University of KwaZulu-Natal

An approach to transformational cost reduction in a private hospital

by

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DECLARATION

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ABSTRACT

The National Healthcare system in South Africa has reached a point of intensifying costs due to increases in escalation of at least 15% year on year. The South African Government's imminent roll out of the National Health Insurance (NHI) programmes is going to cost R69 million rand and currently, the government is uncertain as to where the funds are going to come from – in all probability increased taxes. The government and public sector health have failed to deliver quality, affordable healthcare services to the South African population, with more than 80% of the population still having no healthcare coverage or insurance or medical aid. The government's current management of the public healthcare sector has confirmed that government is unable to control healthcare costs in the public sector. Culture and behaviour that have been in existence for over 30 years cannot have change forced upon them. There have to be many discussions, forums and role modelling with the evidence-based results as the catalyst for the transformation. Management will have to make their staff and doctors comfortable to be receptive to the transformational cost reductions, highlighting that technology is forming a blueprint of all recordable activities which are being measured and monitored by many of the stakeholders from medical aids and managed care organisations. Based on this information, Insight actuaries in South Africa are able to extract data for the medical aids to dispute hospitalisations, doctor behaviour, and treatment patterns with cost per event as a benchmark forming the basis for increased healthcare costs by service providers. These cost efficiency reports are given to hospitals to control doctor behaviour, healthcare spending resulting in the current decreased occupancies, decreased margins, poor profitability and impact on long-term sustainability.

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  It is with God's grace that this MBA process was tolerable and enduring as I was given the strength to persevere and to concentrate on the task at hand.

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LIST OF ACRONYMS AND ABBREVIATIONS

AAOS	American Academy of Orthopaedic Surgeons
ABCs	airways, breathing and circulation
ACOs	Accountable Care Organisations
CABSI	catheter associated blood stream infection
CAUTI	catheter associated urinary tract infection
DOH	Department of Health
EMRs	electronic medical records
HAI	hospital acquired infections
HCG	Healthcare Global
HRRP	hospital readmission rate protocol
ICU	intensive care unit
IT	information technology
LVPEI	L V Parsad Eye Insitute
NH	Narayana Health
NHI	National Health Insurance
PCCU	paediatric critical care unit
PICU	paediatric intensive care unit
PSH	Perioperative Surgical Home
SCAMPs	clinical assessment and management plans
SSI	surgical site infection
TJA	total joint arthroplasty
US	United States
VAP	ventilator-associated pneumonia

CHAPTER 1
OVERVIEW OF THE STUDY

1.1. INTRODUCTION

Porter and Lee (2013) stated that healthcare systems are experiencing a new phenomenon in that healthcare practitioners are not being profiled and managed aggressively by medical aids to reduce their hospital length of stays and minimise x-rays and blood work ups that are unnecessary escalating the costs. The days of business as usual where every claim by healthcare practitioner was paid in full with no investigations and audits has ceased. Every healthcare system around the world is overwhelmed by rising costs and inconsistent quality. Healthcare stakeholders have addressed topics such as rising fraudulent behaviour, reducing medical errors, the importance of promoting best and standardised processes, while alerting patients to become better consumers and the need for implementing electronic medical records, but with no impact. The strategy has to change with the basis of optimising value for patients and achieving good outcomes at the lowest cost. The physicians and creation of new hospitals must move away from a "supply-induced demand" healthcare system to a patient-centred system Porter and Lee (2013). The stakeholders must shift the focus from the volume and profitability of services provided, physician visits, hospitalisations, procedures and tests to the patient outcomes achieved, and substitute the current fragmented system with one in which every local provider offers a full range of services concentrating on health delivery organisations in the right locations to deliver high value care. Ensuring this shift in transformation is a focused strategy known as the "value agenda".

This first chapter provides a synopsis of this topic commencing with the reason for the study, the problem statement, and the discussion of the topic. The aim and objectives are listed with a brief explanation of the research methodology. The limitations of the study are listed. Thereafter, a detailed outline of the study per chapter is summarised.

