% of inbound and outbound calls.

To illustrate an example of sampling, the data from a system-generated operational report of the amount of inbound and outbound calls was used (Managed Care Organisation 2019). This

raw data, and the corresponding results, are documented below. The pre-populated table for choosing suitable sample sizes is provided in Table 3.1.

5.2.3.1 Raw Data: Inbound and Outbound Calls

One of the SLA parameters for the Quality Assessment function, is that 6% of inbound and outbound calls need to be assessed (Managed Care Organisation 2017b). No other requirements are stipulated regarding the sample size, except that it must be a random sample.

The population of the HIV DMP for which samples are extracted for the Quality Assessment process, contains mostly discrete data. In other words, whole numbers. One cannot enroll half a member, but it could take 2.5 days (continuous data) to process an enrolment application. For the purpose of this example, only discrete data is used.

A system-generated report estimate of the outbound and inbound calls was received. The two amounts were added together to get the total number of calls received and calls made per month. The result is found in Table 5.2. For the example, only the calls for six months were used as there was not much variation in the number of calls for the rest of that year. Please note, that these are estimates of calls for illustrative purposes only.

The population size only needs to be part of the formulae to calculate the sample size, if the intended sample size is more than 5% of the population. In the HIV DMP, the expected sample size is 6%. Thus the population size is necessary in this calculation.

Table 5.2: An estimate of the total number of inbound and outbound calls for January to June (**Source**: Managed Care Organisation 2019)

CALLS	JAN	FEB	MAR	APR	MAY	JUN
Inbound Calls	9596	9655	8811	8681	8654	6876
Outbound Calls	21514	21535	19955	19219	20271	18989
TOTAL CALLS	**31110**	**31190**	**28766**	**27900**	**28925**	**25865**

5.2.3.2 Sampling Results: Inbound and Outbound Calls

The total number of calls managed per month seems to be relatively consistent for in- and outbound calls respectively. The population size (N) for January was taken at random to illustrate the use of the sample size calculator. The SigmaXL® calculator was used, but the calculations can be done on Excel or on-line calculators that are freely available on the Internet.

To determine the number of Quality Assessments to be done for January, the following data was used:

- The total number of calls for the month of January (the population) was 31 110. Thus N = 31 110, which is considered a large sample as it is more than 10 000.
- The confidence level of 95% was chosen, with the margin of error at 5%, as it is most commonly used for reliable results.
- The estimate of proportion ('P') is unknown, thus P = 0.5 is used.
- The assumption is made that the population has a normal or near normal distribution.

The results of the SigmaXL® calculator gives the sample size for the month as 385 (Table 5.3). When using the pre-populated table (Table 3.1), the sample size indicated is 397 for the month (Table 5.4).

Table 5.3: Total Calls January Sample Size Calculator (Discrete Data) for 95% confidence level (Source: Own source)

Sample Data (user inputs):		
Estimate of Proportion	P (unknown thus 0.5)	**0.5**
Desired margin of error / Level of precision	E delta / half-interval (±5%)	**0.05**
Population Size (optional)	N (total of January calls)	**31110**
Confidence level	100*(1-α)%	**95.0%**
Results:		
Minimum Sample Size	n	**385**
	n (adjusted for small N)	**381**
	np check (should be ≥ 5)	**192.5**

Table 5.4: Extract from Table 3.1: Sample Sizes (n) for population sizes from 500 to >100 000 - Confidence Level at 95%; Precision Levels (e) at ±3%, ±5%, ±7%, and ±10%; and P = 0.5
(**Source**: Israel 2012)

Size of Population (N)	**Sample Size (n) for Precision (e) of:**			
	±3%	**±5%**	**±7%**	**±10%**
25,000	1,064	394	204	100
50,000	1,087	397	204	100

Using the Medical Scheme's requirement of 6% of total population for January (31110), the sample size was calculated as 6/100 x 31110/1 = 1866.6, rounded off to 1867 calls. This amount is significantly higher that the statistically calculated sample size using the SigmaXL® calculator or the pre-populated table (Table 3.1). If the population is heterogeneous with much variability, or there is a possibility of selection bias, this larger sample size may be the most suitable.

Thus, to summarise, the sample sizes that were generated, are tabulated in Table 5.5.

Table 5.5: Summary of sample sizes (n) generated for population size N = 31110
(**Source**: Own Source)

Calculation Method	**SigmaXL® Calculator** 95% Confidence Level Precision Level (e) at ±5% P = 0.5	**Pre-populated Table** 95% Confidence Level Precision Level (e) at ±5% P = 0.5 **(Table 3.1)**	**6% of N**
Sample Size	385	397	1867 calls

IFA's "*International Standard on Auditing 530"* (n.d., p. 445), was referred to in section 3.3.1 (Data Population) for guidance on sampling requirements. Three requirements were discussed, namely the sample design, the sampling method, and the sample size, as illustrated in Figure 3.2.

Regarding the sample design, the purpose of the assessment and the population's attributes are two factors to be considered. In the example used, the population consisted of all inbound and outbound calls for the month of January (Managed Care Organisation 2019). This population is diverse, as these calls come in via many different queues and the employee categories handling the various calls, were not indicated, nor the purpose or type of calls. The purpose of the assessment is to evaluate whether the calls complied with the relevant Quality Questionnaire's quality requirements, and to identify the errors or omissions made by the employees.

Using various sampling methods, with different subsets of the population, could provide more useful quality-related information which could be utilised to improve the processes and the quality of interactions with Service Providers and beneficiaries. Quality issues may also be identified more quickly, or quality problems discovered that may not have been obvious before. Using other quality information like customer survey results or complaints or queries data to guide the Quality Assessors which subsets to sample and assess, could also indicate where unknown quality issues may be lurking.

No industry benchmark or standard could be found for managed care call centre assessment sampling methods or sizes. This is understandable as each call centre, organisation or health care programme, has unique circumstances and requirements that must be considered. Thus it cannot be said that the requirement of a percentage (e.g. 6%) of inbound and outbound calls that are to be assessed, is appropriate or not. If the samples are truly randomly selected without any form of bias or subjectivity, it may be sufficient to give a true reflection of the population being assessed. For the illustrative example used, random sampling with replacement would probably be the best sampling method to use. Calls that are not relevant or too short, for example, can be replaced with more suitable calls from the original population.

By doing this, the number of calls in the sample for assessment stay the same, and all calls in the sample are able to be assessed against the relevant Quality Questionnaire.

5.2.4 Sample Size

Regarding the sample size requirement, even though no industry benchmarks were found, statistical methods to determine sample sizes for the HIV DMP population and subsets thereof, cannot be ignored or disregarded. These methods and calculations are scientifically sound and used extensively in many industries and call centres with great success and accuracy. The fact that the call centre operates within the highly regulated health industry, compels it to ascertain that a statistically significant number of calls are assessed, so that the assessment results are accurate, and the conclusions reliable. Sample sizes providing a 95% level of confidence with ±5% margin of error, are considered optimal for the sampling results to be trustworthy. Using larger sample sizes as found with the 6% of the population requirement, may increase the credibility of the results, but must just be balanced with the required cost and effort of the resources to meet that requirement.

In whichever way the sample size is obtained, be it through the use of a formula, sampling calculator or a pre-populated table, the sample sizes may differ slightly, but not so much to influence the accuracy or reliability of the results.

5.3 Errors in Health Care

This section relates to answering the following research question:

- Are the correct quality parameters used in the Assessment Questionnaire to identify the critical quality errors that must be addressed?

To answer this question, the four different Error Types identified by the Managed Care Organisation with their corresponding Error Descriptions, were matched to the Medical Scheme's Quality Questionnaire AutoFail list to identify if all critical errors were addressed.

5.3.1 Raw Data and Results: Error Types and Error Descriptions

All the steps to prepare and analyse the raw data to answer the abovementioned research question, is documented in section 4.9.2 (Qualitative Data) and in the detailed steps below, with their corresponding results.

1. The original Quality Questionnaires were obtained from the Managed Care Organisation (2018a) that were used in the Quality Assessment process. All Quality Questionnaires are documented in Appendix F (Checklists / Quality Questionnaires). The list of all the Quality Questionnaires can be found in Table 5.6 (List of Quality Questionnaires from Appendix F) below.

Table 5.6: List of Quality Questionnaires from Appendix F (Checklists / Quality Questionnaires) (**Sources:** Managed Care Organisation 2018a; Medical Scheme 2017)

Quality Questionnaire	Origin
(SCHEME) Generic Telephonic	Table F.1
Call Etiquette	Table F.2
Admin Enrolment	Table F.3
Counsellor New 1st Call	Table F.4
Counsellor 2nd and 3rd Call	Table F.5
Counsellor PMCTC 1st Call	Table F.6
Counsellor PMCTC 2nd and 3rd Call	Table F.7
Counsellor Paediatric New	Table F.8
Counsellor Paediatric Follow Up	Table F.9
Clinical PEP	Table F.10
Clinical Adult New Enrolment	Table F.11
Clinical Adult Follow up	Table F.12
Clinical Paediatric New	Table F.13
Clinical Paediatric Follow up	Table F.14

2. All the Quality Questionnaires with their respective quality requirements were transferred to an Excel workbook, each Questionnaire on a separate tab.
3. To organise the data, all quality requirements from each tab were placed onto a new worksheet, with a corresponding column of the name of the Quality Questionnaire the requirement originated from.
4. Minor formatting, grammatical and spelling errors were corrected.
5. The Error Types were obtained from the Managed Care Organisation's quality plan (2017b). Five categories of Error Types were identified: AutoFail, Critical Clinical, Critical Non-Clinical, Non-Critical Clinical, and Non-Critical Non-Clinical. The sixth Error Type was created by the researcher as 'Unknown' (not on error list), or '00 No category – Health Education?' which contained all the Quality Questionnaire requirements that could not be matched to any of the other 27 Errors. Appendix G Table G.1 (Quality requirements with corresponding Quality Questionnaire Names, matched to Errors) contains all the Error Types with their full descriptions. Table 5.7 below contains the list of error types and their acronyms allocated by the researcher.

Table 5.7: Managed Care Organisation Error Types with Allocated Acronyms
(**Source:** Managed Care Organisation 2017b, pp. 11-3)

Acronym	Error Type
AF	AutoFail
CC	Critical Clinical
CNC	Critical Non Clinical
UN	Unknown not on Error List

6. Error Descriptions were obtained from the Managed Care Organisation's list of errors and numbered randomly (Managed Care Organisation 2017b, pp. 11-3; Medical Scheme 2018). Tables 5.8 to 5.11 below refers. Non-Critical Errors in Tables 5.8 and 5.9 were not numbered as they did not appear in any of the Quality Questionnaires.

Table 5.8: Non-Critical Non-Clinical Error Types
(**Source:** Managed Care Organisation 2017b, pp. 11-3)

Non-Critical Non-Clinical Errors
Incomplete counseling

Table 5.9: Non-Critical Clinical Error Types
(**Source:** Managed Care Organisation 2017b, pp. 11-3)

Non-Critical Clinical Errors
Hospital claims not checked - member recently admitted
WHO staging not done

Table 5.10: Critical Non-Clinical Error Types with numbers allocated by researcher
(**Source:** Managed Care Organisation 2017b, pp. 11-3)

No.	Critical Non-Clinical Errors
--	all AutoFails according to the scheme scorecard
01	programme benefits not discussed
02	security checks not performed
03	status disclosure
04	telephone conduct unprofessional
05	unsuccessful call - no follow up call done
06	welcome call not done

Table 5.11: Critical Clinical Error Types with numbers allocated by researcher
(**Source:** Managed Care Organisation 2017b, pp. 11-3)

No.	Critical Clinical Errors
07	ARV claims not checked - claims irregular
08	auth duration (PMCTC/PEP)
09	auth still pending no follow up done
10	data captured incorrectly
11	new contact details not confirmed or recorded
12	treatment history and dosage not confirmed
13	prophylactic treatment eligibility
14	new script/pathology results received fail to attend to it
15	pathology adverse events grades 3,4,5 fail to intervene (grade 3 serious; grade 4 potentially life threatening; grade 5 death)
16	urgent applications (PMCTC, PEP, PrEP) fail to intervene
17	height and/or weight omission in Paed/Adult patients especially for Creatinine Clearance determination
18	care plan letter/communication not sent or incorrect
19	dosage authorised incorrect
20	regimen authorised incorrect
21	pathology results not obtained/requested
22	PMCTC medications and formula not authorised
23	record keeping incomplete/not comprehensive
24	TAT readiness not assessed
25	enrolment type selected incorrect

7. The Medical Scheme's AutoFail (AF) error list is in Table 5.12. Each Error Type was numbered by the researcher.

Table 5.12: Medical Scheme Quality Questionnaire AutoFail (AF) list with numbers allocated by researcher
(**Source**: Medical Scheme 2018)

	KNOW YOUR CLIENTS
02	All security checks performed?
11	Details updated on the system?
26	**FIRST CALL RESOLUTION**
	The agent provided correct information?
	The agent provided complete information?
	The agent provided workable solutions?
	SOFT SKILLS
04	The agent was not rude/sarcastic
27	**MEMBER/PROVIDER EDUCATION**
	There was sufficient benefit and applicable guidelines explanation
	The caller was requested to complete the telephone survey
	NOTES
10	The agent log the call on the system?
23	The agent captured the query on the system correctly (Query and Sub-Query Type etc.)
10	The agent logged information reflective of the call?

8. The Managed Care Organisation's Critical Error Types and their related Error Descriptions from Tables 5.10 and 5.11, were matched to the Medical Scheme's AutoFail Error Category and Error Description from Table 5.12. There were no Non-Critical Errors to match (Tables 5.8 and 5.9). These results are tabulated in Table 5.13 hereunder.

Table 5.13: Error Types and Error Descriptions matched to AutoFail Error Category and Error Description
(**Sources**: Managed Care Organisation 2017b, pp. 11-3; Medical Scheme 2018)

Error Type Tables 5.10 and 5.11	**Error Description** Tables 5.10 and 5.11	**AutoFail Error Category and Description** Table 5.12
Critical Non-Clinical Error AutoFail	all AutoFails according to the scheme score card	
Critical Non-Clinical Error AutoFail	programme benefits not discussed	Member/Provider Education - There was sufficient benefit and applicable guidelines explanation
Critical Non-Clinical Error AutoFail	security checks not performed	Know Your Clients - All security checks performed?
Critical Non-Clinical Error	status disclosure	
Critical Non-Clinical Error AutoFail	unprofessional telephone conduct	Soft Skills - The agent was not rude/sarcastic
Critical Non-Clinical Error	unsuccessful call - no follow up call done	
Critical Non-Clinical Error	welcome call not done	
Critical Clinical Error	ARV claims not checked - claims irregular	
Critical Clinical Error	auth duration (PMCTC, PEP)	
Critical Clinical Error	auth still pending no follow up done	
Critical Clinical Error	data captured incorrectly	Notes - The agent log the call on the system?
Critical Clinical Error AutoFail	did not confirm or record new contact details	Know Your Clients - Details updated on the system?
Critical Errors Clinical	did not confirm treatment history and dosage	
Critical Errors Clinical AutoFail	eligibility of prophylactic treatment	Member/Provider Education - There was sufficient benefit and applicable guidelines explanation
Critical Clinical Error	failure to attend to new script or pathology results received	
Critical Clinical Error	failure to intervene on pathology adverse events that are grade 3 (serious) / grade 4 (potentially life threatening) / grade 5 (death)	
Critical Clinical Error	failure to intervene on urgent applications (PMCTC, PEP, PrEP)	
Critical Clinical Error	height and/or weight omission in Paediatric / Adult patients especially for Creatinine Clearance determination	
Critical Clinical Error	incorrect care plan letter sent/ communication not sent	
Critical Clinical Error	incorrect dosage authorised	
Critical Clinical Error	incorrect regimen authorised	

Error Type Tables 5.10 and 5.11	**Error Description** Tables 5.10 and 5.11	**AutoFail Error Category and Description** Table 5.12
Critical Clinical Error	pathology results not obtained/requested	
Critical Clinical Error	PMCTC medications and formula not authorised	
Critical Clinical Error AutoFail	record keeping incomplete / not comprehensive	Notes - The agent log the call on the system?
Critical Clinical Error AutoFail	record keeping incomplete / not comprehensive	Notes - The agent captured the query on the system correctly (Query and Sub-Query Type etc.)
Critical Clinical Error AutoFail	record keeping incomplete / not comprehensive	Notes - The agent logged information reflective of the call?
Critical Clinical Error	TAT readiness not assessed	
Critical Clinical Error AutoFail	wrong enrolment type selected	Know Your Clients - Details updated on the system?
Unknown (not on Managed Care Organisation's Errors List) AutoFail	First Call Resolution - The agent provided correct information?	First Call Resolution - The agent provided correct information? correct info for whole call
Unknown (not on Managed Care Organisation's Errors List) AutoFail	First Call Resolution - The agent provided complete information?	First Call Resolution - The agent provided complete information? complete info for whole call
Unknown (not on Managed Care Organisation's Errors List) AutoFail	First Call Resolution - The agent provided workable solutions?	First Call Resolution - The agent provided workable solutions? whole call
Unknown (not on Managed Care Organisation's Errors List) AutoFail	Member/Provider Education - programme guidelines not explained	Member/Provider Education - There was sufficient benefit and applicable guidelines explanation
Unknown (not on Managed Care Organisation's Errors List) AutoFail	Member/Provider Education - programme/member benefits not explained	Member/Provider Education - There was sufficient benefit and applicable guidelines explanation
Unknown (not on Managed Care Organisation's Errors List) AutoFail	Member/Provider Education - The caller was requested to complete the telephone survey	Member/Provider Education - The caller was requested to complete the telephone survey

9. Quality requirements (from the Quality Questionnaires) were matched to the Error Type and Error Description Pairs, identifying key words in the quality requirements that best described the type of error. This is also referred to as theming. A summary of these results is tabulated in Table 5.14 below. Table G.1 (Quality requirements with corresponding Quality Questionnaire Names, matched to Errors) in Appendix G shows all the line items of the Quality requirements from each of the Quality Questionnaires with their

corresponding Quality Questionnaire Names, matched to Error Types and Descriptions (categorised according to Quality Questionnaire name).

Table 5.14: Error Numbers, Descriptions and Types from Tables 5.7, 5.10, 5.11 and 5.12
(**Sources:** Managed Care Organisation 2017b, pp. 11-3; Medical Scheme 2017)

No.	Error Description	Error Type			
		AF	CNC	CC	UN
01	programme benefits not discussed	√	√	X	X
02	security checks not performed	√	√	X	X
03	status disclosure	X	√	X	X
04	telephone conduct unprofessional	√	√	X	X
05	unsuccessful call - no follow up call done	X	√	X	X
06	welcome call not done	X	√	X	X
07	ARV claims not checked - claims irregular	X	X	√	X
08	auth duration (PMCTC/PEP)	X	X	√	X
09	auth still pending no follow up done	X	X	√	X
10	data captured incorrectly	X	X	√	X
11	new contact details not confirmed or recorded	√	X	√	X
12	treatment history and dosage not confirmed	X	X	√	X
13	prophylactic treatment eligibility	√	X	√	X
14	new script/pathology results received fail to attend to it	X	X	√	X
15	pathology adverse events grades 3,4,5 fail to intervene	X	X	√	X
16	urgent applications (PMCTC, PEP, PrEP) fail to intervene	X	X	√	X
17	height and/or weight omission in Paed/Adult patients	X	X	√	X
18	Care plan letter/communication not sent or incorrect	X	X	√	X
19	dosage authorised incorrect	X	X	√	X
20	regimen authorised incorrect	X	X	√	X
21	pathology results not obtained/requested	X	X	√	X
22	PMCTC medications and formula not authorised	X	X	√	X
23	record keeping incomplete/not comprehensive	√	X	√	X
24	TAT readiness not assessed	X	X	√	X
25	enrolment type selected incorrect	√	X	√	X
26	First Call Resolution - The agent provided complete information - correct information - workable solutions?	√	X	X	√
27	Member/Provider Education - telephone survey - programme guidelines explained - programme/member benefits explained	√	X	X	√
00	No category – Health Education? (‘Unknown’)	X	X	X	X

5.3.2 Analysis of Results: Error Types and Error Descriptions

Many appropriate and meaningful quality requirements were found in all of the Quality Questionnaires. According to the literature review in sections 3.4.2. (Error Classification) and 3.4.3 (Error Grading), several themes were identified during the analysis of the Error Types, their descriptions and criticality as assigned by the Managed Care Organisation and Medical Scheme. Details of the findings are listed below.

These were the observations made when the data was analysed.

- AutoFails are not specified as such on any of the Quality Questionnaires. Yet, once the Error Types and Descriptions were matched to the quality requirements in each Questionnaire, nearly every quality requirement could be classified as an AutoFail (AF). For example, the Call Etiquette Questionnaire has 19 quality requirements, of which 20 are AutoFails as some quality requirements have more than one AutoFail Error Type assigned to it.

  If this AutoFail rule is strictly enforced, the employee would have to produce absolutely perfect work with every single interaction every day in order to get a 100% accuracy score. As understood in Reason's theory on Human Error (section 3.4.4 Errors in Health Care), all humans make unintentional errors, and only sometimes intentional errors. A whole range of human factors could result in unintentional errors e.g. boredom, fatigue, interruptions, waiting, inattention, stress, etc. Thus the amount of AutoFails seem excessive.

- Two AutoFail Error Types from the Medical Scheme's AutoFail List (2018) could not be found on the Managed Care Organisation's Error List (Critical or Non-Critical, Clinical or Non-Clinical). Thus they were categorised as 'Unknown - not on the Managed Care Organisation's Errors List'. They are numbers 26 (First Call Resolution) and 27 (Member/Provider Education). It is not clear how these AutoFail errors are assessed.

- Several quality requirements were matched to more than one Error Type and vice versa.

- Some quality requirements from the Quality Questionnaires did not fit into any of the Managed Care Organisation's Error List categories, so were put into the 28th category named '00 No category – Health Education?', also named 'Unknown'.

- Each quality requirement in each Quality Questionnaire has an allocated weighting. The expectation would be that an AutoFail's weighting in a Quality Questionnaire would be 100% - if one does not comply with that quality requirement, the whole call is failed. This is, however, not the case. The weightings in all the Quality Questionnaires do not seem to match their criticality.

- AutoFails do not all correlate with the criticality of the error e.g. number '25 enrolment type selected incorrect' is classified as a Critical Clinical AutoFail. It is understood that enrolment types are important for statistical purposes, but marking it incorrectly on the system can probably not harm the enrolled beneficiary.

- Some Error Descriptions are vague and unspecific e.g. number ‘23 record keeping incomplete/not comprehensive’. This too, is a Critical Clinical AutoFail. But record keeping could relate to a whole host of activities, documents and system fields, thus needs to be more specific.

- Some AutoFail Error Descriptions contained more than one variable to be assessed, and was very broadly described, which could lead to various interpretations. The content of the whole call would have to taken into consideration very carefully to assess if the criteria was met or not. For example, ‘Member/Provider Education - There was sufficient benefit and applicable guidelines explanation’.

- Moreover, the terms ‘sufficient’, ‘applicable’, ‘complete’ and ‘comprehensive’ are not quantifiable, and may be understood differently by different people. This could lead to disputes regarding the marking of the calls through the Quality Assessment Process, especially those marked as AutoFails or deemed to be of poor quality.

Recommendations for improvement are provided in section 6.8.2 (Errors in Health Care).

5.4 Quality Tools

This section answers the investigative sub-question:

- Do the monthly Quality Assessment reports provided to management, identify the essential quality elements to demonstrate the quality of the services provided?

All the Quality Tools are explicated in the literature review in section 3.5.1 (The Seven Basic Quality Tools). Each Quality Tool is further discussed in the next sections, with examples how they can be used to the organisation’s advantage. Recommendations for improvement are provided in Chapter 6, section 6.8.3 (Quality Tools).

It is also difficult to confirm that the essential quality elements of the quality of the services provided, are demonstrated in the monthly Quality Assessment reports. Quality parameters and outcomes are dependent on the quality and information requirements of the Medical Scheme (the customer). The available data also determines which Quality Tools can be utilised and what kind of quality information is available for meaningful analysis.

5.4.1 Process Map

All processes for all categories of employees are documented in training manuals or standard operating procedures, providing screen shots of the electronic record keeping system and step by step comments to guide the user. The process is driven by the electronic systems, which prompt the user at each step according to their access control granted and type of transaction. The documented processes are kept up to date by the business process owners.

However, there were hardly any diagrams of the processes in these organisational documents. That in itself is not incorrect or mandatory, but for improving processes, understanding where bottlenecks or inefficiencies are, etc., would be easier if process flows were documented visually. An example of a process map documented by the researcher is provided in Appendix H, Figure H.1. Should the HFMEA^{TM} methodology or aspects thereof be adopted, to identify and risk rate failure modes, visual representations of the processes and how they are interlinked to form the quality management system, would be necessary.