1.2. MOTIVATION FOR THE STUDY

Although healthcare costs have been well researched (Bailey 2012), the topic has gained phenomenal attention due to the possible collapse of medical aids, poor service delivery and lack of address of the public healthcare services. The private sector healthcare costs are escalating and physicians are over servicing patients by requests for too many

unnecessary tests and investigations Porter and Lee (2013). The data, when analysed, conclusively led to the outcome that the adoption of research methods would be effective in cost containment in private hospitals. The findings resulted in the following recommendations: the provision of centres of excellence which will allow hospitals to provide focused care and avoid duplication of expensive sophisticated equipment; the technique to be employed for cardiac surgery without the use of the very expensive heart lung machine; the procedure of going through the wrist instead of groin in angioplasty procedures resulting in decreased length of stay; the patient can be discharged the same day, reducing hospital costs; task shifting to lower levels of staff, resulting in cheaper labour costs and increased scope and skill alleviating the burden of shortage of expensive skilled labour; the adoption of Electronic Medical Records which increases efficiencies and a tracked care pathway for patients, avoiding the "supply induced demand" from physicians; and the shift from fee for services which is more expensive, to bundled payments and gain sharing for collaborative relationships and good outcomes

This research will contribute to the following stakeholders: healthcare providers, policy makers, medical aids and government. The unique nature of this research is that in light of the fiscal healthcare crisis and imminent National Healthcare Insurance, the time for transformation has arrived. Thus, from an academic viewpoint, this research will contribute greatly to the area of study not covered and will provide further insight of this relevant subject within the confines of South Africa.

1.3. FOCUS OF THE STUDY

The study focused on Ethekwini Hospital and Heart Centre in the KwaZulu-Natal region. All managers, from lower to senior levels, were the focus for the research study. The study did not include healthcare employees from other private hospitals or government hospitals. The research was aimed at specifically obtaining employees' views on the current healthcare climate and the need for transformational cost reduction.

1.4. PROBLEM STATEMENT

Bailey (2012) stated that private hospitals are on the verge of a fiscal crisis. They are dealing with the complexity of declining share prices due to decreased revenue, profit margins, EBITDA (earnings before interest, tax, depreciation and amortization), and poor growth. Substantial reduction in reimbursements from medical aid funders is also a

contributing factor. The catastrophe at hand is the brink of a fiscal crisis in healthcare in the midst of an already strained economic recession. In this critical period, it is paramount that the government, policy makers, medical aids, managed care organisation and key role players from the private sector converge, co-create and collaborate to mitigate the healthcare downturn to a stabilising point once again. This strategy will require all stakeholders to lead and manage their teams to a transformative cost reduction in healthcare spending. The normal practice of reducing expenses, budgets and negotiation with supply chain is not enough for this transformation. The approach required for the transformational cost reduction is ignited from a paradigm shift in culture and behaviour, infused with technology.

1.5. OBJECTIVES OF AND NEED FOR THE STUDY

The objective of this study was to ascertain why the need exists for transformational cost reduction in a private hospital, which should enable future growth and sustainability. Furthermore, this study attempted to establish if standardised processes, control of labour costs, impact of technology and innovative delivery care would result in cost containment. The views of all levels of management were crucial to study their effects and therefore it was necessary to survey all managers at Ethekwini Hospital and Heart Centre. Due to the large number of healthcare employees, a quantitative study was conducted which provided the conduit for which the objectives of the study could be achieved

The problem statement and the research questions were used to develop the following objectives of this study:

1. To determine the impact that standardised care processes have on reducing unnecessary care and costs.
2. To evaluate the control of labour costs by management.
3. To evaluate the influence that technology has on the healthcare business.
4. To analyse the innovativeness of the delivery care model and the impact on healthcare.
5. To provide recommendations on transformational cost reduction.

Research Question 1

Can standardised care processes be an enabler to gain competitive advantage in the market?

Research Question 2

Identify how control of labour costs impacts on operational performance?

Research Question 3

How can streamlined Information Technology functions influence the bottom line?

Research Question 4

Will innovation of a care delivery model impact transformational cost reduction?

Research Question 5

What approaches can management achieve to sustain cost reduction and savings?

The aim of a research study was defined by Farrell (2011) as the purpose of the study which provides planned direction of the research. The description of objectives by Abdulai and Owusu-Ansah (2014) explains how the aim of the research will be achieved by transformation of the aim into functioning declarations

1.6. METHODOLOGY

A quantitative approach to data collection was employed for this study. This was done via a self-administered online survey using the QuestionPro electronic survey system. The numeric data was analysed and developed into statistical form. Permission allowing for the research to be conducted was obtained via a Gatekeepers letter with the condition that the results of the survey be shared with Ethekwini Hospital management before the final research project is submitted. Each participant had to provide informed consent electronically via the survey on QuestionPro. An email to all the participants was sent via tools on QuestionPro with the email containing the hyperlink to the online survey.

The sampling frame used, was the Ethekwini Hospital and Heart Centre payroll head count which maintains a list of all employees. This is necessary as the sampling size was 85 participants.

The questionnaire was created. However, it should be noted that there were logical checks for some of the questions so that decisions or options taken could skip over some

questions. Each question in the questionnaire was linked to an objective and as such provided a measurement of the objective. A detailed breakdown of the questionnaire and details of the research methodology that was implemented are discussed in Chapter 3. For the data analysis, the information from QuestionPro was transferred to the Statistical Package for the Social Sciences (SPSS) on which the analysis was performed. The data was summarised and displayed as graphs and tables which are presented in Chapter 4, with each objective aligned to the research questions. Using the Cronbach Alpha test, the reliability of the research questions being answered by the survey was more than .83, confirming that participants understood the current healthcare landscape and the imminent implementations required for future sustainability.

1.7. LIMITATIONS OF THE STUDY

The research only focused on Ethekwini Hospital and Heart Centre and as such the recommendations should not be generalised and implemented at other hospitals. The research did not include public hospitals as public hospitals and their management model differ from private hospitals because they are not involved with medical aids or patient billing.

1.8. OUTLINE OF THE STUDY

The research process was carried out in a structured and systematic manner which ensured that a thorough understanding of the research topic could be achieved. The resultant study is documented in five chapters, as illustrated in Table 1.1.

Table1.1: Summary of all chapters of the study

Chapter	Content
Chapter 1	This introductory Chapter 1 provides a synopsis of the topic, by describing the need for research into the topic, the problem statement with the aim and objectives to be achieved. It also discusses why the specific research method was chosen and the limitations of the topic.
Chapter 2	A review of existing literature is presented in this chapter which forms the theoretical basis for the study. In Chapter 2, the vast area of cost containment measures through standardised processes, control of labour costs, impact of technology and the innovative delivery care model are discussed.
Chapter 3	Chapter 3 describes the research methodology. The choice of study and the reasons for selecting a quantitative approach are presented. This is followed by a discussion on the sampling decisions that were made and various data

	collection aspects, including instruments used for data collection as well as the validity and reliability of the data. The chapter ends with a description of the analysis that was performed and any ethical considerations that were taken.
Chapter 4	The presentation of the results of the data collection and analysis thereof form the central theme of Chapter 4. The chapter first presents the analysis that was performed of the demographic profile of the participants of the study. This is followed by analysis of each objective of the study from the standpoint of the data that was collected with the various findings being highlighted in relation to previous studies.
Chapter 5	This is the concluding chapter of the study and summarises the study and its various findings, bringing to light the conclusions that may be drawn along with recommendations that can be made to the stakeholders. Recommendations for further studies are also highlighted in this chapter.

1.9. CHAPTER SUMMARY

The evolving healthcare landscape has turned "pear shaped" due to the current economic climate. This research study focused on an approach to transformational cost reduction in a private hospital. This chapter has presented an overview of the study with the motivation for the study, a complete description of the problem statement, the focus of the study as well as the aim and objectives of the study. The research methodology was briefly touched on along with the limitations of the study and finally the structure of the study (per chapter) was outlined. The following chapter reviews the available literature on the vast area of cost containment measures through standardised processes, control of labour costs, impact of technology and innovative delivery care model.

CHAPTER 2
LITERATURE REVIEW

2.1. INTRODUCTION

The healthcare sector is currently positioned for change Porter and Lee (2013). There is an exponential increase in healthcare costs around the world in all healthcare systems. Business leaders and stakeholders are challenged to maintain business continuity, increased market share and profitability. In view of the recent declining margins in healthcare, there is much need for literature which examines the process of standardised care, control of labour costs, impact of technology and the process of an innovative delivery care model. The transformational approach with strategic timing will impact cost reduction in hospitals.

2.2. MANAGEMENT INNOVATION

Management innovation has been defined by Michelman (2007) as anything that substantially changes how management is performed, or significantly modifies customary organisational systems resulting in evolving organisational goals.

2.3. STANDARDISATION

According to Richen and Steinhorst (2005), standardisation means generating identical business processes through all departments in the business. The risk of failure is decreased through repetitive standardised processes. Each business unit can share expenses and with the expansion, business process management results in economies of scale.The standardised processes will allow for the business unit to meet its goals and budgets due to systematic process practised.

2.4. MANAGEMENT INNOVATION THROUGH STANDARDISATION

Sturdy (2011) argued that management innovation is supported by specialists who endorse "new" ideas. This article debating innovation compared to standardisation alluded to standardisation suppressing innovative thinking. That is thinking as opposed to standard approaches.

Indeed, standardisation is often distinguished as the barrier to innovation, especially in the current 'post bureaucratic' era. A challenge of this view is that it implies that consultant-

led management innovation is frequently standardised. Within the popular business literature, innovation is often depicted as the contrast of standardisation.