Some aspects of the electronic record keeping system fields have system controls in place to ensure correct information is captured. These controls could include drop down lists, fields that must be populated before the user can continue, or only allowing a certain number or types of characters to be entered. The system prompts also assist the user to follow the process steps in the order they are designed or documented. Examples of these system controls are available in Appendix I.

Document version control information was not visible on all of the organisational documents scrutinized. This could cause the employees to follow or refer to outdated processes or information. It is recommended that each organisational document is revised to include version control information as stipulated in ISO 9001:2015. Clause 7.5.2 provides the minimum requirements for the creation and updating of documents (Table 5.15). The rest of clause 7.5 “Documented information”, gives organisations guidelines how further to ensure their documents are controlled.

Table 5.15: Quality requirements when creating and updating documents – clause 7.5.2
(**Source**: ISO 9001:2015, p. 9)

“7. Support
7.5 Documented information
7.5.2 Creating and updating When creating and updating documented information, the organization shall ensure appropriate:
a) identification and description (e.g. a title, date, author, or reference number);
b) format (e.g. language, software version, graphics) and media (e.g. paper and electronic);
c) review and approval for suitability and adequacy.”

5.4.1.1 Process Waste in the Context of the Services Industry

The eight groups of wastes, specifically related to the services industry, is depicted in Figure 5.1, as described by Earley (2019), Tariq (2019); Dudenhoefer (2018) and Sarkar (2009). If the wastes in each process can be identified and eliminated, it should improve the customer experience. The wastes in the service industry are described in detail in Table 5.16, with examples from the HIV DMP.

Time and motions studies could also be done to pinpoint inefficiencies in the processes. For the purpose of this research study, this and the identification of relevant wastes, are out of scope.

Figure 5.1: Depiction of the 8 wastes in the services industry
(Acronym: DOWNTIME)
(Source: Own source**)**

Table 5.16: The 8 wastes in the context of the services industry with examples from the HIV DMP
(**Sources**: Earley 2019; Tariq 2019; Dudenhoefer 2018; Sarkar 2009)

WASTES	EXAMPLES
Defects, errors or omissions resulting in rework The wasted cost, time and effort involved in inspecting, finding and fixing any omissions, defects, errors in any aspect of the service delivery, especially when these are essential services.	Having to check and re-check authorisation of medication dosages and correcting errors, particularly when the medicines have already been dispensed and payment processed.
	Correspondence that does not reach the intended party due to incorrect contact details on the electronic record keeping system.
	The courier pharmacy not getting the instruction for the medicine delivery or the wrong delivery address.
Overproduction Processing a transaction more often or sooner than the customer demands or needs it.	Information generated or sent automatically even when not requested or required, especially printed communications that are posted.
	Printing documents before they are required, taking up space to store the documents.
	Processing items before they are required by the next person in the process.
Waiting or delays The waiting time before the next step of the service can be carried out. This could apply to internal and external customers, which could include employees, service providers or electronic systems.	Waiting on the telephone when on hold or waiting for the call to be answered (by the beneficiary, Service Provider or the employees).
	Waiting for the internal Medical Advisor to respond to information for referred cases requiring additional clinical input.
	Any delay in giving or receiving feedback or information.
Not Using Talent – under-utilisation of people or human potential Unnecessarily limiting the tasks, responsibilities and/or authority of an experienced, competent and knowledgeable employee or professional.	Using a skilled employee's time and expertise to complete menial or repetitive tasks that could be automated or completed by an administrative employee.
	Involving employees in continuous improvement assignments or projects without results which could demotivate them.
Transportation This waste focuses on the ineffective or unnecessary movement of items, machines or objects which are not needed to provide the service. Movement of items more than required results in wasted efforts and energy, and could possibly add to cost.	Moving printed documents between a printer and the desks, or e-mails, of various managers and employees for collation, review and signoff or approval. This could also apply to e-mails.
	Movement of files, documents, information from one location to another (physical or electronic).
	Large or many e-mail attachments which could take up unnecessary data storage or usage capacity.
	Handover of cases to several departments for completion.

WASTES	EXAMPLES
Inventory – surplus or incorrect recording of material or information This is any part of the service delivery that is in excess, out of date or expired. Customers could deem employees providing the service not sufficiently qualified, experienced or knowledgeable. This erodes trust in the service and/or the employees providing the service. This waste could also relate to unclear communication which causes confusion. Thus the beneficiary does not follow the health education or take the medication as prescribed.	Outdated medication regimes or information and educational material communicated.
	Duplicate letters or information sent.
	Using terminology or medical terms that beneficiaries do not understand when giving health education or explaining the disease and its transmission. Explaining in the beneficiary's context or culture, language and according to their age is key to the HIV DMP's success.
	Getting conflicting information about the same query from various sources, especially from within the HIV DMP. This could apply to a question from a beneficiary or an employee. Thus clear standardised and up to date guidelines and procedures that are readily available are essential.
Motion or unnecessary movement This waste focuses on the inefficient movement of people and/or information which is not needed to provide the service.	Employees walking excessively between work stations or printers to fetch documents or find out information before they can complete a transaction.
	Fragmentation of services or duties where interaction is necessary from various external providers, internal departments and/or employees to complete a process.
	Transferring calls multiple times, having to repeatedly ask the caller to wait on hold, and explaining the reason for the transfer to each person.
	Having to re-dial telephone numbers when an auto dial facility can do it automatically.
Excessive process - over processing or duplication where a simple method would be adequate Working on a case, or contacting a beneficiary or service provider too many times, or working inefficiently due to poor electronic system or process design. Tariq (2019) also refers to under-processing as a waste. The example used is when technological capacity is not utilised fully. Hand written application forms that need to be converted into an electronic format before it can be processed can cause delays and errors when re-capturing the information onto the electronic system. These forms can be provided in an electronic format which can be imported directly into the electronic system when it is filled in.	Filling in numerous forms with duplicate data (especially if in hard copy).
	Speaking with numerous employees or departments without resolution of the query or complaint.

5.4.2 Checklist

The Quality Assessors of the HIV DMP use checklists or Quality Questionnaires to evaluate the work done by the clinical and administrative employees. Appendix F contains all the Quality Questionnaires that are used to review cases by the Quality Assessors.

The Quality Questionnaires were scrutinized to ascertain if all the crucial aspects of the process where errors are likely to occur, are included and assessed. Results of the analysis was combined with the feedback on the analysis of Errors in Health Care in section 5.3.

It could be speculated that not all employees may be aware or fully understand the criteria they are assessed against, and do not always get detailed feedback of their assessment results. There is thus the possibility that they do not fully comprehend the impact of their errors and omissions, and the resulting consequences these have for the enrolled beneficiary, service providers, the Medical Scheme and the Managed Care Organisation. It is a possibility that errors could be reduced with more employee awareness, so that they work with understanding and not only out of habit.

5.4.3 Histogram

A histogram helps to understand the spread of the data. Using the data from the monthly HIV DMP reports, copying it into an Excel spreadsheet and using SigmaXL® to create the histogram with descriptive statistics, generated the results. Analysis of the results are also presented.

5.4.3.1 Raw Data: Case Manager Quality Scores for Inbound Telephone Calls

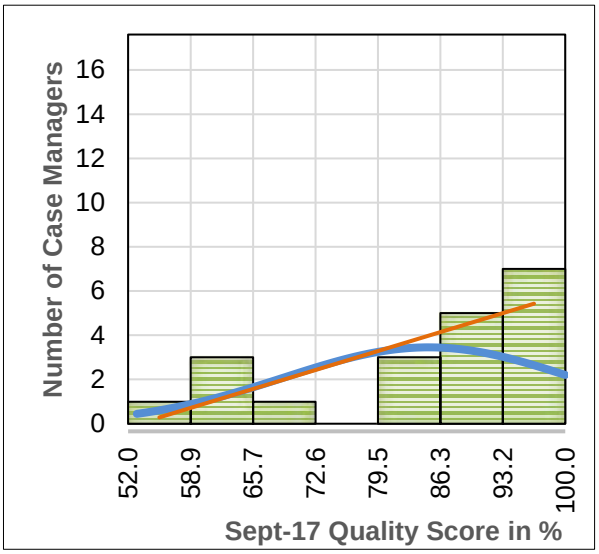
The quantitative data chosen to show the benefits of using a histogram, consists of the quality scores in percentage for twenty Case Managers over a period of three consecutive months chosen at random. The Case Managers' names have been replaced with letters of the alphabet to ensure anonymity. The raw data from the monthly reports is tabulated in Table 5.17 (The monthly quality scores of Case Managers for inbound telephone calls for September, October and November 2017).

Table 5.17: The monthly quality scores of Case Managers for inbound telephone calls for September, October and November 2017
(**Source:** Managed Care Organisation 2017: November 2017)

Case Manager	Sept-17 Quality Score in %	Oct-17 Quality Score in %	Nov-17 Quality Score in %
A	100	88	96
B	80	71	94
C	89	73	100
D	84	94	94
E	52	66	95
F	99	94	87
G	92	89	96
H	86	81	96
I	99	89	100
J	66	89	82
K	90	69	100
L	87	87	100
M	95	80	100
N	64	90	100
O	100	100	100
P	90	99	100
Q	100	100	100
R	100	91	100
S	59	63	89
T	59	78	93

5.4.3.2 Results: Case Manager Quality Scores for Inbound Telephone Calls

Figure 5.2 shows the three monthly histograms with descriptive statistics created with SigmaXL® from the raw data input. Table 5.18 gives a further breakdown of the quality scores obtained by the number of Case Managers. The highlighted number indicate the highest and the lowest quality scores for each month.



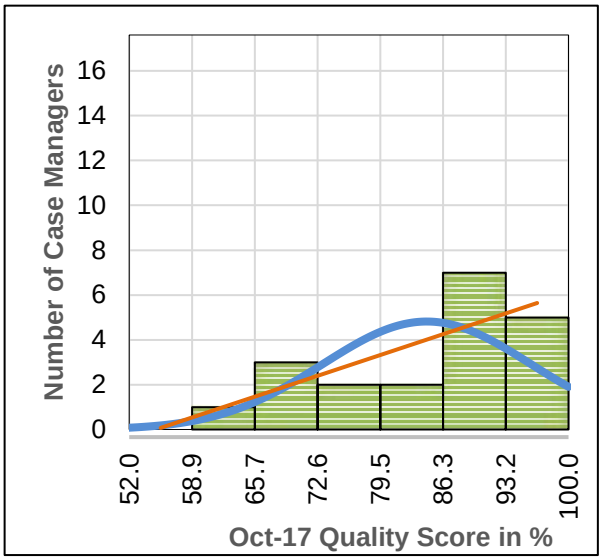
SEPTEMBER 2017
CASE MANAGERS' QUALITY SCORES FOR INBOUND TELEPHONE CALLS

Descriptive Statistics
Count = 20
Mean = 84.550
Stdev = 15.856
Range = 48.00

Minimum = 52
25th Percentile (Q1) = 69.500
50th Percentile (Median) = 89.500
75th Percentile (Q3) = 99
Maximum = 100

95% CI Mean = 77.13 to 91.97
95% CI Sigma = 12.06 to 23.16

Anderson-Darling Normality Test
A-Squared = 1.146; p-value = 0.0041



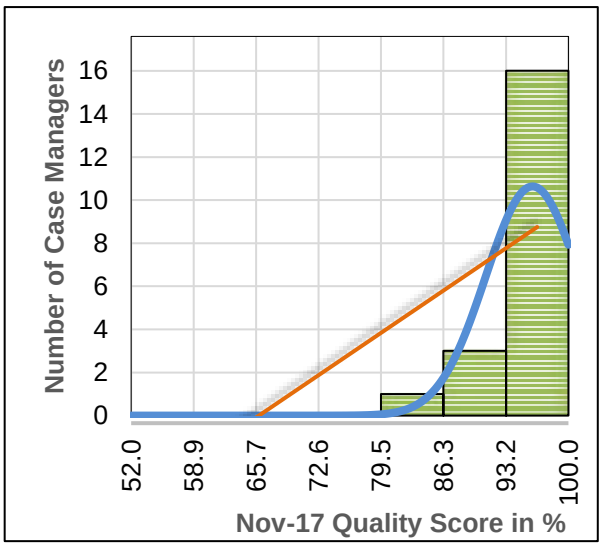
OCTOBER 2017
CASE MANAGERS' QUALITY SCORES FOR INBOUND TELEPHONE CALLS

Descriptive Statistics
Count = 20
Mean = 84.550
Stdev = 11.372
Range = 37.00

Minimum = 63
25th Percentile (Q1) = 74.250
50th Percentile (Median) = 88.500
75th Percentile (Q3) = 93.250
Maximum = 100

95% CI Mean = 79.23 to 89.87
95% CI Sigma = 8.65 to 16.61

Anderson-Darling Normality Test
A-Squared = 0.505500; p-value = 0.1787



NOVEMBER 2017
CASE MANAGERS' QUALITY SCORES FOR INBOUND TELEPHONE CALLS

Descriptive Statistics
Count = 20
Mean = 96.100
Stdev = 5.149
Range = 18.00

Minimum = 82
25th Percentile (Q1) = 94
50th Percentile (Median) = 98
75th Percentile (Q3) = 100
Maximum = 100

95% CI Mean = 93.69 to 98.51
95% CI Sigma = 3.92 to 7.52

Anderson-Darling Normality Test
A-Squared = 1.663; p-value = 0.0002

Figure 5.2: The histograms and their descriptive statistics for the Case Managers' quality scores for inbound telephone calls for September, October and November 2017
(**Source**: Own)

Table 5.18: A breakdown of the quality scores obtained by the number of Case Managers (CMs) (**Source**: Own)

Sept-17		Oct-17		Nov-17	
Scores in %	**No. of CMs**	**Scores in %**	**No. of CMs**	**Scores in %**	**No. of CMs**
52.0	1	52.0	0	52.0	0
58.9	3	58.9	1	58.9	0
65.7	1	65.7	3	65.7	0
72.6	0	72.6	2	72.6	0
79.5	3	79.5	2	79.5	1
86.3	5	86.3	7	86.3	3
93.2	7	93.2	5	93.2	16

5.4.3.3 Analysis of Results: Case Manager Quality Scores for Inbound Telephone Calls

From the diagrams employees can understand the individual scores and how they are distributed in relation to the targets that have been set for accuracy.

Employees can be taught to read the histogram from the diagram alone, or with the descriptive statistics, to draw conclusions relating to the accuracy scores. It should be clear where the scores need to be improved in order to improve the service rendered to all the stakeholders. Employees can then have discussions around improving accuracy and implementing the necessary changes.

Possibly hypothesis tests could also be done, but for clinical employees this may be too complicated and time consuming and may not be worth the effort.

Case Managers' monthly quality scores for inbound telephone calls for September, October and November 2017 were used to illustrate the value of this Quality Tool. Herewith the conclusions reached from the results.

The number of Case Managers (Count = 20) stayed constant over the three month period reviewed.

The lowest quality scores were as follows:

- 52% (Minimum = 52) in September 2017 by Case Manager E;
- 63% (Minimum = 63) in October by Case Manager S; and
- 82% (Minimum = 82) in November by Case Manager J.

Thus there was overall improvement in the range of scores obtained incrementally over the three months. There is no trend regarding the Case Manager that scored the lowest.

The average quality scores (Mean) for September and October remained the same at 84.55%. The average increased to 96.10% in November. Thus the overall number of Case Managers increasing their quality scores in November, was more than either of the two preceding months. The trend lines (orange) show that there was an upward trend toward 100% scores. Therefore there are more high quality scores each month than low quality scores, which is a positive aspect. One does not want more Case Managers scoring low quality scores.

The blue curved line shows the normal distribution for the sample, also known as the Bell Curve (Figure 3.4). Half of the results will be above the mean, the other half below.

The spread or range of the histograms decreased over the three months, as seen by the curve becoming narrower and taller. This is indicated in the descriptions statistics as the range, which was 48 in September, 37 in October, and only 18 in November. This indicates that fewer Case Managers scored low quality scores each month.

The highest quality score that can be obtained is 100%. The histograms are all skewed to the right, which can be expected as the target quality score is 100% - the maximum and Upper Specification Level (USL).

In September, the analysis of the data shows that seven Case Managers scored between 93.2% and 100%. In October, this amount decreased slightly to five Case Managers, and in November there were sixteen Case Managers. This shows an overall improvement of quality scores over the three months.

However, the reason for the sudden and large increase in quality scores may need further investigation. Have the Case Manager's really improved their quality scores so drastically in such a short time? Possibly there was some or other intervention e.g. training sessions or the implementation of a reward system for example? Should different Quality Assessor(s) have assessed their November work, it is possible that their assessment style is far more lenient, and could create a false perception of quality improvement.

5.4.4 Scatter Plots

As was done for the histogram, data was collated and copied into an Excel spreadsheet. The SigmaXL® software was used to create the scatter plots displayed in Figures 5.3 to 5.8. The number of calls Case Managers answered in the months of September, October and November 2017, were compared to their quality scores for the same months. This was to

ascertain if there is any correlation or relationship between the quantity of calls processed, and the quality of those calls.

5.4.4.1 Raw Data: Comparison of Case Managers' Quality Scores to Incoming Calls

The raw data used to demonstrate the scatter plot diagram, is the Case Managers' quality scores compared to the number of incoming calls answered per month for the months of September to November 2017 in Table 5.19. The data was put into Excel, using SigmaXL® to generate the scatter plots.

Table 5.19: The number of inbound telephone calls answered by Case Managers and their monthly quality scores for the corresponding months
(**Source:** Managed Care Organisation 2017: November 2017)

Case Manager	Sept-17 Calls per month	Sept-17 Quality Score in %	Oct-17 Calls per month	Oct-17 Quality Score in %	Nov-17 Calls per month	Nov-17 Quality Score in %
A	259	100	377	88	353	96
B	320	80	313	71	242	94
C	285	89	293	73	177	100
D	249	84	155	94	150	94
E	336	52	326	66	358	95
F	210	99	236	94	174	87
G	92	92	241	89	266	96
H	359	86	250	81	256	96
I	237	99	282	89	138	100
J	185	66	318	89	331	82
K	54	90	177	69	194	100
L	239	87	204	87	206	100
M	243	95	264	80	231	100
N	72	64	55	90	106	100
O	81	100	49	100	52	100
P	52	90	39	99	27	100
Q	18	100	40	100	35	100
R	306	100	399	91	445	100
S	143	59	263	63	275	89
T	159	59	211	78	244	93

5.4.4.2 Results: Comparison of Case Managers' Quality Scores to Incoming Calls

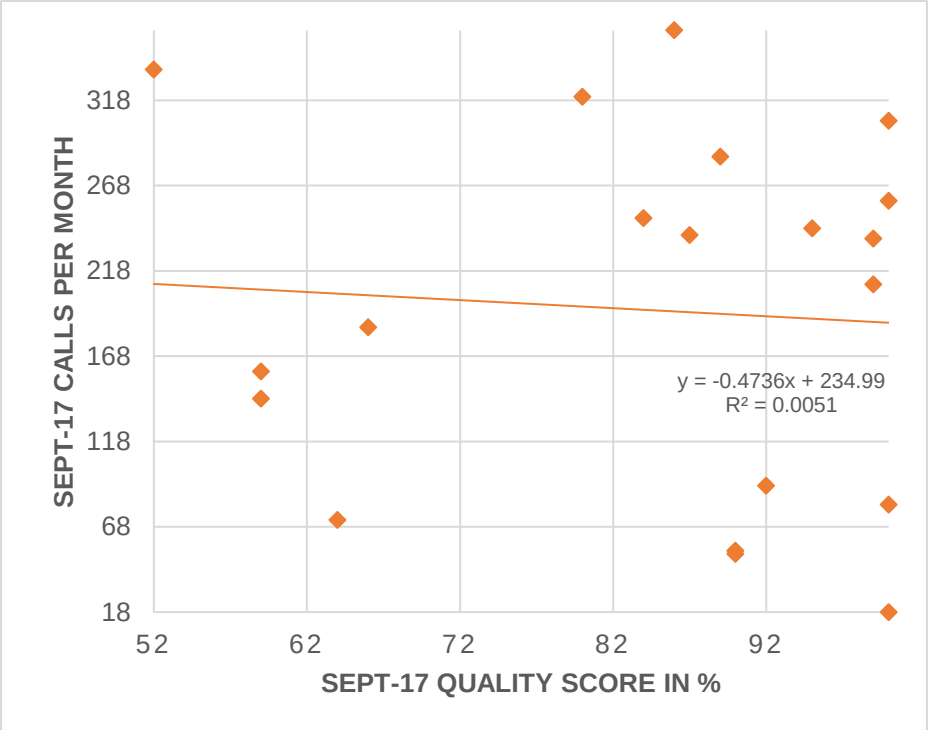


Figure 5.3: The scatter plot for the Case Manager quality scores compared to the number of calls for September 2017
(**Source**: Own)

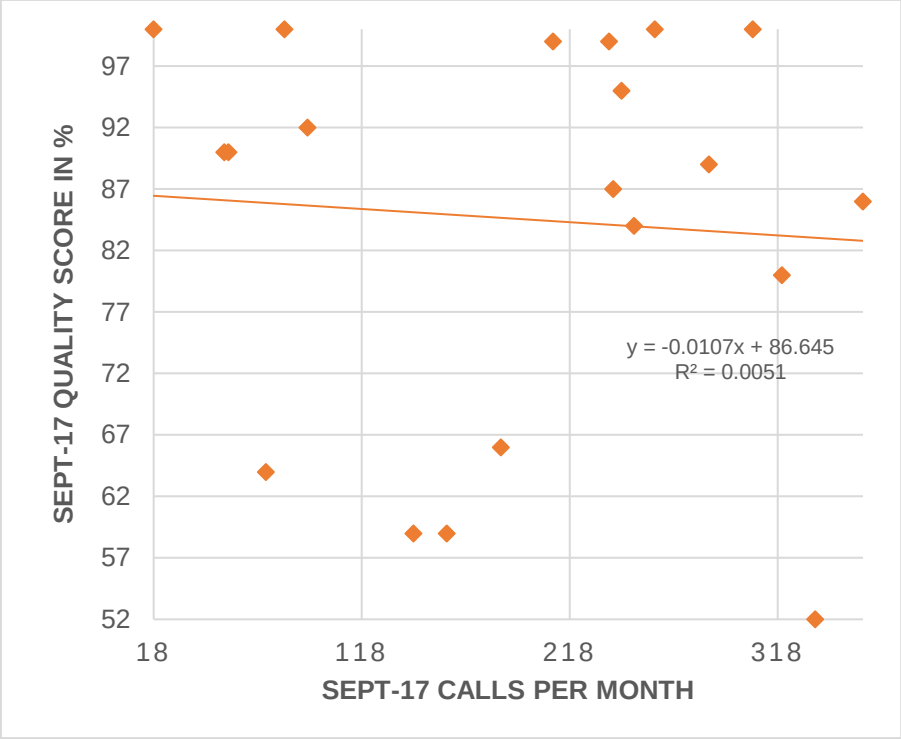


Figure 5.4: The scatter plot for the Case Manager number of calls against the quality scores for September 2017
(**Source**: Own)

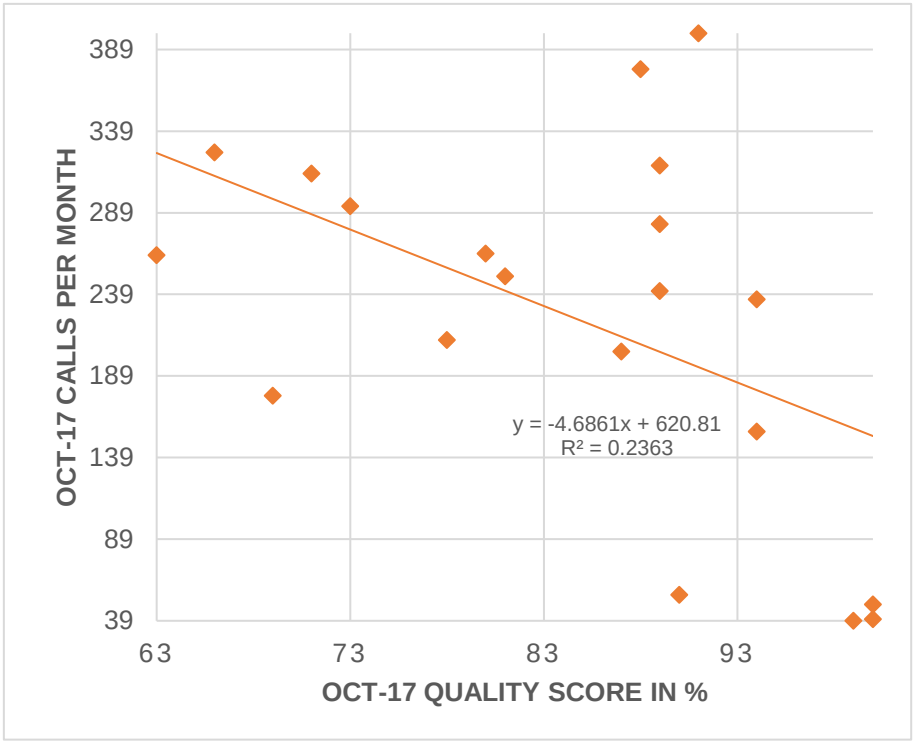


Figure 5.5: **The scatter plot for the Case Manager quality scores compared to the number of calls for October 2017**
(**Source**: Own)

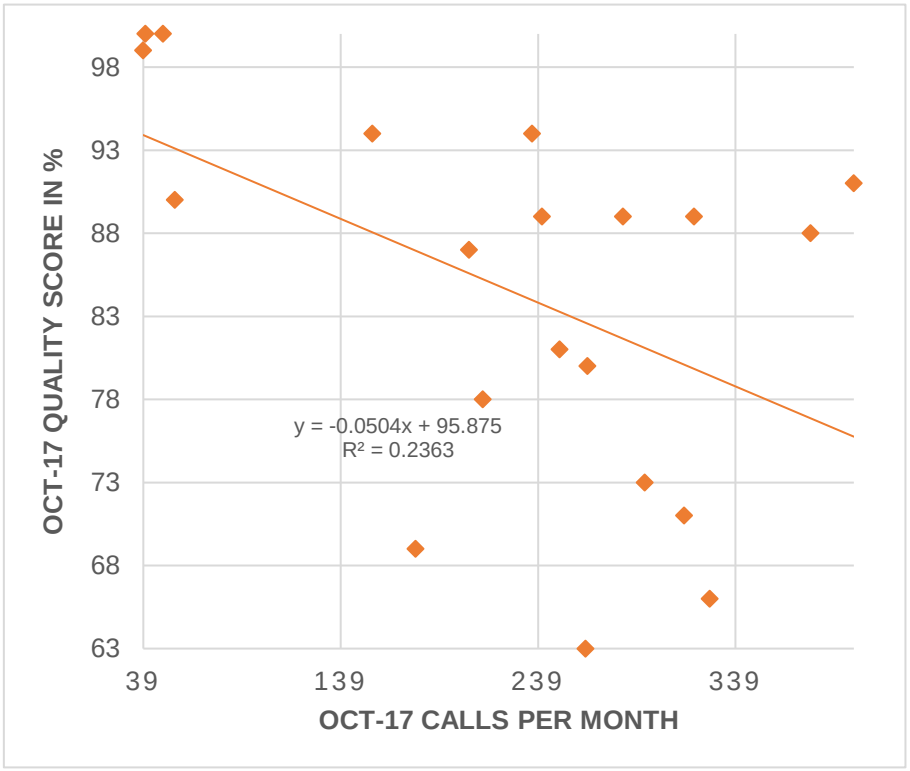


Figure 5.6: The scatter plot for the Case Manager number of calls compared to the quality scores for October 2017
(**Source**: Own)

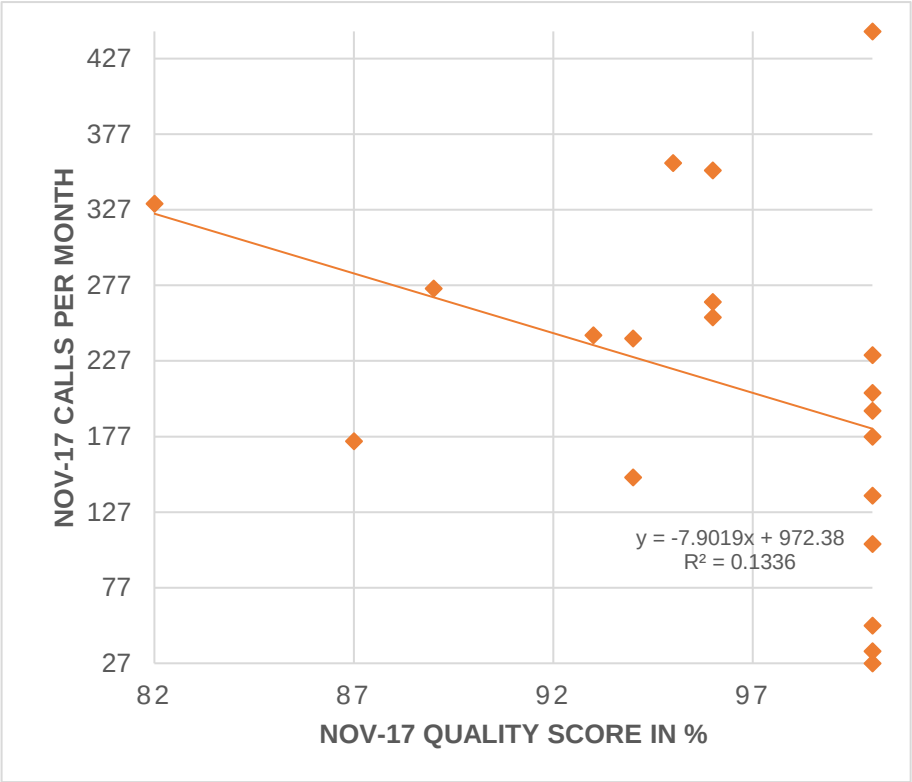


Figure 5.7: **The scatter plot for the Case Manager quality scores compared to the number of calls for November 2017**
(**Source**: Own)

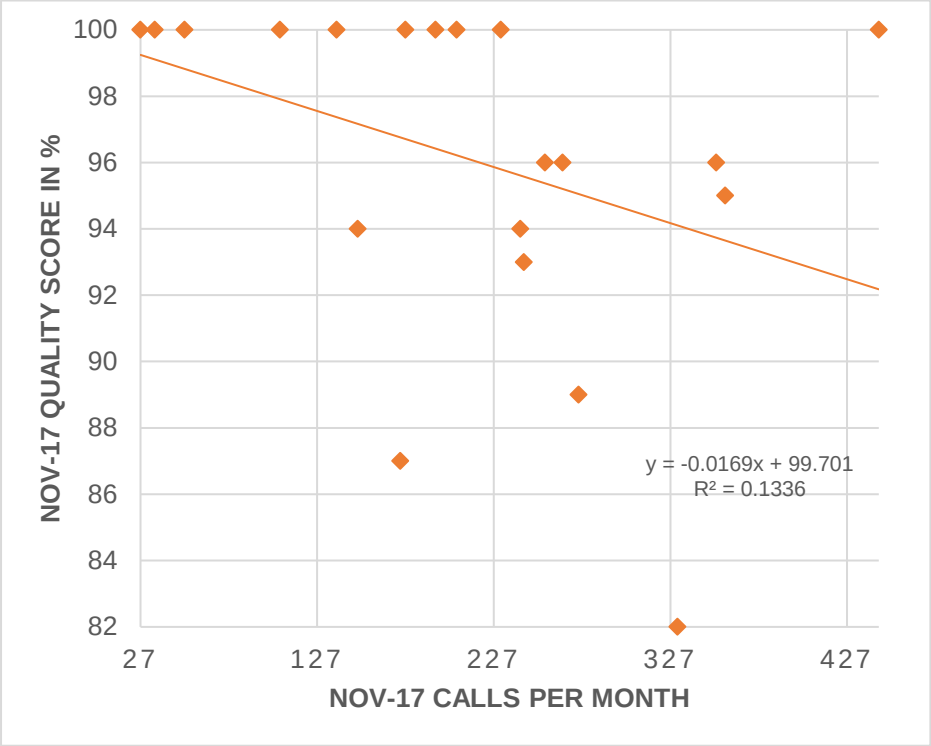


Figure 5.8: The scatter plot for the Case Manager number of calls compared to the quality scores for October 2017
(**Source**: Own)

5.4.4.3 Analysis of Results: Comparison of Case Managers' Quality Scores to Incoming Calls

As the dots are scattered all over the graph and not clustered around the trend line, it can be deduced that there is no relationship (link) between the number of calls Case Managers take per month, and their accuracy scores for that month.

Or said differently, no matter how many calls Case Managers take, their accuracy scores are consistent. So a Case Manager taking many phone calls, could have the same accuracy score as a Case Manager who takes only a few calls. This discredits the belief that the higher the number of calls, the lower the accuracy score will be in this set of data.

It is recommended that this Quality Tool is used to prove or disprove any assumptions made in relation to quality. For example, confirm if there is any correlation between the Quality Assessors and the Quality Assessment scores. In other words, do certain Quality Assessors score in a certain way?

5.4.5 Control Chart

The same data preparation method was used as in sections 5.4.1.3 (Histogram) and 5.4.1.4 (Scatter Plot).

Run charts or control charts, are used for data that is arranged sequentially in a time order to identify trends. This example consists of count data of the number of new enrolments per month over two years, 2017 and 2018. The raw data used and the results, are documented below.

5.4.5.1 Raw Data: Number of New Enrolments

The data that was used for the control chart, is the number of new enrolments per month for two years, namely 2017 and 2018. The data is tabulated in Table 5.20.

Table 5.20: HIV DMP New Enrolments per Month 2017-2018
(**Source:** Managed Care Organisation 2017: December 2017; Managed Care Organisation 2018: December 2018)

Month/ Year	Beneficiaries Enrolled
Jan-17	1150
Feb-17	1418
Mar-17	1366
Apr-17	1019
May-17	1499
Jun-17	1148
Jul-17	1067
Aug-17	1102
Sep-17	987
Oct-17	1099
Nov-17	986
Dec-17	653
Jan-18	1022
Feb-18	1121
Mar-18	1136
Apr-18	995
May-18	1084
Jun-18	967
Jul-18	1037
Aug-18	1028
Sep-18	956
Oct-18	1133
Nov-18	1032
Dec-18	615

5.4.5.2 Results: Number of New Enrolments

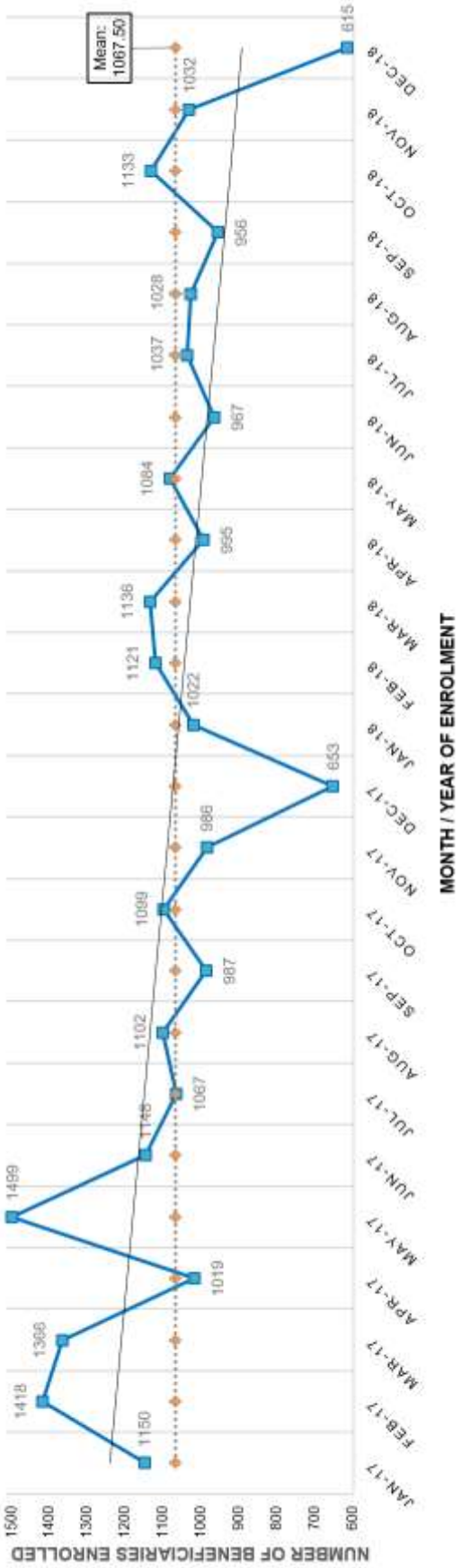


Figure 5.9: Control Chart of the HIV DMP New Enrolments per Month 2017-2018 (**Source**: Own)

5.4.5.3 Analysis of Results: Number of New Enrolments

Both December 2017 and 2018 were at an expected low. December is traditionally South Africa's Christmas season with all schools closed and several Public Holidays. Thus most families take their vacation in this period, spilling over into January. One would not expect many beneficiaries to submit new applications for enrolment at this time of the year.

On average (the Mean), 1067 or 1068 new enrollees were enrolled per month. Thus, in the workforce planning, one would ensure there are enough employees to enroll this number of beneficiaries every month.

In May 2017, there was an unusually sharp increase in new enrollees. The reason for that needs to be investigated. For example, it could be due to an HIV/AIDS awareness campaign held at the employer's premises which identified more HIV-positive beneficiaries that were enrolled.

In April there was a decline in enrolments. Possibly HIV DMP employees were requested to work overtime in May to catch up with a backlog, if there was one for some reason. This could also have caused the spike in the number of beneficiaries enrolled in May.

The control chart could be also useful if different data was gathered. For example, the accuracy score per person per day to see if there is any significant differences or patterns that could be observed and interpreted. One could then see which days of the week, or weeks of the month for example, accuracy scores are lower, and identify the root causes for correction and elimination.

5.4.6 Pareto Diagram

5.4.6.1 Raw Data: Inbound Telephone Calls Received Per Queue

The HIV DMP has several incoming telephone lines called queues. These are set up for specific groups to ensure the telephone lines are answered by suitable employees to assist the caller optimally. For example, language queues routed to an employee speaking that language.

South Africa has eleven official languages for which resources need to be provided for in the HIV DMP. A set of queues are in place for each of the eleven languages. This example was chosen to illustrate the Pareto Diagram's use not only to depict problems to be fixed, but that

it can also be used for resource planning. The 80/20 principle can also be applied to various other data sets.

The Service Provider line is for any language, but has been included in this example as it seems to be one of the telephone lines with the highest incoming call volumes.

Table 5.21 contains the number of calls received per month for each language queue, as well as the queue for Service Providers over a period of ten months chosen at random for illustrative purposes.

Table 5.21: The number of inbound telephone calls received per queue per month, January to October
(**Source:** Managed Care Organisation 2019)

QUEUE	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT
AFRIKAANS	263	211	205	235	212	182	180	213	171	62
ENGLISH	2951	3091	2799	2756	2713	2128	2697	2871	2647	780
NDEBELE	5	7	9	3	10	9	10	8	4	4
SEPEDI	64	53	42	57	67	38	60	47	39	18
SERVICE PROVIDER	4762	4756	4324	4127	4234	3420	4539	4103	3697	1131
SESOTHO	354	332	327	314	296	213	257	317	244	87
SISWATI	6	4	10	9	8	6	7	6	10	2
TSONGA	35	31	43	54	35	26	49	36	37	7
TSWANA	109	113	86	90	79	106	110	72	81	23
VENDA	24	19	19	22	21	10	26	19	25	10
XHOSA	266	271	225	257	238	198	246	260	218	80
ZULU	748	766	722	757	741	540	729	671	634	220

5.4.6.2 Results: Inbound Telephone Calls Received Per Queue

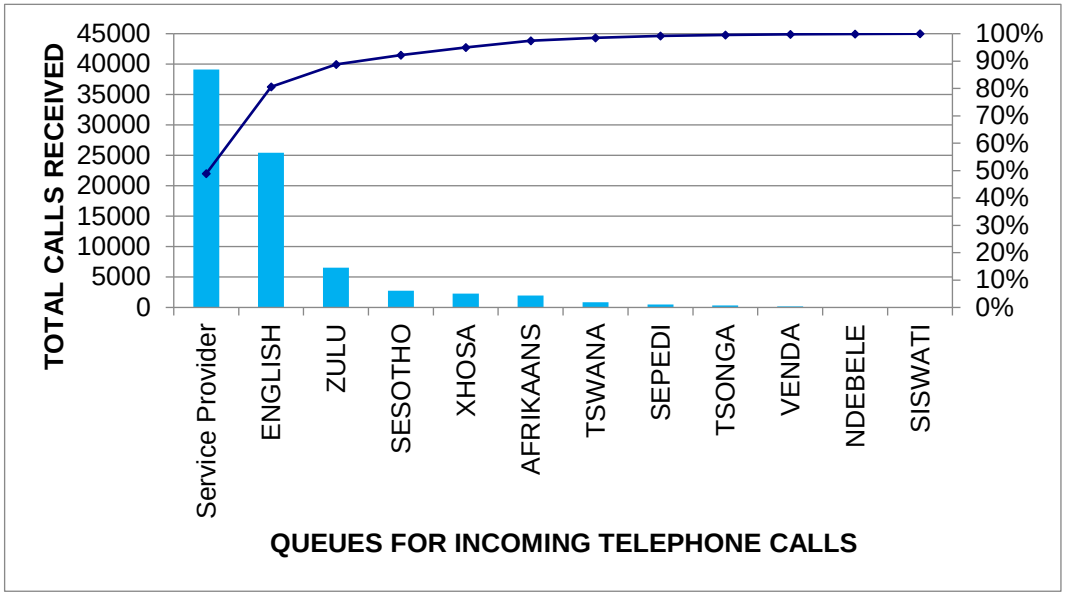


Figure 5.10: **Pareto Diagram of the total number of incoming calls received per queue January to October**
(**Source:** Own)

The total number of calls are depicted in this graph, from January to October. Juran's 80/20 principle states that that approximately 80% of the problems are created by approximately 20% of the causes. Addressing these vital few causes first, eliminates most of the problems (Foster 2013, p. 252).

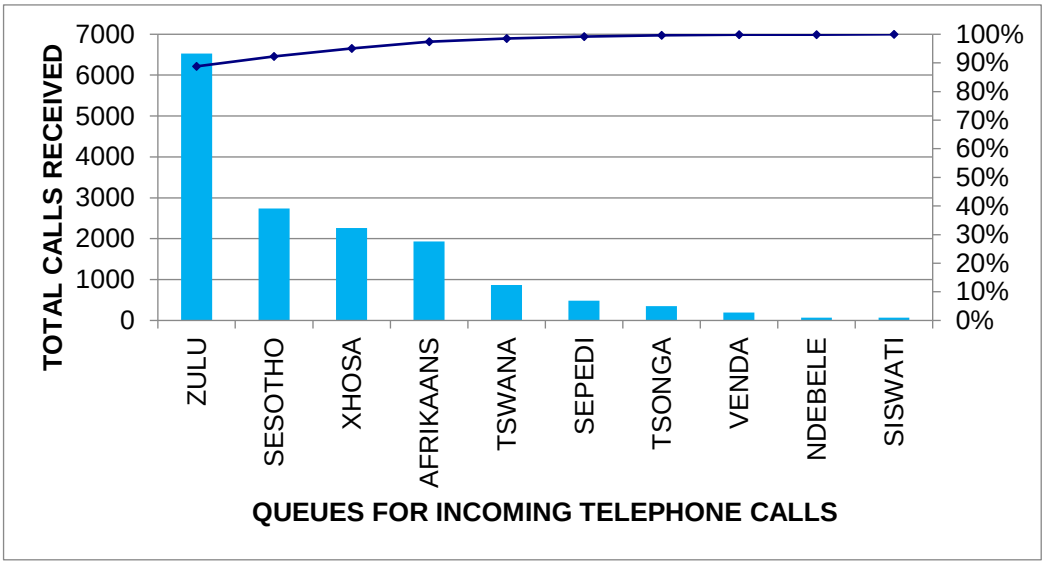


Figure 5.11: **Pareto Diagram of the total number of incoming calls received per queue January to October, excluding the Service Provider and English lines**
(**Source:** Own)

5.4.6.3 Analysis of Results: Inbound Telephone Calls Received Per Queue

According to the results in the Pareto Diagram in Figure 5.10, it can be clearly seen that the Service Provider and the English lines receive the most inbound calls. Thus most employees must be available on those two lines to ensure that the callers are assisted in their language of choice. And these lines need to be monitored more vigilantly to ensure compliance to SLAs.

Removing the Service Provider and English lines for the second part of this analysis, it is apparent in Figure 5.11 that Zulu is predominantly the second main language utilised. The gap between Zulu and Sesotho is significantly larger in this second example, than when viewed on the Pareto Diagram that includes the Service Provider and English telephone queues.

The Pareto Diagrams showing each month's calls, does not differ significantly from the diagram for the total calls for the time period of the ten months.

5.4.7 Fishbone Diagram

5.4.7.1 Raw Data: Error Description - Data Captured Incorrectly

Error Description number 10 (data captured incorrectly*)* from Table 5.11 was used to display the use of the Fishbone Diagram for root cause analysis. The full description of this error is expounded in section 4.9.2 (Qualitative Data) where the data collection and preparation of qualitative data is explained.

5.4.7.2 Results: Error Description - Data Captured Incorrectly

The example Fishbone Diagram can be viewed in Appendix J.

5.4.7.3 Analysis of Results: Error Description - Data Captured Incorrectly

With the scrutiny of the monthly reports made in section 1.3 (Background to the Research Problem), it was observed that it seems that the same errors recur to a varying degree every month.

If this root cause analysis is done comprehensively for each error, it can be re-used as a template to identify specific root causes per case without much extra effort. It is up to the business unit to identify which specific root cause is relevant to that specific case or person,

and to apply the relevant solutions due to uniqueness of each case and wide variety of scenarios. A list of relevant solutions can also be formulated that can be applied as necessary.

5.5 Key Research Findings

The following key research findings are noted in this chapter:

- There are several reliable sampling methods available which could be utilised effectively for analysis of various quality parameters in the numerous subsets of the HIV DMP population;
- Even though no industry benchmark was found for optimal sampling methods or sample sizes related to the HIV DMP's services rendered, there are dependable quality tools and techniques available which can be applied to the data and processes of the services to realize improvement;
- Grading and theming of errors, and identifying relevant quality requirements to be measured to prevent harm to the beneficiaries in the HIV DMP is possible, but recognising and deciding which ones are crucial, is difficult but essential; and
- Various Quality Tools and techniques are available to visually demonstrate the essential quality elements of the services provided, and identify areas of improvement.

5.6 Conclusion

Thus it could be shown that the various Quality Tools could be utilised to improve the reporting, to make the results more visual and easier to interpret. However, the available data needs closer scrutiny to identify other valuable parameters that could be analysed similarly.

In this chapter, each of the research questions were discussed and answered. Chapter 6 concludes this research study, summarising the research and providing recommendations for practice and further research. This will answer the last investigative research question, namely:

- What recommendations can be made regarding interventions for improving the Quality Assessment process?

CHAPTER 6: CONCLUSION AND RECOMMENDATIONS

6.1 Introduction

This chapter concludes the research study, the purpose of which was to investigate how the Quality Assessment process of the HIV Disease Management Programme at a Managed Care Organisation in South Africa can be improved. Recommendations for improvement as well as recommendations for future research are presented.

6.2 The Research Problem Re-Visited

The research problem researched within the scope of this study, reads as follows:
The HIV DMP targets the high risk beneficiaries exposed to HIV to ensure health care cost containment, access to appropriate care, and improved quality of life. It is crucial that these Managed Care services are of a high standard to prevent spiralling treatment costs and early mortality. The Quality Assessment process is key to identify any aspects of poor quality of the HIV DMP Managed Care services that need to be addressed.

It is the researcher's opinion that this research problem has been adequately addressed through the literature review, and the analysis of the available data.

6.3 The Research Questions Re-Visited

6.3.1 The Primary Research Question

The primary research question which was investigated and answered in this research study reads as follows:
How can the HIV DMP Quality Assessment process input, activities and reporting be improved?
This question was answered by answering each of the investigative research questions below.

6.3.2 The Investigative Research Questions

The investigative sub-questions researched in support of the primary research question are the following:

- What is best practice for the current Quality Assessment process sampling activities from a service quality perspective?
- Are the correct quality parameters used in the Assessment Questionnaire to identify the critical quality errors that must be addressed?

- Do the monthly Quality Assessment reports provided to management, identify the essential quality elements to demonstrate the quality of the services provided?

All the primary and investigative research questions were reviewed and answered, although not entirely resolved, through the literature study and demonstrated by practical application of the theory.