2.5. LEAN THINKING

Ohno (1988) quoted,

> *"Lean as a management practice based on the philosophy of continuously improving processes by either increasing customer value or reducing non-value adding activities (muda), process variation (mura), and poor work conditions (muri)".*

The focus on waste alone restricts the scope of Lean, given that 'muda' (waste) is only one of three interrelated concepts: 'mura' relates to 'unevenness', and argues for stable demand that results in less variation and more efficient and standardised processes; 'muri' relates to 'excessive strain', and argues for good working conditions that prevent injuries and strain on the worker which is a clear factor in reducing absenteeism. Thus, putting the elements together, Lean is defined as follows: Originating from the Toyota Motor Corporation, Lean (also referred to as the Toyota Production System, TPS) is considered to be a fundamental alternative to the old-fashioned method of bulk production and batching principles to make the most of operational efficiency, quality, speed and cost (Holweg, 2007).

2.5.1. Key assumptions of Lean

Lean is an improvement of a process to eliminate duplicate or non-value added of services or processes. This will allow operational efficiency, quality, speed, and reduced cost. (Holweg, 2007). Cookson *et al*(2011) concurs that "Lean Thinking" is a philosophy and a management culture which can be used as a driver for process improvement that relies on waste reduction and seamless flow within a system. According to Cookson *et al* (2011), this was highlighted by Taiichi Ohno at Toyota in Japan in the 1950s as the Toyota Production System aimed to "reduce muda (non-value-adding work), muri (overburden) and mura (unevenness offlow)".

Womack and Jones (cited in Cookson *et al* 2011), have detected five key features of Lean, namely "as understanding value, developing the value stream, improving flow, encouraging pull and pursuing perfection".

An explanation of Lean is through the five 'Lean principles' (Womack & Jones, 1996), as outlined in Table 2.1.

The table 2.1 according to (Womack & Jones, 1996) illustrates the value stream expected by the customer where emphasis is placed on continuous product flow thereby eliminating the non-value adding activity. This process allows for perfection allowing for minimal time and information need to serve the customer.

Table 2.1: The five Lean principles

1. Specify the value desired by the customer.
2. Identify the value stream for each product/ service providing that value and, challenge all of the wasted steps.
3. Make the product flow continuously. Standardise processes around best practice allowing them to run more smoothly, freeing up time for creativity and innovation.
4. Introduce 'pull' between all steps where continuous flow is impossible. Focus upon the demand from the customer and trigger events backwards through the value chain.
5. Manage towards perfection so that non-value adding activity will be removed from the value chain so that the number of steps, amount of time and information needed to serve the customer continually falls.

Source: Adapted from Womack& Jones(1996)

During a comprehensive study by Radnor *et al* (2009), they identified five readiness factors critical for implementation which are:

- "Linking Lean with the overall strategy of the hospital".
- "Understanding the different customer groups that a ward, department or a hospital has and what is valued by each of these customer groups".
- "Taking an end-to-end process view when undertaking improvement projects".
- "Matching demand and capacity levels across the hospital".
- "Having trained staff, providing opportunity for them to be engaged in improvement activities/Lean projects and recognizing/rewarding their efforts".
- "Matching demand and capacity levels across the hospital".
- "Having trained staff, providing opportunity for them to be engaged in improvement activities/Lean projects and recognizing/rewarding their efforts".

Farsi *et al*(2014), concludes that "Lean Thinking", has proved to be an invaluable asset in the cost containment area of healthcare operations globally . Their pilot project "to demonstrate how the principles of Lean Thinking can be applied to Oman‟s healthcare sector" can result in more efficient healthcare but most importantly it improves patient care for the residents of Oman.

Table 2.2 below highlights the original 7 wastes and healthcare, however according to Radnor *et al*(2009), the adoption of a Lean philosophy could create many challenges that hospitals may experience.

Table 2.2: The original seven wastes and healthcare examples

Original Wastes	Examples of Healthcare Wastes (NHSIII, 2007)
1. Transportation	*Transportation:* • staff walking to the other end of a ward to pick up notes • central equipment stores for commonly used items instead of locating items where they are used.
2. Inventory	*Inventory:* • excess stock in storerooms that is not being used • patients waiting to be discharged • waiting lists
3. Motion	*Motion:* • unnecessary staff movement looking for paperwork, • not having basic equipment in every examination room
4. Waiting (Delay)	*Waiting* for: • Patients, theatre, staff results, prescriptions and medicines • doctors to discharge patients
5. Overproduction	*Overproduction:* • requesting unnecessary tests from pathology • keeping investigation slots 'just in case'
6. Over- Processing	*Over processing:* • duplication of information • asking for patients' details several times
7. Defects	*Correction:* • readmission because of failed discharge • repeating tests because correct information was not provided