6.4 Key Research Objectives Re-Visited

The following key research objectives of this research study were articulated to support the research questions:

- To examine the current Quality Assessment process sampling activities from a service quality perspective, identify best practice, and recommend improvements.
- To ascertain if the Quality Assessment Questionnaire (the process input) contains the correct quality parameters to identify the critical errors to be addressed.
- To determine if the monthly Quality Assessment reports (the process output) contain the essential quality elements and tools to effectively demonstrate the quality of the services rendered.

It is the researcher's view that all of the research objectives listed above, were achieved and demonstrated where possible. This was done by scrutinising and analysing all available organisational documents (e.g. documented processes, training manuals, scorecards, questionnaires, monthly and other reports), and comparing the information with the reviewed literature to identify best practice and recommend improvements. There are some recommendations made from the data analysis regarding these objectives, which may need further investigation and decision-making by the organisational management.

6.5 Research Design and Methodology Re-Visited

The research design used in this study was that of mixed methods, where quantitative and qualitative data collection techniques and analysis procedures were used.

The research strategy was historical or archival research, using recent or historical administrative records and documents as the main source of data. As this organisational data was originally collected for a different purpose (operational management and reporting of Quality Assessment results of the HIV DMP to management), only certain data sets could be used for specific analysis. But there was enough data to allow all the research questions to be answered.

6.6 Data Analysis and Interpretation of Results Re-Visited

Reliability refers to the extent to which the data collection techniques or analysis procedures will yield consistent findings (Saunders *et al.* 2009, p. 156).

The researcher is confident that these research outputs could be replicated by others with the same knowledge and experience in quality, the managed health care environment and the HIV DMP. The use of the software and data, and the documented steps in analysing the raw data, is transparent and if repeated, should yield the same results and conclusions.

6.7 Research Findings

Through the literature review and analysis of data and its interpretation, each research investigative question was answered, but not necessarily resolved completely.

Best practice related to sampling activities was set out and explained in the literature review in Chapter 3 section 3.3. (Sampling). In Chapter 5 (Data Analysis and Interpretation of Results) section 5.2 (Sampling), examples were provided in the context of the HIV DMP to illustrate these sampling activities relevant to the Quality Assessment Process. Recommendations are provided in the next segment, section 6.8.1 (Sampling).

The quality parameters or requirements used in the Assessment Questionnaires were analysed and matched to the critical errors provided by the Managed Care Organisation and Medical Scheme. These findings are detailed in Chapter 5 section 5.3.2 (Analysis of Results: Error Types and Error Descriptions). Although many of the quality requirements in all of the Quality Questionnaires were appropriate and meaningful, several improvements are recommended in Chapter 6 (Conclusion and Recommendations) section 6.8.2 (Errors in Health Care). In the literature review section 3.4 (Understanding Errors in Health Care), factors regarding the classification and grading of errors were outlined, as well as the errors in health care in the context of James Reason's human error theory. The HFMEA^{TM} tool was offered as a possible solution for identifying and analysing errors, which was presented in section 3.4.7 (Health Care Failure Mode and Effect Analysis^{TM}). This tool would proactively identify weaknesses in a health care process to prevent errors from occurring.

Each Quality Tool that could be applied was expounded in the literature review Chapter 3 section 3.5 (Quality Tools for Reporting). It was found that not all these Quality Tools are used in the current monthly Quality Assessment reports. The organisational data available was applied to the relevant Quality Tools and techniques that can be harnessed to maximize the

benefits, outcomes and analysis of the data obtained. The results are displayed in Chapter 5 section 5.4 (Quality Tools). These can be utilised in the monthly reporting, or in the operational areas, with the ultimate goal to improve the customer experience. Recommendations are made regarding their use and implementation in section 6.8.3 (Quality Tools).

The final research question (What recommendations can be made regarding interventions for improving the Quality Assessment Process?), is answered in section 6.8 (Recommendations for Practice).

6.8 Recommendations for Practice

Based on the research findings, it is recommended that the results of this research study are communicated to the relevant management and employees of the Managed Care Organisation and Medical Scheme for review and consideration for implementation.

Specific recommendations, the potential value of the recommendation(s), and examples are tabled for each research question in sections 6.8.1, 6.8.2 and 6.8.3.

6.8.1 Sampling

This section provides recommendations regarding the investigative sub-question researched, namely:

- What is best practice for the current Quality Assessment process sampling activities from a service quality perspective?

All recommendations, their potential value if implemented with examples, are tabulated in Table 6.1 below.

Table 6.1: Recommendations to improve sampling methods and sample sizes, their potential value, and examples
(**Source**: Own source)

Recommendation	Potential Value of Recommendation	Examples
Use different but suitable methods of sampling and sample sizes from more specific subsets within the HIV DMP population.	➢ This could allow the use of smaller, yet statistically reliable sample size. ➢ It may yield valuable insights into the quality of each of the services rendered. ➢ Could assist management to effectively target the areas that will have the biggest impact on improving customer service. ➢ Could enable more targeted assessments of a wider variety of processes than currently assessed. ➢ May be more valuable in identifying quality issues, whilst using the same resources.	Subsets for assessment, could include the following: ➢ a sample per employee group (e.g. Admin Assistant, Case Manager, Pharmacist, Counsellor); ➢ sampling categories of work (e.g. capturing data, outbound calls, etc.); ➢ selecting samples from each of the various call queues (e.g. Service Provider queue, capturing, counseling, clinical interventions).
Refine data sets, if this is not already done.	➢ Identification of the optimal sample size per data set that needs to be assessed to ensure representative sampling and valid results. ➢ Resources could be used more efficiently.	➢ Personal calls separated or extracted from the data set from which samples are taken.
Assess a sample of calls the same day of the call, or early the next day, after the call was processed.	➢ Would be ideal to detect (and fix) any errors as quickly as possible before any queries or complaints are received. ➢ Minimisation of critical errors that could potentially harm the enrolled beneficiary.	➢ A report of all inbound and outbound calls of the morning or the previous day extracted from the system, and assessed the same day or early the next day.
Ensure that the sampling methods are correctly understood, documented, and applied in a standardised manner.	➢ Ensures appropriate sampling methods and sizes are used for the assessment purpose and population. ➢ Assures accurate results and that reliable conclusions are made.	➢ Documented Standard Operating Procedure detailing the methods and optimal sample sizes. ➢ Regular quality assessment and/or internal audit of the Quality Assessment process(es) and outcomes.
Look for and identify any trends or patterns from the data, especially outliers. This includes what is not showing up in the data, which could also be significant.	➢ Could reveal quality issues not identified before.	➢ Identification of days of the week or months of the year that are particularly prone to poor quality service.
Identify and add any quality parameters not checked or reported on, that would be valuable for continuous improvement.	➢ It would showcase continuous improvement to the customer, the Medical Scheme.	➢ Clinical information like number of hospitalisations per enrolled beneficiary (could be an indication of compliance to treatment protocols, for example).

Recommendation	Potential Value of Recommendation	Examples
Where data is not available from the systems, system enhancements could be motivated. If the data is available on the systems, but just not extracted for scrutiny, new or adapted system-generated reports could be put into place.	➢ To enable reporting on those quality aspects deemed lacking, yet valuable for quality improvement.	➢ System enhancements. ➢ New or adapted system-generated reports.
As no industry benchmark specifically for DMP Call or Contact centres could be found, consider the possibility of enlisting a subject matter expert (or experts) in this particular field to review the sampling, the Quality Questionnaires, and the Quality Assessment process holistically.	➢ It may be beneficial to ensure improvement of the overall service quality and use of resources.	

6.8.2 Errors in Health Care

Recommendations are provided in Table 6.2 below for the researched investigative sub-question:

- Are the correct quality parameters used in the Assessment Questionnaire to identify the critical quality errors that must be addressed?

Table 6.2: Recommendations to improve the quality parameters so that critical quality errors can be addressed
(**Sources**: NPSF 2015, pp. 26-28; Lucian Leape Institute 2013, pp. 7-10; McLaughlin & Kaluzny 2013, p. 328; Meadows *et al.* 2005; Bogner 2004, pp. xii-xiii; 7-9; Ryan & Bernard 2003, p. 85; DeRosier *et al.* 2002, pp. 264-267; Morath n.d., slide 3)

Recommendation	Potential Value of Recommendation	Examples
Explate Reason's theory that "to err, is human": ➢ Understand the types and causes of human error as described by James Reason (identify the slips, lapses, mistakes, violations, adverse events, close calls, errors, near misses, omissions that can occur). ➢ Create awareness of the errors that transpire and their root causes. ➢ Evaluate the availability and need for psychosocial support to the employees.	➢ Identifying the root causes of errors and ways to avoid the errors first time every time with each transaction, should be the ultimate goal of every employee with the understanding that all humans err – it is the intention that is important. ➢ Root cause analysis can reduce or even eliminate a majority of the errors occurring. ➢ Psychosocial support can enhance the trust relationship with the employer, and can reduce stress factors affecting the quality of work, absenteeism, etc.	➢ If thorough root cause analysis can be carried out to pinpoint the core reasons for the errors occurring, and actions plans developed to eliminate the errors permanently, the customer experience should be delightful. ➢ An illustration of how root cause analysis using the Fishbone Diagram can be utilised to identify the root causes of errors, can be viewed in Annexure W. ➢ As call centre environments are known to be highly stressful settings due to the nature of the work, and dealing with highly emotive topics and giving life changing information to beneficiaries on a daily basis, could increase the chance that employees can become ill, burnt out, demotivated, stressed and tired. ➢ Personal issues like safety concerns traveling to and from work, strike action and labour unrest, are factors to be considered when experiencing high absenteeism rates. This also puts extra pressure on the remaining employees.

Recommendation	Potential Value of Recommendation	Examples
Explate Reason's theory that "to err, is human" (cont.) ➢ Evaluate systemic support systems in place for the employees.	➢ Effective systemic support can enhance the ability of the systems to improve employee's adherence to clinical protocols and standard operating procedures.	➢ Ascertain if employees: • have access to regular psychological debriefing sessions if required; • have easy access to the clinical knowledge and Medical Scheme information they need; • require any hard or soft skill development; • have prompts on the systems or can request enhancements to help them provide crucial information or guidance with the health education to be given; ➢ are provided with a separate space where they can take a break, interact socially with colleagues, and have refreshments away from their desks.
Establish and implement a reporting procedure to relate errors.	➢ Internal reporting of errors so that they can be fixed before there are problems, can improve the turnaround time to minimize queries or complaints before they are received from service providers and enrolled beneficiaries. ➢ Critical errors that could cause harm to the enrolled beneficiary, could potentially be reduced or eliminated.	➢ A formalized and documented procedure can be determined and adopted using the principles of the HFMEA™, James Reason's Culpability Decision Tree and his GEMS taxonomy of human error.
Establish and implement a plan to create and promote a quality culture and healthy workplace where employees are encouraged to produce error free work, and to report identified errors.	➢ If employees have insight into the effect of their actions (or omissions), it may give them motivation to try to avoid the error altogether, as it becomes more personalised and significant. ➢ Ensuring that there is a blame-free or Just culture, can increase the incentive for reporting errors.	➢ Ensure that employee incentives and recognition for excellence, include quality parameters, not only quantity of work.

Recommendation	Potential Value of Recommendation	Examples
Re-assess the scoring method of the Quality Assessments, as well as the list of AutoFail and Critical Errors.	➢ If the absolute critical errors are identified that could truly harm the enrolled beneficiary, and the current list of AutoFail and Critical Errors are reduced, they may become more manageable and effectively governed.	➢ Possibly including the severity rating of the error in the total score and in the resulting percentage of the accuracy obtained.
When errors do occur, use Reason's Decision Tree to identify culpability, and to implement appropriate action as necessary.	➢ The most common error occurring, or the one that could make the biggest impact on the enrolled beneficiary and Service Providers' quality of service, can be identified without conveying blame. ➢ Should the error(s) be identified as being intentionally generated, appropriate action can be taken quickly against the erring employee to prevent further harm.	➢ The most significant error(s) can be made the improvement focus of the week or month.
Consider the implementation of an adapted version of the HFMEA™ with permission and assistance of the initial developers as a possible solution to manage errors. (Some adjustments to the terminology, for example, may be necessary.)	➢ Even just starting by identifying and risk rating failure modes in the current processes may be beneficial for improving the HIV DMP.	➢ The fact that it has been thoroughly researched and successfully implemented in American health care organisations, is an indication that it is a reliable method.

6.8.3 Quality Tools

This section provides recommendations regarding the researched investigative sub-question:

- Do the monthly Quality Assessment reports provided to management, identify the essential quality elements to demonstrate the quality of the services provided?

Using the Quality Tools not only in reporting, but also in continuous quality improvement activities and decision making processes, could enable the Managed Care Organisation to identify the key problems, their root causes and the solutions in all phases of their processes. This would ultimately improve the customer's experience and re-enforce the customer-centricity strategy of the organisation.

In addition, implementing diagrammatic and SIPOC process mapping, will also assist in identifying where wastes occur in the processes, and eliminating them to create efficiencies.

This is especially applicable if identifying and risk rating failure modes in the current processes are agreed upon.

In Table 6.3 below, recommendations specifically regarding improving the quality of the management reports, are stipulated.

Table 6.3: Recommendations to improve management reports to demonstrate the quality of the services provided
(**Source**: Own source)

Recommendation	Potential Value of Recommendation	Examples
Re-evaluation of the data collected and displayed in the monthly Quality Assessment reports.	➢ To ensure the data and analysis included in the reports are valuable and beneficial to bring about improvement and to enable the meaningful monitoring of quality.	➢ Results of root cause analysis done of the errors identified, and the action plans to rectify and eliminate the errors. Month to month progress of the elimination of those errors can be charted and reported on.
Standardisation of the Quality Assessment report data and format.	➢ To enable comparison of data and accuracy scores across the different areas of the HIV DMP. ➢ Consensus must be reached as to the most relevant data to be collected and reported on, as well as the optimal format it is to be displayed and presented.	➢ Standardised formatting of the report headings. ➢ Include the results of individual monthly accuracy scores and how they are distributed in relation to the targets set, presented as histograms with their descriptive statistics.
Training employees on the basic methods of the application and interpretation of the Quality Tools.	➢ It can be demonstrated that the Quality Tools are not only easy to use, but can be invaluable for collecting, analysing and displaying data visually. ➢ Identification of training needs and suitable training courses regarding quality improvement, root cause analysis, quality standards and methodologies.	➢ Employees can be taught to read the histogram results from the diagram and the descriptive statistics, to identify where the accuracy scores need to be improved. These results should be indicators where improvements need to be made to improve the services rendered to all stakeholders. ➢ Training courses provided by certified training institutions can be identified to enhance the necessary skills that are lacking e.g. South African Bureau of Standards (SABS).

6.9 Recommendations for Further Research

Some aspects of Quality Assessment were not included in the scope of this research study and is recommended for further research to improve the Quality Assessment process and reporting within the Managed Care Organisation.

The following topics are recommended for further research:

- Investigate the design of the current systems used, to identify if they are optimal to enable employees to deliver quality work with the assistance of technology to automate certain aspects of the processes, and put in place reminders and prompts to ensure the services rendered to the beneficiaries, is optimal and effective;
- Ascertain whether the implementation of Quality Tools assisted management with improving the monitoring, measurement, reporting and the identification of errors;
- Investigate calibration of the Quality Assessment and scoring process to ensure standardised results between Quality Assessors;
- Investigate and/or develop Quality Assessor minimum competency levels and training requirements;
- Explore the role of the coaching process after the Quality Assessment scoring has been communicated to the employee, to determine if the feedback and resultant coaching is effective, and to identify improvements and best practice if the process is ineffective; and
- Adaptation of the HFMEA^{TM} specifically for DMPs in Managed Care Organisations in South Africa, and to measure the impact on quality (reduction of errors, irrespective of their criticality) when implemented.

6.10 Conclusion

The purpose of this research study was to demonstrate that the Quality Assessment process and reporting of the HIV DMP delivered by Managed Care Organisation could be improved. The research problem, and its related research objectives and questions, has been successfully met and answered, with recommendations for improvement and further research for each topic covered.

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APPENDIX A: SUMMARY OF INFORMATION IN MONTHLY QUALITY ASSESSMENT REPORTS

The content of all the monthly Quality Assessment reports provided to the Medical Scheme by the Managed Care Organisation, is summarised in Table A.1. All the reports from March 2017 until December 2018 are included in the review, except the July 2017 report. Observations and conclusions from this summary, are included in section 1.3 (Background to the Research Problem).

Table A.1: Summary of information in monthly Quality Assessment reports (March 2017 to December 2018)
(**Source**: Own source)

Report Section	Factors Measured	Time Period	Format	Number or %
SUMMARIES				
Executive summary	n/a	Preceding month of report	Written paragraph	n/a
Quality Assurance	n/a	Preceding month of report	Written paragraph	n/a
Trend Analysis	n/a	Preceding month of report	Written paragraph	n/a
Clinical Errors	n/a	Preceding month of report	Written paragraph	n/a
Root Cause Analysis	n/a	Preceding month of report	Written paragraph	n/a
Weaknesses/ Challenges of the Current QA System	n/a	Preceding month of report	Written paragraph	n/a
QA Corrective Action Taken	n/a	Preceding month of report	Written paragraph	n/a
Training and Development Needs	n/a	Preceding month of report	Written paragraph	n/a
Complaints and Compliments	n/a	Preceding month of report	Written paragraph	n/a
Challenges and Way Forward	n/a	Preceding month of report	Written paragraph	n/a
GRAPHS				
Inbound and Outbound Calls	QA score for call centre – inbound calls / outbound calls / total average	Calendar year per month up to preceding month of report	Bar graph	%
TABLES				
Contact centre QA framework reporting summary	No. of calls per month / No. of calls assessed / % of calls assessed / No. of individual feedback / Auto Zeros	Calendar year per month up to preceding month of report	Table	Number %
Beneficiary membership validation	Membership status / Beneficiary validation / Waiting periods / Exclusions / Option benefits / Overall average	Calendar year per month up to preceding month of report	Table	%
Registration process QA	Registration process and services / PEP / PMCTC / Overall average	Calendar year per month up to preceding month of report	Table	%

Report Section	Factors Measured	Time Period	Format	Number or %
Application of formulary/ protocols/ exclusions and scheme rules	Applications reviewed by clinical employees / Adherence to clinical protocols / Benefit limits per option (care plan) / Medicine authorisation within formulary / Overall average	Calendar year per month up to preceding month of report	Table	%
Area of non-conformance Case Managers	Telephone Etiquette: POPI including non-HIV calls / Warm transfer / Change of language / Politeness / Unprofessionalism / Attentive listening / On hold instruction / Wrong dept. transfer / Case not escalated / Call reference / Further assistance offered / Survey line / Silence / Cost effective / Total errors	Calendar year per month up to preceding month of report	Table	Number
Area of non-conformance Admin Assistants	Telephone Etiquette: POPI including non-HIV calls / Warm transfer / Change of language / Politeness / Unprofessionalism / Attentive listening / On hold instruction / Wrong dept. transfer / Case not escalated / Call reference / Further assistance offered / Survey line / Silence / Cost effective / Total errors	Calendar year per month up to preceding month of report	Table	Number
Compliments	Compliments Source: Members / Providers / Third Party / Total	Calendar year per month up to preceding month of report	Table	Number
Complaints by Source	Complaints Source: Members / Providers / Third Party / Total	Calendar year per month up to preceding month of report	Table	Number
Complaint Entry Channel	Complaint Entry Mode: CMS / Social Media / Complaints / HIV mailbox / Telephonic / Total	Calendar year per month up to preceding month of report	Table	Number
Complaints Trends and Root Cause	Complaint Category: DPP registration / ART authorisation / Medicine delivery / Claims related / Service experience / Others / Total	Calendar year per month up to preceding month of report	Table	Number
HIV Identified Report and SMS Reminders File	Month / Total no. of files Month / Total no. of SMS files	Calendar year per month up to preceding month of report	Table	Number
Case Managers Inbound Telephonic QA Scores	Case Manager by Name / No. of calls per month / No. of calls assessed / No. of individual feedback / Auto Zeros / Average	2 months preceding month of report	Table	Number %
Case Managers Capturing and Authorisation QA Scores	Case Manager by Name / Average score	Calendar year per month up to preceding month of report	Table	%
Admin Assistants Inbound Telephonic QA Scores	Admin Assistants by Name / No. of calls per month / No. of calls assessed / No. of individual feedback / Auto Zeros / Average	2 months preceding month of report	Table	Number %
Admin Assistants Capturing QA Scores	Admin Assistants by Name / Average	Calendar year per month up to preceding month of report	Table	%
Counsellors Outbound QA Scores	Counsellors by Name / Average score	Calendar year per month up to preceding month of report	Table	%

Report Section	Factors Measured	Time Period	Format	Number or %
AMOUNT OF WORK DONE				
Number of files worked on (only for Admin)	Per employee: Number of files worked on / Number of files assessed			

APPENDIX B: SOUTH AFRICAN LEGISLATION RELEVANT TO MEDICAL SCHEMES AND MANAGED CARE ORGANISATIONS

The legal framework wherein Medical Schemes and Managed Care Organisations operate is documented in Table B.1, which includes the objective of each Act (as at 31 March 2019). Legislation relating to an organisation (or company), and the employer/employee relationship, is not included.

The following terms are relevant to legislation, as defined by ISO:

- A statutory requirement is the "obligatory requirement specified by a legislative body" (ISO 9000:2015);
- A regulatory requirement is an "obligatory requirement specified by an authority mandated by a legislative body" (ISO 9000:2015); and
- Legal requirements are "statutory and regulatory requirements" (ISO 9001:2008).

Table B.1: South African legislation applicable to Medical Schemes and Managed Care Organisations
(**Source:** Acts Online n.d.)

Act	Objective of the Act
Allied Health Professions Act, 1982 (Act No. 63 of 1982)	"To provide for the control of the practice of allied health professions, and for that purpose to establish an Allied Health Professions Council of South Africa."
Children's Act, 2005 (Act No. 38 of 2005)	"To give effect to certain rights of children as contained in the Constitution; to set out principles relating to the care and protection of children; to define parental responsibilities and rights; to make further provision regarding children's courts; to provide for the issuing of contribution orders; to make new provision for the adoption of children; to provide for inter-country adoption; to give effect to the Hague Convention on Inter-country Adoption; to prohibit child abduction and to give effect to the Hague Convention on International Child Abduction; to provide for surrogate motherhood; and to create certain new offences relating to children."
Choice on Termination of Pregnancy Act, 1996 (Act No. 92 of 1996)	"To determine the circumstances in which and conditions under which the pregnancy of a woman may be terminated."
Compensation for Occupational Injuries and Diseases Act, 1993 (Act No. 130 of 1993)	"To provide for compensation for disablement caused by occupational injuries or diseases sustained or contracted by employees in the course of their employment, or for death resulting from such injuries or diseases."
Competition Act, 1998 (Act No. 89 of 1998)	"To provide for the establishment of a Competition Commission responsible for the investigation, control and evaluation of restrictive practices, abuse of dominant position, and mergers; and for the establishment of a Competition Tribunal responsible to adjudicate such matters; and for the establishment of a Competition Appeal Court."
Constitution of the Republic of South Africa, 1996 (Act No. 108 of 1996)	"To introduce a new Constitution."

Act	Objective of the Act
Consumer Protection Act, 2008 (Act No. 68 of 2008)	"To promote a fair, accessible and sustainable marketplace for consumer products and services and for that purpose to establish national norms and standards relating to consumer protection, to provide for improved standards of consumer information, to prohibit certain unfair marketing and business practices, to promote responsible consumer behaviour, to promote a consistent legislative and enforcement framework relating to consumer transactions and agreements, and to establish the National Consumer Commission."
Council for Medical Schemes Levies Act, 2000 (Act No. 58 of 2000)	"To provide for the imposition of levies by the Council for Medical Schemes."
Electronic Communications and Transactions Act, 2002 (Act No. 25 of 2002)	"To provide for the facilitation and regulation of electronic communications and transactions; to provide for the development of a national e-strategy; to promote universal access to electronic communications and transactions and the use of electronic transactions by SMMEs; to provide for human resource development in electronic transactions; and to prevent abuse of information systems."
Financial Advisory and Intermediary Services Act, 2002 (Act No. 37 of 2002)	"To regulate the rendering of certain financial advisory and intermediary services to clients."
Financial Intelligence Centre Act, 2001 (Act No. 38 of 2001)	"To establish a Financial Intelligence Centre and a Money Laundering Advisory Council in order to combat money laundering activities and the financing of terrorist and related activities; and to impose certain duties on institutions and other persons who might be used for money laundering purposes and the financing of terrorist and related activities."
Health Professions Act, 1974 (Act No. 56 of 1974)	"To establish the Health Professions Council of South Africa and professional boards; and to provide for control over the education, training and registration for and practising of health professions registered under the Act."
Medical Schemes Act, 1998 (Act No. 131 of 1998)	"To consolidate the laws relating to registered Medical Schemes; to provide for the establishment of the Council for Medical Schemes as a juristic person; to provide for the appointment of the Registrar of Medical Schemes; to make provision for the registration and control of certain activities of Medical Schemes; to protect the interests of members of Medical Schemes; and to provide for measures for the co-ordination of Medical Schemes."

Act	Objective of the Act
Medicines and Related Substances Control Act, 1965 (Act No. 101 of 1965)	"To provide for the registration of medicines and related substances intended for human and animal use; to provide for the establishment of a Medicines Control Council; to provide that such council shall be a juristic person; to make other provision for the constitution of the council; to provide that a member of the council or committee shall declare his or her commercial interest related to the pharmaceutical or health care industry; to provide that the appointment of members of the executive committee is subject to the approval of the Minister; to provide for the control of medicines and scheduled substances and medical devices; to make further provision for the prohibition on the sale of medicines which are subject to registration and are not registered; to provide for procedures that will expedite the registration of essential medicines, and for the re-evaluation of all medicines after five years; to provide for measures for the supply of more affordable medicines in certain circumstances; to provide that labels be approved by the council; to prohibit sampling and bonusing of medicines; to provide for the licensing of certain persons to compound, dispense or manufacture medicines and medical devices and also to act as wholesalers or distributors; to provide for the generic substitution of medicines; to provide for the establishment of a pricing committee; to regulate the purchase and sale of medicines by manufacturers, distributors, wholesalers, pharmacists and persons licenced to dispense medicines; and to make new provisions for appeals against decisions of the Director-General or the council."
Mental Health Care Act, 2002 (Act No. 17 of 2002)	"To provide for the care, treatment and rehabilitation of persons who are mentally ill; to set out different procedures to be followed in the admission of such persons; to establish Review Boards in respect of every health establishment; to determine their powers and functions; and to provide for the care and administration of the property of mentally ill persons."
National Health Act, 2003 (Act No. 61 of 2003)	"To provide a framework for a structured uniform health system, taking into account the obligations imposed by the Constitution and other laws on the national, provincial and local governments with regard to health services."
Nursing Act. 2005 (Act No. 33 of 2005)	"To regulate the nursing profession. Certain rules and regulations of the Nursing Act 50 of 1978 are still in place."
Occupational Health and Safety Act, 1993 (Act No. 85 of 1993)	"To provide for the health and safety of persons at work and for the health and safety of persons in connection with the use of plant and machinery; the protection of persons other than persons at work against hazards to health and safety arising out of or in connection with the activities of persons at work; and to establish an advisory council for occupational health and safety."
Pharmacy Act, 1974 (Act No. 53 of 1974)	"To provide for the establishment of the South African Pharmacy Council and for its objects and general powers; to extend the control of the council to the public sector; and to provide for pharmacy education and training, requirements for registration, the practice of pharmacy, the ownership of pharmacies and the investigative and disciplinary powers of the council."
Prevention of and Treatment for Substance Abuse Act, 2008 (Act No. 70 of 2008)	"To provide for a comprehensive national response for the combating of substance abuse; to provide for mechanisms aimed at demand and harm reduction in relation to substance abuse through prevention, early intervention, treatment and re-integration programmes; to provide for the registration and establishment of treatment centres and halfway houses; and to provide for the committal of persons to and from treatment centres and for their treatment, rehabilitation and skills development in such treatment centres."
Promotion of Access to Information Act, 2000 (Act No. 2 of 2000)	"To give effect to the constitutional right of access to any information held by the State or another person and that is required for the exercise or protection of any rights."

Act	Objective of the Act
Protection of Personal Information Act, 2013 (Act No. 4 of 2013) *Partial commencement: sections 1, 112, 113 and Part A of Chapter 5; Remainder of Act: Awaiting proclamation.*	"To promote the protection of personal information processed by public and private bodies; to introduce certain conditions so as to establish minimum requirements for the processing of personal information; to provide for the establishment of an Information Regulator to exercise certain powers and to perform certain duties and functions in terms of this Act and the Promotion of Access to Information Act, 2000; to provide for the issuing of codes of conduct; to provide for the rights of persons regarding unsolicited electronic communications and automated decision making; to regulate the flow of personal information across the borders of the Republic; and to provide for matters connected therewith."
Recognition of Customary Marriages Act, 1998 (Act No. 120 of 1998)	"To make provision for the recognition of customary marriages; to specify the requirements for a valid customary marriage; to regulate the registration of customary marriages; to provide for the equal status and capacity of spouses in customary marriages; to regulate the proprietary consequences of customary marriages and the capacity of spouses of such marriages; and to regulate the dissolution of customary marriages."
Road Accident Fund Act, 1996 (Act No. 56 of 1996)	"To provide for the establishment of the Road Accident Fund."
Sterilisation Act, 1998 (Act No. 44 of 1998)	"To provide for the right to sterilisation; to determine the circumstances under which sterilisation may be performed and, in particular, the circumstances under which sterilisation may be performed on persons incapable of consenting or incompetent to consent due to mental disability."
Traditional Health Practitioners Act, 2007 (Act No. 22 of 2007)	"To establish the Interim Traditional Health Practitioners Council of South Africa; to provide for a regulatory framework to ensure the efficacy, safety and quality of traditional health care services; to provide for the management and control over the registration, training and conduct of practitioners, students and specified categories in the traditional health practitioners profession; and to provide for matters connected therewith."

APPENDIX C: REASON AND RASMUSSEN's TAXONOMIES EXPLAINING HUMAN ERROR

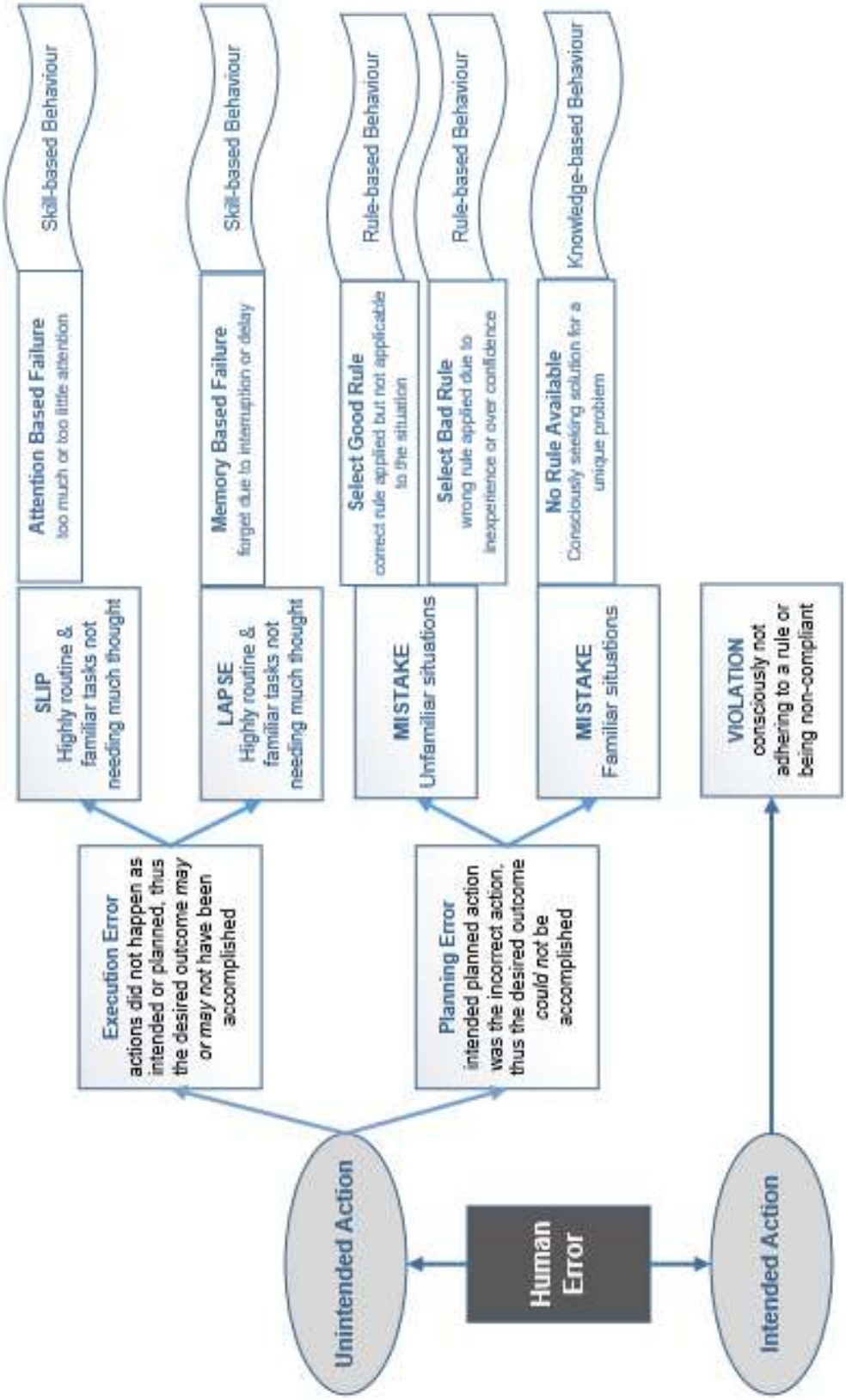


Figure C.1: A summary of Reason's GEMS taxonomy of human error showing how Rasmussen's SRK taxonomy is interlinked
(**Source:** Adapted from Whittingham 2004, pp. 15-23)

APPENDIX D: REASON'S DECISION TREE FOR DETERMINING CULPABILITY OF UNSAFE ACTS

Below is the detailed diagram of James Reason's Culpability Decision Tree from his 1997 book "*Managing the Risks of Organizational Accidents",* cited by Morath (n.d., slide 3). It can be used as a tool to assist with the categorisation of human error – if the person making the mistake is culpable or not, and what systemic factors could have played a role in the error occurring.

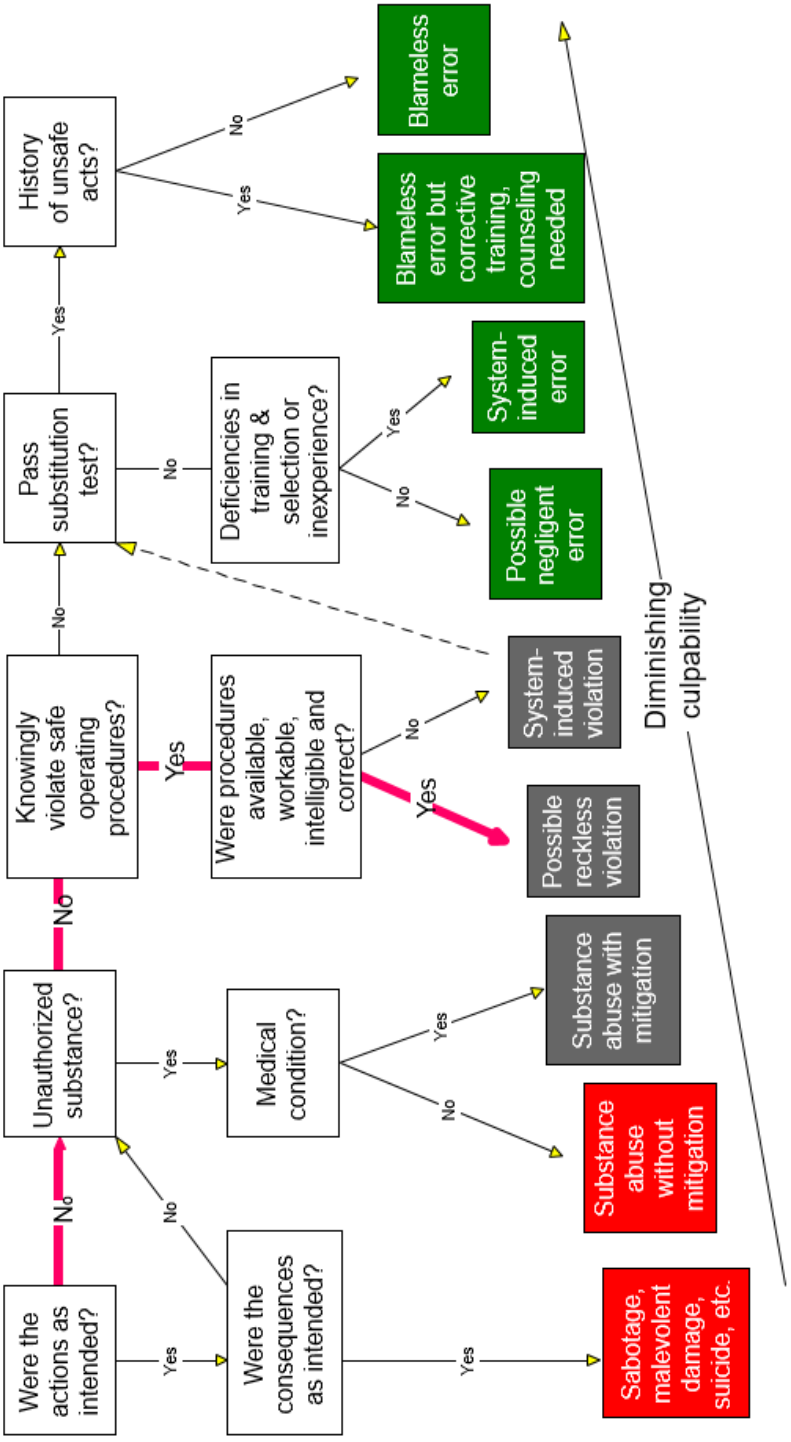


Figure D.1: James Reason's Decision Tree for determining culpability of unsafe acts (**Source**: Morath, n.d., slide 3)

APPENDIX E: FAILURE MODE AND EFFECT ANALYSIS (FMEA) FOR PROCESSES

FMEA's steps and ten point rating scales of the three variables used to calculate the Risk Priority Number (RPN), namely severity, occurrence and probability. The RPN = Severity x Occurrence x Detection.

All the Tables in this Appendix, are quoted in its entirety, for informational purposes.

Table E.1: FMEA's ten steps
(**Source**: McDermott *et al.* 2009, p. 23)

Step 1	Review the process or product.
Step 2	Brainstorm potential failure modes.
Step 3	List potential effects of each failure mode.
Step 4	Assign a severity ranking for each effect.
Step 5	Assign an occurrence ranking for each failure mode.
Step 6	Assign a detection ranking for each failure mode and/or effect.
Step 7	Calculate the risk priority number for each effect.
Step 8	Prioritize the failure modes for action.
Step 9	Take action to eliminate or reduce the high-risk failure modes.
Step 10	Calculate the resulting RPN as the failure modes are reduced or eliminated.

Table E.2: Severity rating criteria and ranking of the effect of failure on the product, process and customer
(**Source**: Ford Motor Company 2011, pp. 4-24)

Effect	Criteria: Severity of Effect on Product (Customer Effect)	Rank	Effect	Criteria: Severity of Effect on Process (Manufacturing/ Assembly Effect)
Failure to Meet Safety and/or Regulatory Requirements	Potential failure mode affects safe vehicle operation and/or involves noncompliance with government regulation without warning.	**10**	**Failure to Meet Safety and/or Regulatory Requirements**	May endanger operator (machine or assembly) without warning.
	Potential failure mode affects safe vehicle operation and/or involves noncompliance with government regulation with warning.	**9**		May endanger operator (machine or assembly) with warning.
Loss or Degradation of Primary Function	Loss of primary function (vehicle inoperable, does not affect safe vehicle operation).	**8**	**Major Disruption**	100% of product may have to be scrapped. Line shutdown or stop ship.
	Degradation of primary function (vehicle operable, but at reduced level of performance).	**7**	**Significant Disruption**	A portion of the production run may have to be scrapped. Deviation from primary process including decreased line speed or added manpower.
Loss or Degradation of Secondary Function	Loss of secondary function (vehicle operable, but comfort / convenience functions inoperable).	**6**	**Moderate Disruption**	100% of production run may have to be reworked off line and accepted.
	Degradation of secondary function (vehicle operable, but comfort / convenience functions at reduced level of performance).	**5**		A portion of the production run may have to be reworked off line and accepted.
Annoyance	Appearance or Audible Noise, vehicle operable, item does not conform and noticed by most customers (> 75%).	**4**	**Moderate Disruption**	100% of production run may have to be reworked in station before it is processed.
	Appearance or Audible Noise, vehicle operable, item does not conform and noticed by many customers (50%).	**3**		A portion of the production run may have to be reworked in-station before it is processed.
	Appearance or Audible Noise, vehicle operable, item does not conform and noticed by discriminating customers (< 25%).	**2**	**Minor Disruption**	Slight inconvenience to process, operation, or operator.
No effect	No discernible effect.	**1**	**No effect**	No discernible effect.

Table E.3: Process FMEA occurrence evaluation criteria and ranking
(**Source:** Ford Motor Company 2011, pp. 4-35)

Likelihood of Failure	Criteria: Occurrence of Cause – PFMEA (Incidents per items/vehicles)	Rank
Very High	≥ 100 per thousand ≥ 1 in 10	10
High	50 per thousand 1 in 20	9
	20 per thousand 1 in 50	8
	10 per thousand 1 in 100	7
Moderate	2 per thousand 1 in 500	6
	.5 per thousand 1 in 2,000	5
Low	.1 per thousand 1 in 10,000	4
	.01 per thousand 1 in 100,000	3
	≤.001 per thousand 1 in 1,000,000	2
Very Low	Failure is eliminated through preventive control.	1

Table E.4: Process FMEA probability of detection evaluation criteria and ranking
(**Source:** Ford Motor Company 2011, pp. 4-44)

Opportunity for Detection	Criteria: Likelihood of Detection by Process Control	Rank	Likelihood of Detection
No detection opportunity	No current process control; Cannot detect or is not analyzed.	10	Almost Impossible
Not likely to detect at any stage	Failure Mode and/or Error (Cause) is not easily detected (e.g., random audits).	9	Very Remote
Problem Detection Post Processing	Failure Mode detection post-processing by operator through visual/tactile/audible means.	8	Remote
Problem Detection at Source	Failure Mode detection in-station by operator through visual/tactile/audible means or post-processing through use of attribute gauging (go/no-go, manual torque check/clicker wrench, etc.).	7	Very Low
Problem Detection Post Processing	Failure Mode detection post-processing by operator through use of variable gauging or in-station by operator through use of attribute gauging (go/no-go, manual torque check/clicker wrench, etc).	6	Low
Problem Detection at Source	Failure Mode or Error (Cause) detection in-station by operator through use of variable gauging or by automated controls in-station that will detect discrepant part and notify operator (light, buzzer, etc.). Gauging performed on setup and first-piece check (for set-up causes only).	5	Moderate
Problem Detection Post Processing	Failure Mode detection post-processing by automated controls that will detect discrepant part and lock part to prevent further processing.	4	Moderately High
Problem Detection at Source	Failure Mode detection in-station by automated controls that will detect discrepant part and automatically lock part in station to prevent further processing.	3	High
Error Detection and/or Problem Prevention	Error (Cause) detection in-station by automated controls that will detect error and prevent discrepant part from being made.	2	Very High
Detection not applicable; Error Prevention	Error (Cause) prevention as a result of fixture design, machine design or part design. Discrepant parts cannot be made because item has been error-proofed by process/product design.	1	Almost Certain

APPENDIX F: CHECKLISTS / QUALITY QUESTIONNAIRES

F.1 Medical Scheme Generic Quality Questionnaire

The quality requirements of the Medical Scheme's Generic Quality Questionnaire or scorecard used to assess the quality of telephone calls, is set out below in Table F.1.

Table F.1: Generic Telephonic Quality Scorecard
(**Source:** Medical Scheme 2017)

Date of Call:	Agent's Name:	
Time of Call:	Team Leader:	
Telephone No.:	QA Consultant:	
Membership/Provider No.:	Service Provider Network:	
Call Duration:	Call ID:	
GENERIC TELEPHONIC QUESTIONNAIRE	**Rating**	**Weighting**
INTRODUCTION		**8%**
Did the agent introduce the name of the company/division and their name	Yes	3%
Was the greeting friendly	No	2%
Was the purpose of the call established	Yes	3%
KNOW YOUR CUSTOMER		**10%**
All security checks performed (POPI Act)	Yes	-
Security checks performed with the rightful person (POPI Act)	N/A	4%
Details updated on the system	Yes	4%
Correct member/provider profiling	Yes	2%
FIRST CALL RESOLUTION		**23%**
The process was adequately explained	Yes	4%
Follow up processes were adequately explained	Yes	2%
The agent provided correct information	Yes	4%
The agent provided complete information	Auto Fail	4%
Correct turnaround times were provided	Yes	2%
The agent provided workable solutions	Yes	4%
The caller was called if a call back was promised	Yes	3%
COMPLAINT /COMPLIMENT MANAGEMENT		**5%**
The call was a complaint (no mark allocation)	Yes	0%
The call was a compliment	Yes	0%
The agent resolved the complaint	Yes	3%
The agent escalated the complaint (no mark allocation)	Yes	2%
SOFT SKILLS		**19%**
The agent listened actively	Yes	2%
The agent was polite and friendly	Yes	2%
The agent avoided using slang/jargon	Yes	2%
The caller's name was used	Yes	2%
The agent used correct close/open probing techniques	Yes	2%
The agent empathized	Yes	3%
There was rapport between the caller and the agent	Yes	2%
The agent was not rude/sarcastic	Yes	4%
HOLD/TRANSFER PROCEDURE		**7%**
The agent obtained permission before placing caller on hold/transferring or asking the caller to wait	Yes	2%
The holding time was not too long (more than 30 seconds)	Yes	2%
The agent thanked the caller for holding	Yes	1%
The agent did a warm transfer to another Service Provider Network	Yes	2%

GENERIC TELEPHONIC QUESTIONNAIRE	Rating	Weighting
MEMBER/PROVIDER EDUCATION		**6%**
There was sufficient benefit/process explanation	Yes	4%
The agent ensured that the caller understands the explanation	Yes	2%
CLOSING		**10%**
The agent recapped the discussion	Yes	2%
The agent offered further assistance	Yes	2%
The caller was offered a reference number	Yes	2%
The caller was requested to complete the telephone survey	Yes	4%
NOTES		**12%**
The agent log the call on the system?	Yes	4%
The agent captured the query on the system correctly (Query and Sub-Query Type etc.)	Yes	4%
The agent logged information reflective of the call	N/A	4%
		100%

F.2 HIV DMP Quality Questionnaires

This section contains all the quality requirements of each Quality Questionnaire or scorecard used for the HIV DMP's Quality Assessment process. These are also known as checklists, which is one of the 7 Basic Quality Tools.

These are the Quality Questionnaires included in this Appendix:

- Call Etiquette (Table F.2);
- Admin Enrolment (Table F.3);
- Counsellor New 1st Call (Table F.4);
- Counsellor 2nd and 3rd Call (Table F.5);
- Counsellor PMCTC 1st Call (Table F.6);
- Counsellor PMCTC 2nd and 3rd Call (Table F.7);
- Counsellor Paediatric New (Table F.8);
- Counsellor Paediatric Follow Up (Table F.9);
- Clinical PEP (Table F.10);
- Clinical Adult New Enrolment (Table F.11);
- Clinical Adult Follow up (Table F.12);
- Clinical Paediatric New (Table F.13);
- Clinical Paediatric Follow up (Table F.14).

Table F.2: HIV Call Etiquette Quality Questionnaire
(**Source:** Managed Care Organisation 2018a)

HIV CALL ETIQUETTE	Rating	Weighting
CALL OPENING		**100%**
Caller identity: Good day title, you are speaking to Case Manager or Admin Assistant name & surname, How may I be of assistance to you today?		40%
Security verification: Did the agent confirm membership number and ask to verify ID number / DOB		50%
Did the agent explain the purpose of the call or listen attentively to the caller enquiry		10%
CALL MANAGEMENT		**100%**
Did the agent portray active listening skills, interactive feedback, verbal nods, etc.		10%
Did the agent use effective questioning / probing to correctly identify a problem		10%
Was the agent mindful of the call duration and silent gaps		10%
Did the agent control the interaction / assertive when necessary / not allow the beneficiary to take over		10%
Did the agent interrupt the beneficiary unnecessarily or inappropriately		10%
Did the agent manage any (potential) conflict situation in an appropriate manner		10%
Did the agent address the beneficiary in an appropriate language		10%
Did the agent use no or minimal slang / habitual patterns e.g. um, yip, etc.		10%
Did the agent speak clearly and in an acceptable tone and volume		10%
Did the agent use a professional style and level of communication appropriate to the call		10%
LOGGINGS		**100%**
Was the call logged on the system		30%
Are notes explicit and reader friendly		40%
Were all e-mails archived where applicable		30%
CALL CLOSURE		**100%**
Did the agent offer any further assistance at the end of the call and send relevant communications, application form		40%
Did the agent refer the call to the relevant person for assistance: Admin Assistant, Counsellor, Case Manager		40%
Did the agent transfer the call to the survey line		20%

Table F.3: HIV Admin Enrolment Quality Questionnaire
(**Source:** Managed Care Organisation 2018a)

HIV ADMIN ENROLMENT	Rating	Weighting
DATA MANAGEMENT		**100%**
Was a valid beneficiary and dependant code loaded; Beneficiary not resigned		30%
Was the application form signed by beneficiary		5%
Was the application form signed by Doctor		5%
Was date of diagnosis captured		2%
Was obstetric information captured (if Female)		5%
Were allergies captured		2%
Was alcohol intake captured		3%
Was TB information captured		5%
Was the correct CD4 and VL results captured with date		3%
Was the Doctor's details loaded		20%
Was the confidential address loaded		20%
SUPPORTING DOCUMENTS		**100%**
Does the script have the Doctor's signature and valid for 6 months		25%
Is the application accompanied by blood results CD4/VL		30%
Was Doctor's room contacted for any missing documents and notes written		25%
Is the application accompanied by additional results		20%
OPERATIONAL		**100%**
Notes written (adequate and understandable)		50%
File forwarded to HIV DMP Case Manager workflow		50%

Table F.4: HIV Counsellor New 1st Call Quality Questionnaire
(**Source:** Managed Care Organisation 2018a)

HIV COUNSELLOR NEW FIRST CALL	Rating	Weighting
COUNSELLING INTERVENTION		100%
Caller identity: Good day title and surname, you are speaking to Counsellor name from company / Scheme		10%
Security verification: Did the agent confirm membership number and ask to verify ID number / DOB		20%
Did the agent explain the purpose of the call		2%
Was the confidentiality address confirmed		20%
Gave information on HIV/AIDS		5%
Disclosure discussed		5%
Discussed other symptoms / illnesses / hospitalisations in the past 6 months		2%
Informed beneficiary about results (CD4 and VL and others) and their significance		2%
Informed beneficiary of the scheme benefits (e.g. Vaccines, number of consultations)		2%
Informed the beneficiary of the ARVs to be used *names, dosages, storage*		2%
Discussed pregnancy (applicable to Females)		1%
Discussed with beneficiary if communication can be posted		2%
Informed / emphasized adherence frequency and consistency		2%
Informed beneficiary about possible side effects		2%
Discussed nutrition, fluid intake, alcohol intake, herbal and traditional medication		5%
Discussed importance of exercise		1%
Discussed Safe Sex		2%
Informed beneficiary about follow-up tests *6-8 weeks, then every 4 months*		1%
If beneficiary is a Female - *discussed contraceptives, Pap smear, breast examination*		2%
If beneficiary has active TB *discussed script, follow ups at clinic or Doctor, water consumption*		5%
Informed beneficiary of TB prophylaxis or Purbac		1%
Discussed dispensing of script *DSP, local or courier*		2%
Was the beneficiary given an opportunity to ask questions, and were those questions answered		2%
Has Counsellor / Case Manager indicated where beneficiary will get script *(if delivery was arranged to right delivery address)*		2%
LOGGINGS		100%
Do the notes correspond with the call		40%
Do the notes contain the beneficiary telephone number used		30%
Are the abbreviations used understandable and as per the standard of abbreviations		30%

Table F.5: HIV Counsellor 2nd and 3rd Call Quality Questionnaire
(**Source:** Managed Care Organisation 2018a)

HIV COUNSELLOR 2ND AND 3RD CALL	Rating	Weighting
COUNSELLING INTERVENTION		100%
Caller identity: Good day title and surname, you are speaking to (name) from (Scheme)		10%
Security verification: Did the agent confirm membership number and ask to verify ID number / DOB		20%
Introduction with reason for the call		5%
Ask beneficiary how they feel since starting ART		5%
Disclosure discussed if not discussed previously		5%
Informed beneficiary about results (CD4 and VL and others) and *their significance*		10%
Has Counsellor checked for allergies and side effects		5%
Emphasized / informed adherence, frequency and consistency		5%
Discussed nutrition, fluid intake, alcohol intake		5%
Discussed importance of exercise		5%
Discussed Safe Sex		5%
Reminded about follow-up tests and script repeat (6 *months interval*)		10%
Health Education if beneficiary is a Female regarding *contraceptives, pap smear, breast examination* / Male *regarding prostate tests, breast examination*		5%
Ask the beneficiary if they have any questions		5%
DATA MANAGEMENT		100%
Do notes correspond with the intervention?		35%
Do the notes contain the beneficiary telephone number used		30%
Are the abbreviations used understandable		35%

Table F.6: HIV Counsellor PMCTC 1st Call Quality Questionnaire
(**Source:** Managed Care Organisation 2018a)

HIV COUNSELLOR PMCTC 1st CALL	Rating	Weighting
HIV INTERVENTION		100%
Caller identity: Good day title and surname, you are speaking to name and surname from Scheme		10%
Security verification: Did the agent confirm membership number and ask to verify ID number / DOB		15%
Introduction with reason for the call		5%
Disclosure discussed if not discussed previously		5%
Discussed other symptoms / illnesses / hospitalisations *in the past 6 months*		3%
Informed beneficiary about results (CD4 and VL and others) and *their significance*		5%
Informed the beneficiary of the ARVs to be used if there is a change of script (*Medicine names, dosages, storage)*		5%
Informed beneficiary about possible side effects		5%
Verified how far pregnant and EDD		2%
Informed beneficiary of the scheme benefits		10%
Ask beneficiary about her fears about starting ARVs and if partner has been tested		5%
Discussed delivery mode (Caesarian / NVD)		3%
Counsel on Breastfeeding, Milk Formula use in line with South African guidelines		3%
Emphasized importance of adherence, frequency and consistency		5%
Discussed baby syrup and time period		5%
Discussed Safe Sex (condom usage)		3%
Informed beneficiary to register baby on medical aid, to take baby for tests 6 weeks post-delivery and reasons		3%
Informed beneficiary of her follow up tests 6 months		3%
DATA MANAGEMENT		100%
Do the notes correspond with the call		40%
Do the notes contain the beneficiary telephone number used		20%
Are the abbreviations used understandable		20%
Has Counsellor indicated where beneficiary will get script *(if delivery was arranged to right delivery address) form archived*		20%

Table F.7: HIV Counsellor PMCTC 2nd and 3rd Call Quality Questionnaire
(**Source:** Managed Care Organisation 2018a)

HIV COUNSELLOR PMCTC 2nd AND 3rd CALL	Rating	Weighting
HIV INTERVENTION		100%
Caller identity: Good day title and surname, you are speaking --name and surname from Scheme		30%
Security verification: Did the agent confirm membership number and ask to verify ID number / DOB		20%
Introduction with reason for the call		5%
Ask the beneficiary how she feels about starting ART		10%
Ask the beneficiary if she experienced any side effects		5%
Emphasized importance of adherence, frequency and consistency		5%
Did she experience any problems collecting or taking her medication		10%
Ask the beneficiary if she has any questions		10%
Remind the beneficiary that she can always call back if there is any problem		5%
DATA MANAGEMENT		100%
Do the notes correspond with the call		40%
Do the notes contain the beneficiary's telephone number used		40%
Are the abbreviations used understandable		20%

Table F.8: HIV Counsellor Paediatric New Quality Questionnaire
(**Source:** Managed Care Organisation 2018a)

HIV COUNSELLOR PAEDIATRIC NEW	Rating	Weighting
PAEDIATRIC COUNSELLING INTERVENTION		100%
Caller identity: Good day title and surname, you are speaking to Case Manager name from Scheme		5%
Security verification: Did the agent confirm membership number and ask to verify ID number / DOB		10%
Introduction with reason for the call		5%
Confirmed if speaking to the Parent / Caregiver / Guardian		10%
If child is above 10 years, discussed possibility of disclosure in the near future. *(Assistance from Psychologist etc.)*		5%
Discussed other symptoms/ illnesses/ hospitalisations *in the past 6 months*		5%
Informed Parent / Caregiver / Guardian about results CD4 and VL and others *their significance*		5%
Discussed with Parent / Caregiver / Guardian if communication can be posted		3%
Explained to Parent / Caregiver / Guardian how to give the medicines *and emphasized dosages, storage*		5%
Emphasized/ informed adherence, frequency and consistency		5%
Informed Parent / Caregiver / Guardian about possible side effects		5%
Reminded about immunization schedule (0-6 years)		5%
Informed Parent / Caregiver / Guardian of the scheme benefits (e.g. Vaccines, number of consultations)		5%
Discussed nutrition, fluids intake, oral hygiene		5%
Re-emphasized importance of height, weight when taking child for follow ups		5%
Discussed dispensing of script *DSP, local or courier*		5%
Reminded about follow-up tests *4 months interval*		5%
Informed Parent / Caregiver / Guardian of TB prophylaxis or Purbac		2%
Asked Parent / Caregiver / Guardian about possible symptoms of TB or subsequent diagnosis and script *discussed, follow ups at clinic or Doctor, water consumption*		5%
PAEDIATRIC DATA MANAGEMENT		100%
Do the notes correspond with the call		40%
Do the notes contain the Parent / Caregiver / Guardian's telephone number used		20%
Are the abbreviations used understandable		20%
Has Counsellor indicated where Parent / Caregiver / Guardian will get script *if delivery was arranged to right delivery address*		20%

Table F.9: HIV Counsellor Paediatric follow up Quality Questionnaire
(**Source:** Managed Care Organisation 2018a)

HIV COUNSELLOR PAEDIATRIC FOLLOW UP	Rating	Weighting
PAEDIATRIC COUNSELLING INTERVENTION		100%
Caller identity: Good day title and surname, you are speaking to Case Manager name from Scheme		10%
Security verification: Did the agent confirm membership number and ask to verify ID number / DOB		15%
Introduction with reason for the call		10%
Confirmed if speaking to the Parent / Caregiver / Guardian		10%
If child is above 10 years discussed possibility of disclosure in the near future *(Assistance from Psychologist etc.)*		5%
Discussed other symptoms / illnesses / hospitalisations *in the past 6 months*		5%
Informed Parent / Caregiver / Guardian about results CD4 and VL and others *their significance*		5%
Ascertained how Parent / Caregiver / Guardian is giving ARVs *and emphasized dosage, storage*		5%
Emphasized / informed adherence, frequency and consistency		5%
Reminded about immunization schedule (0-6 years)		5%
Discussed nutrition, fluids intake, oral hygiene		5%
Re-emphasized importance of height, weight when taking child for follow ups		5%
Discussed dispensing of script *DSP, local or courier*		5%
Reminded about follow-up tests *4 months interval*		5%
Asked Parent / Caregiver / Guardian about possible symptoms of TB or subsequent diagnosis and script *discussed, follow ups at clinic or Doctor, water consumption*		5%
PAEDIATRIC DATA MANAGEMENT		100%
Do the notes correspond with the call		30%
Do the notes contain the Parent / Caregiver / Guardian's telephone number used		20%
Are the abbreviations used understandable		20%
Are the contact details of the Doctor captured on notes		15%
Has Counsellor indicated where Parent / Caregiver / Guardian will get script *if delivery was arranged to right delivery address*		15%

Table F.10: HIV Clinical PEP Quality Questionnaire
(**Source:** Managed Care Organisation 2018a)

HIV CLINICAL PEP	Rating	Weighting
INTERVENTION		100%
Has the application form been signed by the beneficiary		15%
Has the application been signed by the Doctor		10%
Has the beneficiary's confidential address been updated		15%
Were the Doctor's details been updated on the system		10%
Did Case Manager request ELISA test from beneficiary or Doctor (check notes)		10%
Were details of exposure provided (check notes)		10%
Was medication authorised within 8 hours of receipt of script (check notes / medicine screen)		20%
Was the appropriate care plan generated by Case Manager		10%
MEDICINE AUTHORISATION		100%
Medication authorised according to Guidelines (check medicine screen)		30%
Was the correct regimen authorised		20%
Was the correct quantity authorised		20%
Was the duration authorised adequate (one month)		15%
Is the PEP end date updated (should be 18 months from start date)		15%
LOGGINGS		100%
Do the notes correspond with the call		25%
Are the contact details of the Doctor captured on notes		25%
Do the notes contain the beneficiary's telephone number to be used		25%
Are the abbreviations used understandable and as per the standard of abbreviations		25%

Table F.11: HIV Clinical Adult New Enrolment Quality Questionnaire
(**Source:** Managed Care Organisation 2018a)

HIV CLINICAL ADULT NEW ENROLMENT	Rating	Weighting
HIV INTERVENTION		**65%**
Has the application data been updated correctly and completely on the system		5%
Has the beneficiary consent to be registered on the HIV DMP		10%
Has the beneficiary's confidential address been updated		10%
Has the application been signed by the Doctor		5%
Were the Doctor's details been updated on the system		5%
Allergies / alcohol noted (enrolment screen)		3%
Were symptoms experienced by beneficiary over the past 6 months updated (enrolment screen)		2%
TB information updated, past treatment and tests done (enrolment screen)		5%
ARV treatment history		5%
Were the correct care plans (beneficiary and Provider) generated and sent by Case Manager		10%
Were the baseline results received and abnormalities noted by Case Manager (check notes)		5%
MEDICINE AUTHORISATION		**30%**
Were the appropriate results received for prescribed regimen *[FBC for AZT, LFT for NVP, Creatinine Clearance for TDF (50ml/min)]*		5%
Was the correct dosage calculated (considered renal function / TB)		5%
Was the duration authorised adequate (2021 for adults and 6 months for Paediatrics)		5%
Was the correct quantity authorised		5%
Was the authorisation letter sent/faxed/posted to the Doctor and beneficiary		10%
DATA MANAGEMENT		**5%**
Do the notes correspond with the intervention		3%
Are the abbreviations used understandable		2%

Table F.12: HIV Clinical Adult follow up Quality Questionnaire
(**Source:** Managed Care Organisation 2018a)

HIV CLINICAL ADULT FOLLOW UP	Rating	Weighting
HIV INTERVENTION		**35%**
Were the beneficiary details updated *confidential address*		10%
Were the Doctor's details updated		5%
Were the results correctly updated		5%
Was the script correctly updated		5%
Did the Case Manager review the claims history for ARVs adherence		5%
Has the general beneficiary information been updated (disclosure, allergies, etc.)		5%
MEDICINE AUTHORISATION		**35%**
Did the Case Manager authorise the prescribed regimen based on appropriate results received and guidelines *[FBC for AZT, LFT for NVP, Creatinine Clearance for TDF (60ml/min)]*		10%
Was the correct dosage and quantity authorised (medicine screen)		5%
Was the correct formulation authorised (medicine screen) in cases of renal failure		5%
Was the duration authorised correct (2021)		5%
Is the status granted if declined pending blood results		**5%**
Was the update authorisation letter sent to the Doctor		5%
DATA MANAGEMENT		**30%**
Do the notes correspond with the intervention		5%
Are the abbreviations used understandable		5%
Are the contact telephone numbers of the beneficiary captured on notes		5%
Has Case Manager indicated where beneficiary will be getting treatment		5%
Did the Case Manager generate all the relevant communications		10%

Table F.13: HIV Clinical Paediatric New Quality Questionnaire
(**Source:** Managed Care Organisation 2018a)

HIV CLINICAL PAEDIATRIC NEW	Rating	Weighting
HIV INTERVENTION		**100%**
Has the application been completed		20%
Were the beneficiary's details updated *confidential address*		15%
Has the application form been signed by the Parent / Caregiver / Guardian		10%
Were the Doctor's details updated / *signatures present*		5%
Was the latest Height and Weight recorded (notes)		15%
Were symptoms experienced by child over past 6 months updated (enrolment screen) as explained by Parent / Caregiver / Guardian		15%
Were allergies noted (enrolment screen)		10%
Did the Case Manager contact the Doctor regarding Co-trimoxazole Prophylaxis		10%
Was the correct care plan generated and sent by Case Manager		10%
Were the baseline results received and abnormalities noted by Case Manager		10%
MEDICATION AUTHORISATION		**100%**
Did the Case Manager authorise the prescribed regimen based on appropriate results received and guidelines *[FBC for AZT,LFT for NVP, Creatinine Clearance for TDF (50ml/min)]*		30%
Was the correct dosage calculated (height and body weight)		15%
Was the correct quantity authorised (medicine screen)		15%
Was the duration authorised correct (6 months)		10%
Did Case Manager authorise formulations as warranted by age / height / weight		20%
Was the authorisation letter sent / faxed / posted to the Doctor (check notes)		10%
DATA MANAGEMENT		**100%**
Do the notes correspond with the intervention?		30%
Are the contact details of the beneficiary captured on notes		20%
Are the abbreviations used understandable		15%
Has Case Manager indicated where beneficiary will get script *(if delivery was arranged to right delivery address)*		20%
Did the Case Manager generate all the relevant communications		15%

Table F.14: HIV Clinical Paediatric follow up Quality Questionnaire
(**Source:** Managed Care Organisation 2018a)

HIV CLINICAL PAEDIATRIC FOLLOW UP	Rating	Weighting
HIV INTERVENTION		100%
Were the Parent / Caregiver / Guardian's details updated *confidential address*		20%
Was the latest Height and Weight recorded (notes)		20%
Were the side effects recorded if applicable		10%
Did the Case Manager review and update according to toxicity pathology		20%
Has the general beneficiary information been updated (disclosure, allergies, etc.)		20%
Uncontactable beneficiary's: Letter sent to Parent / Caregiver / Guardian who is aware of the child's HIV status		10%
MEDICATION AUTHORISATION		100%
Did the Case Manager authorise the prescribed regimen based on appropriate results received and guidelines [*FBC for AZT,LFT for NVP, Creatinine Clearance for TDF (50ml/min)]*		40%
Was the correct dosage and quantity calculated and authorised (as per current height and body weight)		30%
Was the duration authorised correct (6 months)		20%
Was the authorisation letter sent / faxed / posted to the Doctor (check notes)		10%
DATA MANAGEMENT		100%
Have comprehensive notes written regarding interventions made		30%
Are the abbreviations used understandable		20%
Are the contact details of the Parent / Caregiver / Guardian captured on notes		20%
Has Case Manager indicated where Parent / Caregiver / Guardian is getting treatment		15%
Did the Case Manager generate all the relevant communications		15%

APPENDIX G: RESULTS OF ERROR ANALYSIS OF HIV DMP QUESTIONNAIRE REQUIREMENTS

Table G.1 below is the detailed result of the error analysis described in step 9 from section 5.3.1 (Raw Data and Results: Error Types and Error Descriptions). The line items from each of the Quality Questionnaires (Quality Requirement) corresponding to each Quality Questionnaire Name, were matched to Error Types and Error Descriptions (Errors). These were categorised according to the Quality Questionnaire Name.

Table G.1: Quality requirements with corresponding Quality Questionnaire Names, matched to Errors
(**Source**: Own source)

Quality Requirement	Weighting %	Quality Questionnaire Name	Errors
Correct turnaround times were provided	2%	SCHEME Generic Telephonic	26 AF UN First Call Resolution
Follow up processes were adequately explained	2%	SCHEME Generic Telephonic	26 AF UN First Call Resolution
The agent provided complete information	4%	SCHEME Generic Telephonic	26 AF UN First Call Resolution
The agent provided correct information	4%	SCHEME Generic Telephonic	26 AF UN First Call Resolution
The agent provided workable solutions	4%	SCHEME Generic Telephonic	26 AF UN First Call Resolution
The caller was called if a call back was promised	3%	SCHEME Generic Telephonic	05 CNC
			26 AF UN First Call Resolution
The process was adequately explained	4%	SCHEME Generic Telephonic	26 AF UN First Call Resolution
The agent offered further assistance	2%	SCHEME Generic Telephonic	04 AF CNC Professional
The agent recapped the discussion	2%	SCHEME Generic Telephonic	04 AF CNC Professional
The caller was offered a reference number	2%	SCHEME Generic Telephonic	04 AF CNC Professional
The caller was requested to complete the telephone survey	4%	SCHEME Generic Telephonic	27 AF UN Member/Provider Education
The agent escalated the complaint (no mark allocation)	2%	SCHEME Generic Telephonic	00 No category
The agent resolved the complaint	3%	SCHEME Generic Telephonic	04 AF CNC Professional
The call was a complaint (no mark allocation)	0%	SCHEME Generic Telephonic	00 No category
The call was a compliment	0%	SCHEME Generic Telephonic	00 No category
The agent did a warm transfer to another SPN	2%	SCHEME Generic Telephonic	04 AF CNC Professional
The agent obtained permission before placing caller on hold/transferring or asking the caller to wait	2%	SCHEME Generic Telephonic	04 AF CNC Professional
The agent thanked the caller for holding	1%	SCHEME Generic Telephonic	04 AF CNC Professional
The holding time was not too long(more than 30 seconds)	2%	SCHEME Generic Telephonic	04 AF CNC Professional
Did the agent introduce the name of the company /division and their name	3%	SCHEME Generic Telephonic	04 AF CNC Professional
Was the greeting friendly	2%	SCHEME Generic Telephonic	04 AF CNC Professional
Was the purpose of the call established	3%	SCHEME Generic Telephonic	04 AF CNC Professional

Quality Requirement	Weighting %	Quality Questionnaire Name	Errors
All security checks performed (POPI Act)	-	SCHEME Generic Telephonic	02 AF CNC
Correct member/provider profiling	2%	SCHEME Generic Telephonic	25 AF CC enrolment type selected incorrect
Details updated on the system	4%	SCHEME Generic Telephonic	10 CC data capture
			11 AF CC
			23 AF CC records
Security checks performed with the rightful person (POPI Act)	4%	SCHEME Generic Telephonic	02 AF CNC
The agent ensured that the caller understands the explanation	2%	SCHEME Generic Telephonic	04 AF CNC Professional
There was sufficient benefit /process explanation	4%	SCHEME Generic Telephonic	04 AF CNC Professional
			26 AF UN First Call Resolution
The agent captured the query on the system correctly (Query and Sub-Query Type etc.)	4%	SCHEME Generic Telephonic	10 CC data capture
			23 AF CC records
			25 AF CC enrolment type selected incorrect
The agent log the call on the system?	4%	SCHEME Generic Telephonic	10 CC data capture
			23 AF CC records
The agent logged information reflective of the call?	4%	SCHEME Generic Telephonic	10 CC data capture
			23 AF CC records
The agent avoided using slang/jargon	2%	SCHEME Generic Telephonic	04 AF CNC Professional
The agent empathized	3%	SCHEME Generic Telephonic	04 AF CNC Professional
The agent listened actively	2%	SCHEME Generic Telephonic	04 AF CNC Professional
The agent used correct close/open probing techniques	2%	SCHEME Generic Telephonic	04 AF CNC Professional
The agent was not rude/sarcastic	4%	SCHEME Generic Telephonic	04 AF CNC Professional
The agent was polite and friendly	2%	SCHEME Generic Telephonic	04 AF CNC Professional
The caller's name was used	2%	SCHEME Generic Telephonic	04 AF CNC Professional
There was rapport between the caller and the agent	2%	SCHEME Generic Telephonic	04 AF CNC Professional
Did the agent offer any further assistance at the end of the call and sent relevant comms e.g. application form	40%	Call Etiquette	04 AF CNC Professional
			18 CC comms
Did the agent refer the call to the relevant person for assistance - Counsellor, CM, Admin	40%	Call Etiquette	26 AF UN First Call Resolution
Did the agent transfer the call to the survey line	20%	Call Etiquette	27 AF UN Member/Provider Education
Are notes explicit and reader friendly	40%	Call Etiquette	10 CC data capture
			23 AF CC records
			26 AF UN First Call Resolution
Was the call logged on the system	30%	Call Etiquette	10 CC data capture
			23 AF CC records
Were all e-mails archived where applicable	30%	Call Etiquette	10 CC data capture
			23 AF CC records
Did the agent address the beneficiary in an appropriate language	10%	Call Etiquette	04 AF CNC Professional
Did the agent control the interaction / assertive when necessary / not allow the beneficiary to take over	10%	Call Etiquette	04 AF CNC Professional
Did the agent interrupt the beneficiary / dependant unnecessarily or inappropriately	10%	Call Etiquette	04 AF CNC Professional

Quality Requirement	Weighting %	Quality Questionnaire Name	Errors
Did the agent manage any (potential) conflict situation in an appropriate manner	10%	Call Etiquette	04 AF CNC Professional
Did the agent portray active listening skills, interactive feedback, verbal nods, etc.	10%	Call Etiquette	04 AF CNC Professional
Did the agent speak clearly and in an acceptable tone and volume	10%	Call Etiquette	04 AF CNC Professional
Did the agent use a professional style and level of communication appropriate to the call	10%	Call Etiquette	04 AF CNC Professional
Did the agent use effective questioning / probing to correctly identify a problem	10%	Call Etiquette	04 AF CNC Professional
Did the agent use no or minimal slang / habitual patterns e.g. um, yip, etc.	10%	Call Etiquette	04 AF CNC Professional
Was the agent mindful of the call duration and silent gaps	10%	Call Etiquette	04 AF CNC Professional
Caller identity: Good day title, you are speaking to CM or AA name and surname, How may I be of assistance to you today?	40%	Call Etiquette	04 AF CNC Professional
Did the agent explain the purpose of the call or listen attentively to the caller enquiry	10%	Call Etiquette	04 AF CNC Professional
Security verification: Did the agent confirm membership number and ask to verify ID number / DOB	50%	Call Etiquette	02 AF CNC
Was a valid member and dependant code loaded - beneficiary not resigned	30%	Admin Enrolment	02 AF CNC
Was alcohol intake captured	3%	Admin Enrolment	23 AF CC records
Was date of diagnosis captured	2%	Admin Enrolment	10 CC data capture
			23 AF CC records
Was obstetric Information captured (if Female)	5%	Admin Enrolment	10 CC data capture
			23 AF CC records
Was TB information captured	5%	Admin Enrolment	10 CC data capture
			12 CC
			23 AF CC records
Was the application form signed by beneficiary/ Guardian	5%	Admin Enrolment	23 AF CC records
Was the application form signed by Doctor	5%	Admin Enrolment	23 AF CC records
Was the confidential address loaded	20%	Admin Enrolment	11 AF CC
			23 AF CC records
Was the correct CD4 and VL results captured with date	3%	Admin Enrolment	10 CC data capture
			23 AF CC records
Was the Doctor's details loaded	20%	Admin Enrolment	11 AF CC
			23 AF CC records
Were allergies captured	2%	Admin Enrolment	12 CC
			15 CC adverse event
File forwarded to HIV.DRM_cm workflow	50%	Admin Enrolment	00 No category
Notes written (adequate and understandable)	50%	Admin Enrolment	10 CC data capture
			23 AF CC records
Does the script have the Doctor's signature and valid for 6 months	25%	Admin Enrolment	14 CC script/ pathol
			23 AF CC records
Is the application accompanied by additional results	20%	Admin Enrolment	21 CC pathol results
			23 AF CC records
Is the application accompanied by blood results CD4/VL	30%	Admin Enrolment	21 CC pathol results
			23 AF CC records
Was Doctor's room contacted for any missing documents and notes written	25%	Admin Enrolment	21 CC pathol results
			23 AF CC records

Quality Requirement	Weighting %	Quality Questionnaire Name	Errors
Are the abbreviations used understandable and as per the standard of abbreviations	30%	Counsellor New 1st Call	10 CC data capture
			23 AF CC records
Do the notes contain the beneficiary's phone number used	30%	Counsellor New 1st Call	11 AF CC
			23 AF CC records
Do the notes correspond with the call	40%	Counsellor New 1st Call	10 CC data capture
			23 AF CC records
Caller identity: Good day title and surname, you are speaking to CM name from Scheme name	10%	Counsellor New 1st Call	04 AF CNC Professional
Did the agent explain the purpose of the call	2%	Counsellor New 1st Call	04 AF CNC Professional
Disclosure discussed	5%	Counsellor New 1st Call	03 CNC
Discussed dispensing of treatment DSP, local or courier	2%	Counsellor New 1st Call	00 No category
Discussed importance of exercise	1%	Counsellor New 1st Call	00 No category
Discussed nutrition, fluid intake and alcohol intake, herbal and traditional medication	5%	Counsellor New 1st Call	00 No category
Discussed other symptoms /illnesses /hospitalisations in the past 6 months	2%	Counsellor New 1st Call	12 CC
			15 CC adverse event
Discussed pregnancy applicable to Females	1%	Counsellor New 1st Call	00 No category
Discussed Safe Sex	2%	Counsellor New 1st Call	00 No category
Discussed with beneficiary if communication can be posted	2%	Counsellor New 1st Call	11 AF CC
			18 CC comms
Gave information on HIV/AIDS	5%	Counsellor New 1st Call	00 No category
Has Counsellor/CM indicated where beneficiary will get treatment (if delivery was arranged to right delivery address)	2%	Counsellor New 1st Call	11 AF CC
			23 AF CC records
If beneficiary has active TB discussed treatment, follow ups at clinic or Doctor, water consumption	5%	Counsellor New 1st Call	00 No category
If beneficiary is a Female discussed, contraceptives, pap smear, breast examination	2%	Counsellor New 1st Call	00 No category
Informed beneficiary about follow-up tests 6-8 weeks, then every 4 months	1%	Counsellor New 1st Call	00 No category
Informed beneficiary about possible side effects	2%	Counsellor New 1st Call	15 CC adverse event
Informed beneficiary about results (CD4 and VL and others) and their significance	2%	Counsellor New 1st Call	00 No category
Informed beneficiary of TB prophylaxis or Purbac	1%	Counsellor New 1st Call	13 AF CC prophylaxis
Informed beneficiary of the ARVS to be used names, dosages, storage	2%	Counsellor New 1st Call	07 CC
			12 CC
			13 AF CC prophylaxis
			19 CC dosage
			22 CC PMCTC meds
Informed beneficiary of the scheme benefits (e.g. Vaccines, number of consultations)	2%	Counsellor New 1st Call	01 AF CNC
			27 AF UN Member/Provider Education
Informed/emphasized adherence frequency and consistency	2%	Counsellor New 1st Call	00 No category
Security verification: Did the agent confirm membership number and ask to verify ID number/ DOB	20%	Counsellor New 1st Call	02 AF CNC
Was beneficiary given an opportunity to ask questions, and were those questions answered	2%	Counsellor New 1st Call	04 AF CNC Professional
			26 AF UN First Call Resolution

Quality Requirement	Weighting %	Quality Questionnaire Name	Errors
Was the confidentiality address confirmed	20%	Counsellor New 1st Call	11 AF CC
Are the abbreviations used understandable	35%	Counsellor 2nd and 3rd Call	10 CC data capture
			23 AF CC records
Do notes correspond with the intervention	35%	Counsellor 2nd and 3rd Call	10 CC data capture
			23 AF CC records
Do the notes contain the beneficiary's telephone number used	30%	Counsellor 2nd and 3rd Call	11 AF CC
			23 AF CC records
Ask beneficiary how he/she feels since starting ART	5%	Counsellor 2nd and 3rd Call	15 CC pathol adverse events grades 3,4,5 fail to intervene
Ask the beneficiary if they have any questions	5%	Counsellor 2nd and 3rd Call	26 AF UN First Call Resolution
Caller identity: Good day title and surname, you are speaking to ……name	10%	Counsellor 2nd and 3rd Call	04 AF CNC Professional
Disclosure discussed if not discussed previously	5%	Counsellor 2nd and 3rd Call	03 CNC
Discussed importance of exercise	5%	Counsellor 2nd and 3rd Call	00 No category
Discussed nutrition, fluid intake and alcohol intake	5%	Counsellor 2nd and 3rd Call	00 No category
Discussed Safe Sex	5%	Counsellor 2nd and 3rd Call	00 No category
Emphasized/informed adherence, frequency and consistency	5%	Counsellor 2nd and 3rd Call	00 No category
Has Counsellor checked for allergies and side effects	5%	Counsellor 2nd and 3rd Call	12 CC
			15 CC adverse event
Health Education Female re *contraceptives, pap smear, breast examination* Male *re: prostate testes, breast examination*	5%	Counsellor 2nd and 3rd Call	00 No category
Informed beneficiary about results (CD4 and VL and others) their significance	10%	Counsellor 2nd and 3rd Call	00 No category
Introduction with reason for the call	5%	Counsellor 2nd and 3rd Call	04 AF CNC Professional
Reminded about follow-up tests and script repeat (6 *months interval*)	10%	Counsellor 2nd and 3rd Call	00 No category
Security verification: Did the agent confirm membership number and ask to verify ID number / DOB	20%	Counsellor 2nd and 3rd Call	02 AF CNC
Are the abbreviations used understandable	20%	Counsellor PMCTC 1st Call	10 CC data capture
			23 AF CC records
Do the notes contain the beneficiary number used	20%	Counsellor PMCTC 1st Call	11 AF CC
			23 AF CC records
Do the notes correspond with the call	40%	Counsellor PMCTC 1st Call	10 CC data capture
			23 AF CC records
Has Counsellor indicated where beneficiary will get treatment (if delivery was arranged to right delivery address) form archived	20%	Counsellor PMCTC 1st Call	11 AF CC
			23 AF CC records
Ask beneficiary about her fears about starting ARVs and if partner has been tested	5%	Counsellor PMCTC 1st Call	07 CC
			13 AF CC prophylaxis
Caller identity: Good day title and surname, you are speaking to ---------- and surname	10%	Counsellor PMCTC 1st Call	04 AF CNC Professional
Counsel on Breastfeeding; Milk Formula Use in line with South African guidelines	3%	Counsellor PMCTC 1st Call	22 CC PMCTC meds
Disclosure discussed if not discussed previously	5%	Counsellor PMCTC 1st Call	03 CNC

Quality Requirement	Weighting %	Quality Questionnaire Name	Errors
Discussed baby syrup and time period	5%	Counsellor PMCTC 1st Call	08 CC
			13 AF CC prophylaxis
Discussed other symptoms/illnesses/hospitalisations *in the past 6 months*	3%	Counsellor PMCTC 1st Call	12 CC
			15 CC adverse event
Discussed Safe Sex (Condom Usage)	3%	Counsellor PMCTC 1st Call	00 No category
Emphasized importance of adherence, frequency and consistency	5%	Counsellor PMCTC 1st Call	00 No category
Informed beneficiary about possible side effects.	5%	Counsellor PMCTC 1st Call	15 CC adverse event
Informed beneficiary about results (CD4 and VL and others) and their significance	5%	Counsellor PMCTC 1st Call	00 No category
Informed beneficiary of her follow up tests 6 months	3%	Counsellor PMCTC 1st Call	00 No category
Informed beneficiary of the ARVS to be used if there is a change of treatment names, dosages, storage	5%	Counsellor PMCTC 1st Call	07 CC
			12 CC
			13 AF CC prophylaxis
			19 CC dosage
			22 CC PMCTC meds
Informed beneficiary of the scheme benefits	10%	Counsellor PMCTC 1st Call	01 AF CNC
			27 AF UN Member/Provider Education
Informed beneficiary to register baby on medical aid, to take baby for tests 6 weeks post-delivery and reasons	3%	Counsellor PMCTC 1st Call	27 AF UN Member/Provider Education
Informed the beneficiary of the ARVS to be used *names, dosages, storage*	5%	Counsellor PMCTC 1st Call	07 CC
			12 CC
			13 AF CC prophylaxis
			19 CC dosage
			22 CC PMCTC meds
Introduction with reason for the call	5%	Counsellor PMCTC 1st Call	04 AF CNC Professional
Security verification: Did the agent confirm membership number and ask to verify ID number / DOB	15%	Counsellor PMCTC 1st Call	02 AF CNC
Verified how far pregnant and EDD	2%	Counsellor PMCTC 1st Call	08 CC
Are the abbreviations used understandable	20%	Counsellor PMCTC 2nd and 3rd Call	10 CC data capture
			23 AF CC records
Do the notes contain the beneficiary's telephone number used	40%	Counsellor PMCTC 2nd and 3rd Call	11 AF CC
			23 AF CC records
Do the notes correspond with the call	40%	Counsellor PMCTC 2nd and 3rd Call	10 CC data capture
			23 AF CC records
Ask beneficiary how they feel about starting ART	10%	Counsellor PMCTC 2nd and 3rd Call	13 AF CC prophylaxis
Ask beneficiary if they experienced any side effects	5%	Counsellor PMCTC 2nd and 3rd Call	15 CC adverse event
			26 First Call Resolution AF UN
Ask beneficiary if they have any questions	10%	Counsellor PMCTC 2nd and 3rd Call	26 First Call Resolution AF UN
Caller identity: Good day title and surname, you are speaking --------- and surname	30%	Counsellor PMCTC 2nd and 3rd Call	04 AF CNC Professional
Did beneficiary experience any problems collecting or taking their medication	10%	Counsellor PMCTC 2nd and 3rd Call	22 CC PMCTC meds
Emphasized importance of adherence, frequency and consistency	5%	Counsellor PMCTC 2nd and 3rd Call	00 No category
Introduction with reason for the call	5%	Counsellor PMCTC 2nd and 3rd Call	04 AF CNC Professional

Quality Requirement	Weighting %	Quality Questionnaire Name	Errors
Remind Beneficiary they can always call back if there is any problem	5%	Counsellor PMCTC 2nd and 3rd Call	04 AF CNC Professional
Security verification: Did the agent confirm membership number and ask to verify ID number / DOB	20%	Counsellor PMCTC 2nd and 3rd Call	02 AF CNC
Asked beneficiary about possible symptoms of TB or subsequent diagnosis and treatment, discussed the treatment, follow ups at clinic or Doctor, water consumption	5%	Counsellor Paediatric New	12 CC
			26 AF UN First Call Resolution
Caller identity: Good day title and surname, you are speaking to CM name from Scheme name	5%	Counsellor Paediatric New	04 AF CNC Professional
Confirmed if speaking to the Parent/Guardian/Caregiver	10%	Counsellor Paediatric New	02 AF CNC
			04 AF CNC Professional
Discussed dispensing of treatment DSP, local or courier	5%	Counsellor Paediatric New	00 No category
Discussed nutrition, fluids intake, oral hygiene	5%	Counsellor Paediatric New	00 No category
Discussed other symptoms/illnesses/hospitalisations in the past 6 months	5%	Counsellor Paediatric New	12 CC
			15 CC adverse event
Discussed with Parent/Guardian/Caregiver if communication can be posted	3%	Counsellor Paediatric New	11 AF CC
			18 CC comms
Emphasized/informed adherence, frequency and consistency	5%	Counsellor Paediatric New	00 No category
Explained to Parent/Guardian/Caregiver how to give the meds *and emphasized dosaging, storage*	5%	Counsellor Paediatric New	12 CC
If child is above 10 years discussed possibility of disclosure in the near future *(Assistance from Psychologist etc.)*	5%	Counsellor Paediatric New	03 CNC
Informed beneficiary of TB prophylaxis or Purbac	2%	Counsellor Paediatric New	13 AF CC prophylaxis
Informed Parent/Guardian/Caregiver about possible side effects	5%	Counsellor Paediatric New	15 CC adverse event
Informed Parent/Guardian/Caregiver about results CD4 and VL and others *their significance*	5%	Counsellor Paediatric New	00 No category
Informed Parent/Guardian/Caregiver of the scheme benefits (e.g. Vaccines, number of consultations)	5%	Counsellor Paediatric New	01 AF CNC
			27 Member/Provider Education AF UN
Introduction with reason for the call	5%	Counsellor Paediatric New	04 AF CNC Professional
Re-emphasized importance of height, weight when taking child for follow ups	5%	Counsellor Paediatric New	17 CC ht/wt
Reminded about follow-up tests *4 months interval*	5%	Counsellor Paediatric New	00 No category
Reminded about immunization schedule (0-6 years)	5%	Counsellor Paediatric New	00 No category
Ascertained how Parent/Guardian/Caregiver is giving ARVS *and emphasized dosaging, storage*	5%	Counsellor Paediatric Follow Up	07 CC
			12 CC
			13 AF CC prophylaxis

Quality Requirement	Weighting %	Quality Questionnaire Name	Errors
Asked beneficiary about possible symptoms of TB or subsequent diagnosis and treatment, discussed the treatment, follow ups at clinic or Doctor, water consumption	5%	Counsellor Paediatric Follow Up	12 CC
			26 AF UN First Call Resolution
Caller identity: Good day title and surname, you are speaking to CM name from Scheme name	10%	Counsellor Paediatric Follow Up	04 AF CNC Professional
Confirmed if speaking to the Parent/Guardian/Caregiver	10%	Counsellor Paediatric Follow Up	02 AF CNC
			04 AF CNC Professional
Discussed dispensing of treatment DSP, local or courier	5%	Counsellor Paediatric Follow Up	00 No category
Discussed nutrition, fluids intake, oral hygiene	5%	Counsellor Paediatric Follow Up	00 No category
Discussed other symptoms/illnesses/hospitalisations in the past 6 months	5%	Counsellor Paediatric Follow Up	12 CC
			15 CC adverse event
Emphasized/informed adherence, frequency and consistency	5%	Counsellor Paediatric Follow Up	00 No category
If child is above 10 years discussed possibility of disclosure in the near future. *(Assistance from Psychologist etc.)*	5%	Counsellor Paediatric Follow Up	03 CNC
Informed Parent/Guardian/Caregiver about results CD4 and VL and others *their significance*	5%	Counsellor Paediatric Follow Up	00 No category
Introduction with reason for the call	10%	Counsellor Paediatric Follow Up	04 AF CNC Professional
Re-emphasized importance of height, weight when taking child for follow ups	5%	Counsellor Paediatric Follow Up	17 CC ht/wt
Reminded about follow-up tests *4 months interval*	5%	Counsellor Paediatric Follow Up	00 No category
Reminded about immunization schedule (0-6 years)	5%	Counsellor Paediatric Follow Up	00 No category
Security verification: Did the agent confirm membership number and ask to verify ID number / DOB	15%	Counsellor Paediatric Follow Up	02 AF CNC
Are the abbreviations used understandable and as per the standard of abbreviations	25%	Clinical PEP	10 CC data capture
			23 AF CC records
Are the contact details of the Doctor captured on notes	25%	Clinical PEP	11 AF CC
			23 AF CC records
Do the notes contain the beneficiary phone number used	25%	Clinical PEP	11 AF CC
			23 AF CC records
Do the notes correspond with the call	25%	Clinical PEP	10 CC data capture
			23 AF CC records
Did CM request ELISA test from beneficiary or Doctor (check notes)	10%	Clinical PEP	21 CC pathol results
			23 AF CC records
Has the application been signed by the Doctor	10%	Clinical PEP	10 CC data capture
			23 AF CC records
Has the application form been signed by the beneficiary	15%	Clinical PEP	10 CC data capture
			23 AF CC records
Has the beneficiary's confidential address been updated	15%	Clinical PEP	11 AF CC
			23 AF CC records
Was medication authorised within 8 hours of receipt of script (check notes/medicine screen)	20%	Clinical PEP	14 CC script/ pathol
			16 CC urgent
Was the appropriate care plan generated by CM	10%	Clinical PEP	18 CC comms
Were details of exposure provided (check notes)	10%	Clinical PEP	10 CC data capture
			23 AF CC records

Quality Requirement	Weighting %	Quality Questionnaire Name	Errors
Were the Doctor's details updated on the system	10%	Clinical PEP	11 AF CC 23 AF CC records
Is the PEP end date updated (should be 18 months from start date)	15%	Clinical PEP	08 CC 23 AF CC records
Medication authorised according to Guidelines (check medicine screen)	30%	Clinical PEP	14 CC script/ pathol 23 AF CC records
Was the correct quantity authorised	20%	Clinical PEP	20 CC regimen 23 AF CC records
Was the correct regimen authorised	20%	Clinical PEP	20 CC regimen 23 AF CC records
Was the duration authorised adequate (one month)	15%	Clinical PEP	08 CC 23 AF CC records
Are the abbreviations used understandable	2%	Clinical Adult New Enrolment	10 CC data capture 23 AF CC records
Do the notes correspond with the intervention	3%	Clinical Adult New Enrolment	10 CC data capture 23 AF CC records
Allergies / alcohol noted (enrolment screen)	3%	Clinical Adult New Enrolment	10 CC data capture 12 CC 15 CC adverse event 23 AF CC records
ARV treatment history	5%	Clinical Adult New Enrolment	07 CC 12 CC 13 AF CC prophylaxis 23 AF CC records
Has the application been signed by the Doctor	5%	Clinical Adult New Enrolment	23 AF CC records
Has the application data been updated correctly and completely on the system	5%	Clinical Adult New Enrolment	10 CC data capture 23 AF CC records
Has the beneficiary given consent to be registered on the programme	10%	Clinical Adult New Enrolment	23 AF CC records
Has the beneficiary's confidential address been updated	10%	Clinical Adult New Enrolment	11 AF CC 23 AF CC records
TB information updated, past treatment and tests done (enrolment screen)	5%	Clinical Adult New Enrolment	10 CC data capture 23 AF CC records
Were symptoms experienced by beneficiary over past 6 months updated (enrolment screen)	2%	Clinical Adult New Enrolment	10 CC data capture 12 CC 23 AF CC records
Were the baseline results received and abnormalities noted by CM (check notes)	5%	Clinical Adult New Enrolment	14 CC script/ pathol 23 AF CC records
Were the correct care plans (beneficiary and Provider) generated and sent by CM	10%	Clinical Adult New Enrolment	18 CC comms
Were the Doctor's details been updated on the system	5%	Clinical Adult New Enrolment	11 AF CC 23 AF CC records
Was the authorisation letter sent/faxed/posted to the Doctor and beneficiary	10%	Clinical Adult New Enrolment	18 CC comms
Was the correct dosage calculated (considered renal function / TB)	5%	Clinical Adult New Enrolment	19 CC dosage
Was the correct quantity authorised	5%	Clinical Adult New Enrolment	20 CC regimen 23 AF CC records
Was the duration authorised adequate (2021 for adults and 6 months for Paeds)	5%	Clinical Adult New Enrolment	08 CC 23 AF CC records
Were the appropriate results received for prescribed regimen *[FBC for AZT, LFT for NVP, Creatinine Clearance for TDF (50ml/min])*	5%	Clinical Adult New Enrolment	13 AF CC prophylaxis 14 CC script/ pathol 20 CC regimen 23 AF CC records

Quality Requirement	Weighting %	Quality Questionnaire Name	Errors
Are the abbreviations used understandable	5%	Clinical Adult Follow up	10 CC data capture
			23 AF CC records
Are the contact telephone numbers of the beneficiary captured on notes	5%	Clinical Adult Follow up	10 CC data capture
			11 AF CC
			23 AF CC records
Did CM generate all relevant communications	10%	Clinical Adult Follow up	18 CC comms
			26 AF UN First Call Resolution
Do the notes correspond with the intervention	5%	Clinical Adult Follow up	10 CC data capture
			23 AF CC records
Has CM indicated where beneficiary will be getting treatment	5%	Clinical Adult Follow up	23 AF CC records
Did CM review claims history for ARVs adherence	5%	Clinical Adult Follow up	07 CC
			12 CC
			13 AF CC prophylaxis
Has the general beneficiary information been updated (disclosure, allergies, etc.)	5%	Clinical Adult Follow up	03 CNC
			10 CC data capture
			12 CC
			15 CC adverse event
			23 AF CC records
Was the script correctly updated	5%	Clinical Adult Follow up	10 CC data capture
			14 CC script/ pathol
			23 AF CC records
Were the beneficiary details updated confidential address	10%	Clinical Adult Follow up	11 AF CC
			23 AF CC records
Were the Doctor's details updated	5%	Clinical Adult Follow up	11 AF CC
			23 AF CC records
Were the results correctly updated	5%	Clinical Adult Follow up	10 CC data capture
			14 CC script/ pathol
			23 AF CC records
Did CM authorise the prescribed regimen based on appropriate results received and guidelines *[FBC for AZT, LFT for NVP, Creatinine Clearance for TDF (60ml/min)]*	10%	Clinical Adult Follow up	08 CC auth duration (PMCTC/PEP)
			13 AF CC prophylaxis
			14 CC script/ pathol
			20 CC regimen
			23 AF CC records
Is the status granted if declined pending blood results	5%	Clinical Adult Follow up	21 CC pathol results
Was the correct dosage and quantity authorised (medicine screen)	5%	Clinical Adult Follow up	19 CC dosage
			23 AF CC records
Was the correct formulation authorised (medicine screen) in cases of renal failure	5%	Clinical Adult Follow up	15 CC adverse event
			20 CC regimen
Was the duration authorised correct 2021	5%	Clinical Adult Follow up	08 CC
			23 AF CC records
Was the update authorisation letter sent to the Doctor	5%	Clinical Adult Follow up	18 CC comms
			23 AF CC records
Are the abbreviations used understandable	15%	Clinical Paediatric New	10 CC data capture
			23 AF CC records
Are the contact details of the Parent/Guardian/Caregiver captured on notes	20%	Clinical Paediatric New	11 AF CC
			23 AF CC records
Did CM generate all relevant communications	15%	Clinical Paediatric New	18 CC comms
			26 First Call Resolution AF UN
Do the notes correspond with the intervention	30%	Clinical Paediatric New	10 CC data capture
			23 AF CC records
Has CM indicated where child will get treatment (if delivery was arranged to right delivery address)	20%	Clinical Paediatric New	11 AF CC
			23 AF CC records
Did CM contact the Doctor regarding Co-trimoxazole Prophylaxis	10%	Clinical Paediatric New	13 AF CC prophylaxis

Quality Requirement	Weighting %	Quality Questionnaire Name	Errors
Has the application been completed	20%	Clinical Paediatric New	10 CC data capture
			23 AF CC records
Has the application form been signed by Parent/Guardian/Caregiver	10%	Clinical Paediatric New	23 AF CC records
Was the correct care plan generated and sent by CM	10%	Clinical Paediatric New	18 CC comms
Was the latest Height and Weight recorded (notes)	15%	Clinical Paediatric New	17 CC ht/wt
			23 AF CC records
Were allergies noted (enrolment screen)	10%	Clinical Paediatric New	12 CC
			15 CC adverse event
			23 AF CC records
Were symptoms experienced by child over past 6 months updated (enrolment screen) as explained by Parent/Guardian/Caregiver	15%	Clinical Paediatric New	10 CC data capture
			12 CC
			23 AF CC records
Were the baseline results received and abnormalities noted by CM (check notes)	10%	Clinical Paediatric New	14 CC script/ pathol
			23 AF CC records
Were the Doctor's details updated /signatures present	5%	Clinical Paediatric New	11 AF CC
			23 AF CC records
Were the Parent/Guardian/Caregiver's details updated / confidential address	15%	Clinical Paediatric New	11 AF CC
			23 AF CC records
Did CM authorise formulations as warranted by age/height/weight	20%	Clinical Paediatric New	17 CC ht/wt
			23 AF CC records
Did CM authorise the prescribed regimen based on appropriate results received and guidelines *[FBC for AZT, LFT for NVP, Creatinine Clearance for TDF (50ml/min)]*	30%	Clinical Paediatric New	13 AF CC prophylaxis
			14 CC script/ pathol
			20 CC regimen
			23 AF CC records
Was the authorisation letter sent/faxed/posted to the Doctor (check notes)	10%	Clinical Paediatric New	18 CC comms
Was the correct dosing calculated (height and body weight)	15%		17 CC ht/wt
			19 CC dosage
Was the correct quantity authorised (medicine screen)	15%	Clinical Paediatric New	20 CC regimen
			23 AF CC records
Was the duration authorised correct (6 months)	10%	Clinical Paediatric New	08 CC
			23 AF CC records
Security verification: Did the agent confirm membership number and ask to verify ID number / DOB	10%	Clinical Paediatric New	02 AF CNC
Are the abbreviations used understandable	20%	Clinical Paediatric New	10 CC data capture
			23 AF CC records
Do the notes contain Parent/Guardian/Caregiver's telephone number used	20%	Clinical Paediatric New	11 AF CC
			23 AF CC records
Do the notes correspond with the call	40%	Clinical Paediatric New	10 CC data capture
			23 AF CC records
Has Counsellor indicated where beneficiary will get treatment if delivery was arranged to right delivery address	20%	Clinical Paediatric New	11 AF CC
			23 AF CC records
Are the abbreviations used understandable	20%	Clinical Paediatric Follow Up	10 CC data capture
			23 AF CC records
Are the contact details of the Parent/Guardian/Caregiver captured on notes	20%	Clinical Paediatric Follow Up	11 AF CC
			23 AF CC records
Did CM generate all relevant communications	15%	Clinical Paediatric Follow Up	18 CC comms
			26 AF UN First Call Resolution
Has CM indicated where child is getting treatment	15%	Clinical Paediatric Follow Up	10 CC data capture
			23 AF CC records

Quality Requirement	Weighting %	Quality Questionnaire Name	Errors
Have comprehensive notes written regarding interventions made	30%	Clinical Paediatric Follow Up	10 CC data capture
			23 AF CC records
Did CM review and update according to toxicity pathology	20%	Clinical Paediatric Follow Up	15 CC adverse event
			23 AF CC records
Has the general child's information been updated (disclosure, allergies, etc.)	20%	Clinical Paediatric Follow Up	03 CNC
			10 CC data capture
			12 CC
			15 CC adverse event
			23 AF CC records
Uncontactable Parent/Guardian/Caregiver: Letter sent to Parent/Guardian/Caregiver who is aware of the child's HIV status	10%	Clinical Paediatric Follow Up	18 CC comms
Was the latest Height and Weight recorded (notes)	20%	Clinical Paediatric Follow Up	17 CC ht/wt
			23 AF CC records
Were the Parent/Guardian/Caregiver's details updated /confidential address	20%	Clinical Paediatric Follow Up	11 AF CC
			23 AF CC records
Were the side effects recorded if applicable	10%	Clinical Paediatric Follow Up	15 CC adverse event
			23 AF CC records
Did CM authorise the prescribed regimen based on appropriate results received and guidelines *[FBC for AZT, LFT for NVP, Creatinine Clearance for TDF (50ml/min)]*	40%	Clinical Paediatric Follow Up	13 AF CC prophylaxis
			14 CC script/ pathol
			20 CC regimen
			23 AF CC records
Was the authorisation letter sent/faxed/posted to the Doctor (check notes)	10%	Clinical Paediatric Follow Up	18 CC comms
Was the correct dosing and quantity calculated and authorised (as per current height and body weight)	30%	Clinical Paediatric Follow Up	17 CC ht/wt
			23 AF CC records
Was the duration authorised correct (6 months)	20%	Clinical Paediatric Follow Up	08 CC
			23 AF CC records
Are the abbreviations used understandable	20%	Clinical Paediatric Follow Up	10 CC data capture
			23 AF CC records
Are the contact details of the Doctor captured on notes	15%	Clinical Paediatric Follow Up	11 AF CC
			23 AF CC records
Do the notes contain Parent/Guardian/Caregiver's telephone number used	20%	Clinical Paediatric Follow Up	11 AF CC
			23 AF CC records
Do the notes correspond with the call	30%	Clinical Paediatric Follow Up	10 CC data capture
			23 AF CC records
Has Counsellor indicated where beneficiary will get treatment if delivery was arranged to right delivery address	15%	Clinical Paediatric Follow Up	11 AF CC
			23 AF CC records

APPENDIX H: QUALITY TOOLS - PROCESS MAP

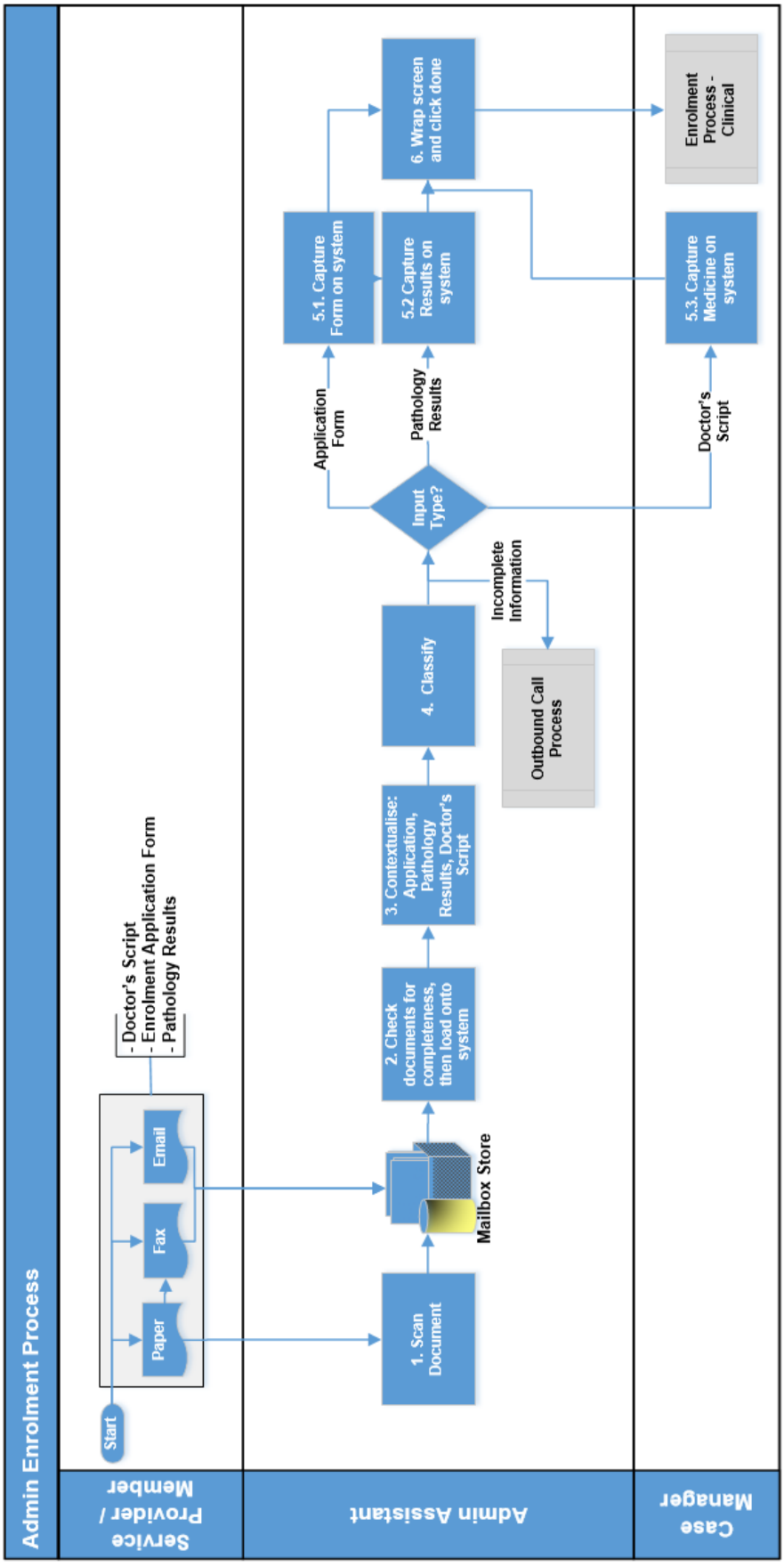


Figure H.1: The Admin Enrolment process map or flow chart
(**Source**: Adapted from Managed Care Organisation 2015)

APPENDIX I: QUALITY TOOLS – PROCESS MAP: ELECTRONIC RECORD KEEPING SYSTEM CONTROLS

Some of the electronic record keeping system fields are ‘hard-coded’. In other words, the field must be populated from a drop down list before allowing the user to continue to the next step of the process. Figure I.1 provides an example.

Figure I.2 shows another form of a drop down list, a tick box to choose the pre-populated option.

Figure I.1: Example of a drop down list on the electronic record keeping system
(**Source**: Managed Care Organisation n.d.)

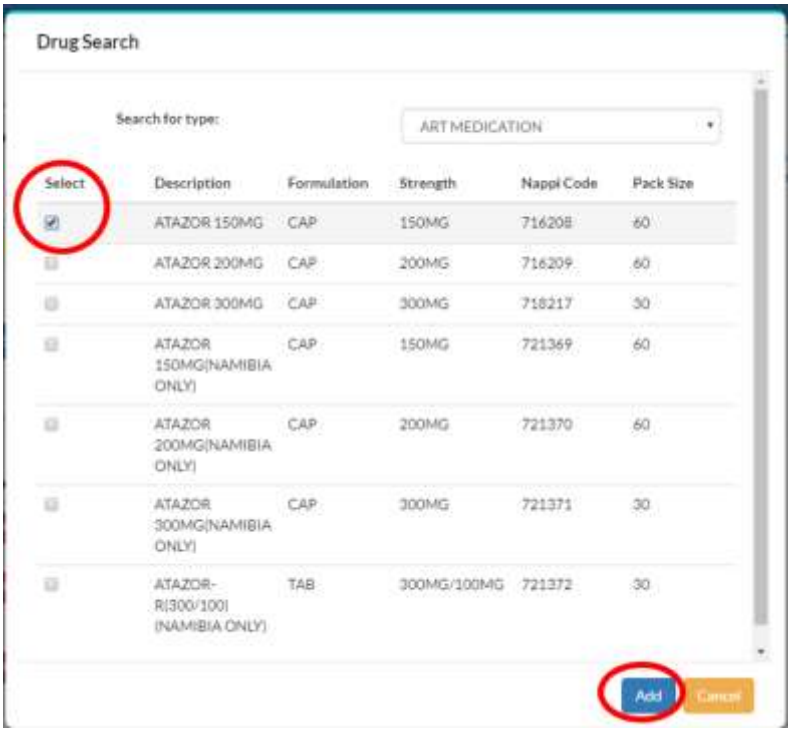
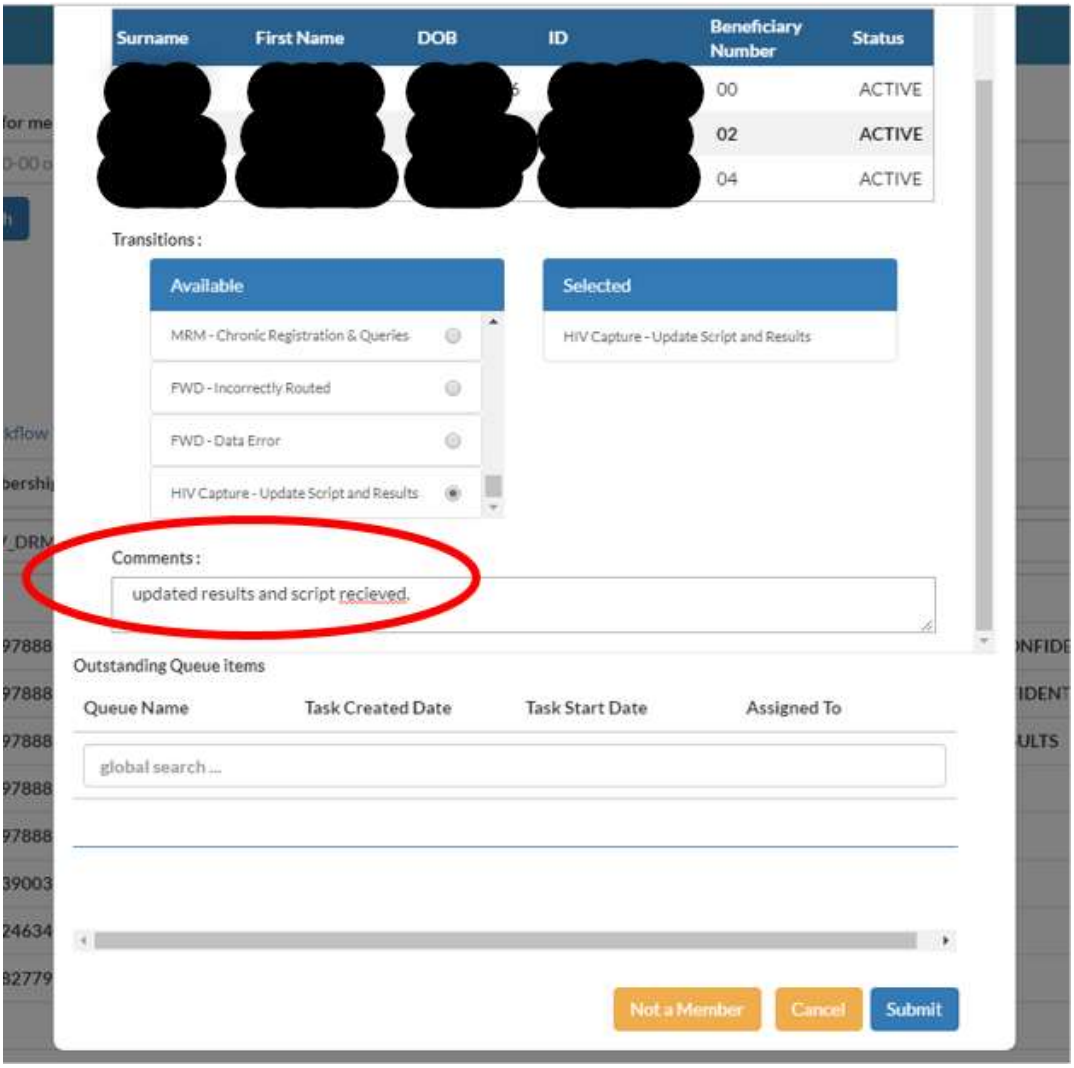


Figure I.2: Example of a tick list option on the electronic record keeping system
(**Source**: Managed Care Organisation n.d.)

Controls are also in place to ensure the following:

- That the fields for free text are populated before allowing the user to continue the process on the electronic system (Figure I.3);
- The validity of the information captured on the electronic record keeping system, for example the treating Doctor's details (Figure I.4).



Note: if there is no comment added then the work item will not transition.

Figure I.3: Example of the electronic record keeping system screen which will not allow the user to progress to the next step until the comments field has been populated
(**Source**: Managed Care Organisation n.d.)

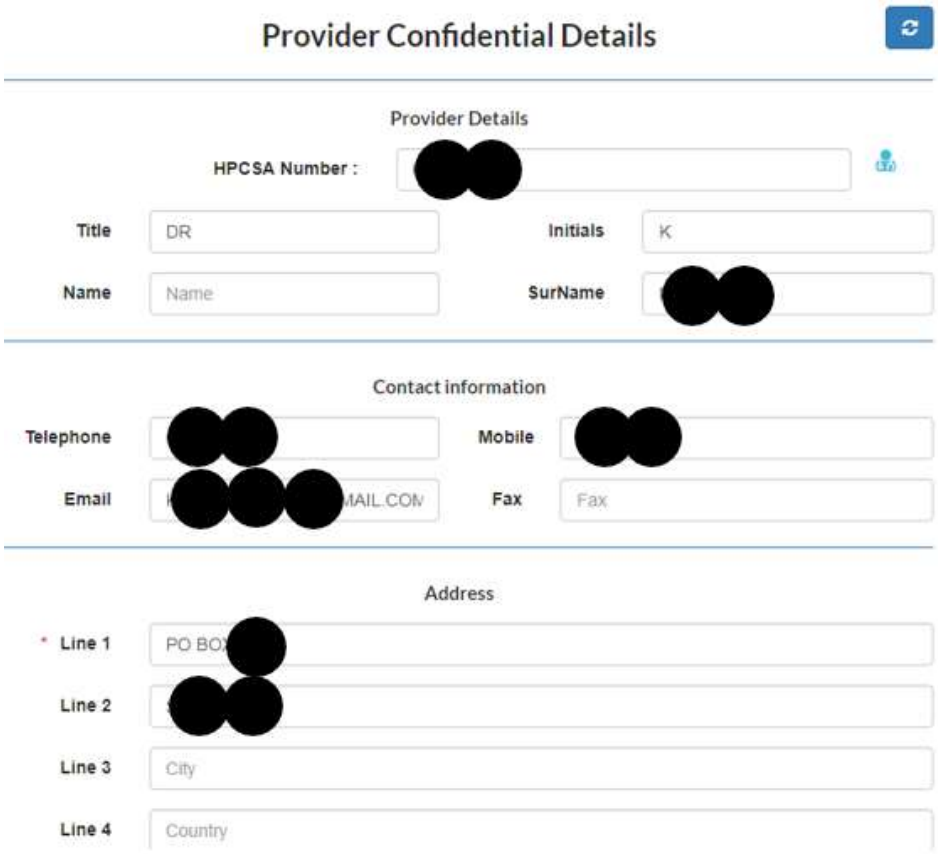


Figure I.4: Example where only valid details of the treating Doctor can be captured on the electronic record keeping system
(**Source**: Managed Care Organisation n.d.)

APPENDIX J: QUALITY TOOLS - FISHBONE DIAGRAM

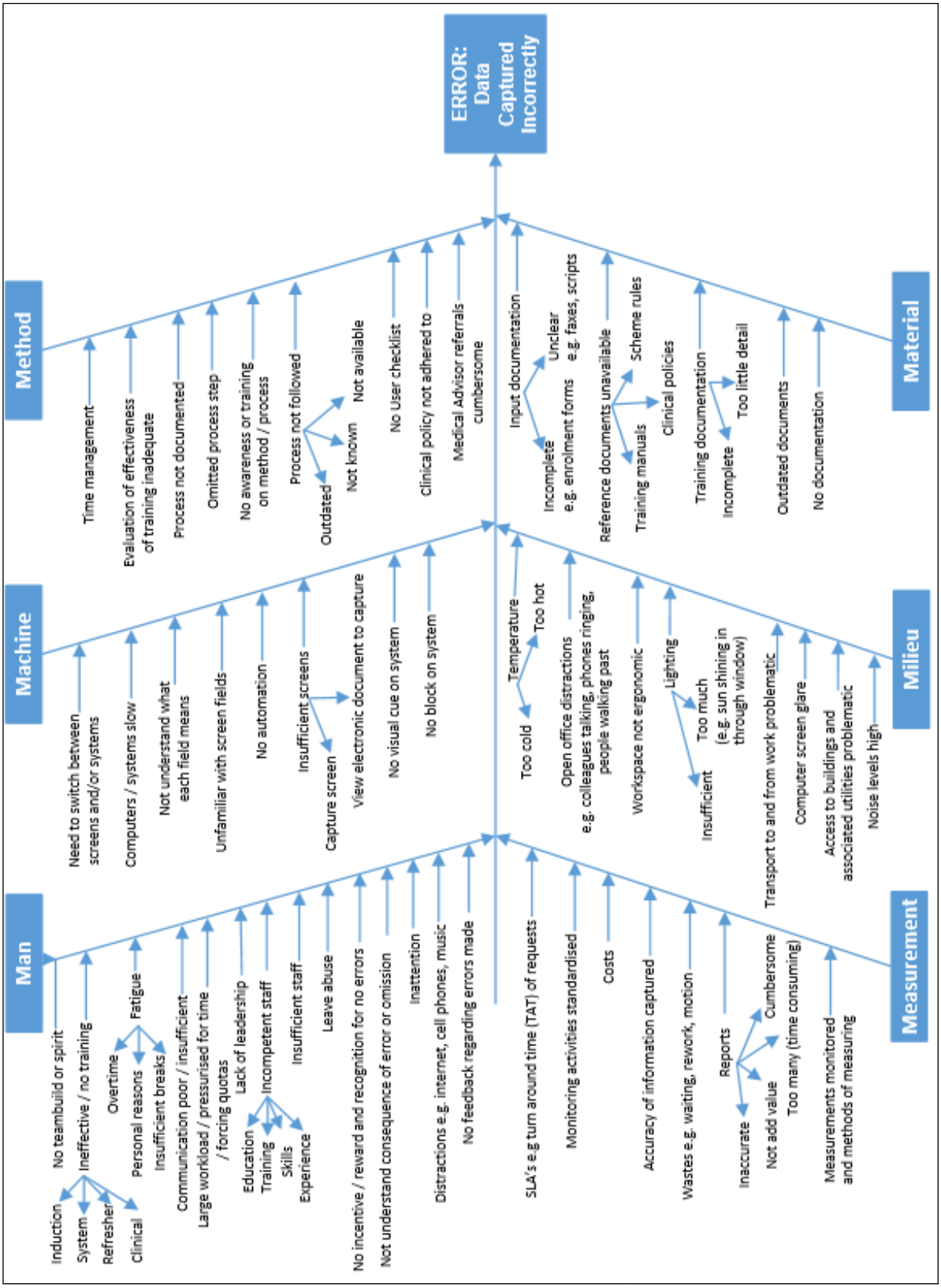


Figure J.1: **Fishbone Diagram showing possible causes for the error 'Data Captured Incorrectly'**
(**Source:** Own)

APPENDIX K: PLAGIARISM REPORT

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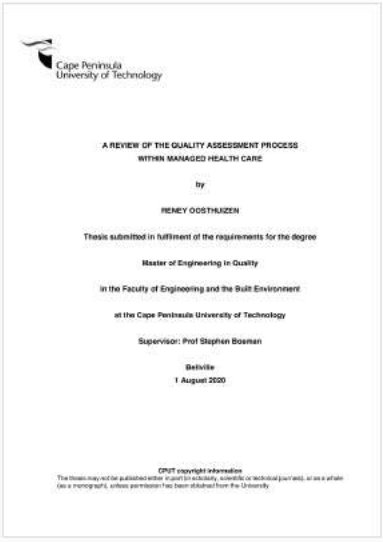

Cape Peninsula University of Technology

A REVIEW OF THE QUALITY ASSESSMENT PROCESS WITHIN MANAGED HEALTH CARE

by

RENEY OOSTHUIZEN

Thesis submitted in fulfilment of the requirements for the degree

Master of Engineering in Quality

in the Faculty of Engineering and the Built Environment

at the Cape Peninsula University of Technology

Supervisor: Prof Stephen Bosman

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