Source: Adapted from Womack& Jones(1996)

2.5.2. Lean in healthcare

Radnor (2010) confirmed that Lean has been adopted in public healthcare services and central government organisations. In healthcare, the adoption of Lean processes should remove duplicate processes, such as patients waiting at bed bookings to complete admission details and then the duplication of admission details being captured at theatre; and the wastage of time waiting for ward staff to bring patients down to theatre for a

booked procedure and uncoordinated theatre surgery without having the authorisation for theatre procedure or not having all the required instruments or machines (NHSIII, 2007).

2.6. HUB AND SPOKE - RURAL HEALTHCARE SERVICE DELIVERY

The study by Govindarajan and Ramamurti (2013) examined the functioning and processes of the exemplar Indian hospital and their efficiencies and success on cost containment, and how, by creating a HUB facility in the suburban areas with a full range of services and high end equipment, they were able to prevent duplication of their services such as most United States (US) hospitals do. Most of the US hospitals invest in duplicate equipment and offer full range services with high end equipment at their individual hospital sites. These exemplar Indian hospitals further created a spoke facility around the urban hubs, which enables patients to have access to medical care, thereby providing a service to the underserved or uninsured patients in their remote towns or villages.

2.6.1. Sophisticated technology at centre of excellence

Due to the expensive equipment in Health Care Global (HCG) Cancer Treatment Centre, Govindarajan and Ramamurti (2013) argued that the centre houses equipment such as an $8 million high-precision, robotic radiosurgery system called the Cyber Knife that HCG cannot afford to duplicate. They therefore ensure cost containment by the spoke facilities concentrating mainly on diagnosis, regular treatment, and follow-up care; they channel patients to the hubs for complex procedures and surgery and the spoke facilities are being serviced by less specialised physicians who will provide care using simple, less expensive equipment. The hub and spoke approach is facilitated by the utilisation of technology Govindarajan and Ramamurti (2013) such as telemedicine, which enables the remote distribution of healthcare over the phone, allowing physicians in the hubs to effectively and efficiently accommodate patients seeking care at the spokes.

Physicians are able to read medical images remotely and discuss the findings with their patients Govindarajan and Ramamurti (2013). A hub and spoke architecture has also helped to create large volumes with reduction in barriers to treatment; Narayana Health (NH) has carried out more open-heart surgeries and Aravind's Eye Care System has done more eye surgeries than any other hospitals in the world. Several Indian exemplars run their MRI machines 24/7, sometimes charging lower prices at night when the machines would normally be idle, as an incentive for patients to have scans at inconvenient times.

Higher volumes have also allowed these hospitals to reap economies of scale in purchasing medicines, supplies, and medical equipment. The hub and spoke configuration has allowed hospitals not only to lower costs but also to improve quality.

All seven of the academic hospitals studied by Govindarajan and Ramamurti (2013), namely NH, HCG, LVPEI, Aravind Eye Care, Care Hospitals, Iora Health, and Deccan Hospital have recruited their talented and skilled doctors from among their students that were trained.. The return on their investment in this regard is that these doctors accelerate in their performance with excellent outcomes.

2.6.2. Process of promoting innovation that suits local conditions

Studies by Govindarajan and Ramamurti (2013) have revealed that in India, higher volumes of patients have ignited innovation into pioneering the "beating heart method of surgery", without shutting down the patient's heart. This cardiac surgery is performed without using the very expensive heart lung machine which is routinely used in most other countries of the world. This method has resulted in fewer complications, thus reducing length of stay in hospitals, which directly impacts reduced hospital acquired infections, thus increasing the time for recovery. Care Hospitals also use the technique for Angioplasties of inserting a line through the wrist instead of the common practice of the groin which takes longer recovery time; this wrist method enables faster recovery time and same day discharge which in turn reduces hospital costs.

Aravind's Eye Care System specialises in a technique that is performed by the manual small incision cataract surgery, according to Govindarajan and Ramamurti (2013) which requires cheap lenses and less expensive equipment. The common practice in other countries is the phacoemulsification technique with more expenses lenses.

Deccan Hospital uses peritoneal dialysis, Govindarajan and Ramamurti (2013) a home-based treatment for patients with chronic kidney disease that is substantially cheaper than hospital-based haemodialysis. LVPEI has developed technology that allows a single cornea to be sliced and used for more than one transplant patient, thus extending coverage to more patients.

2.6.3. Process of task shifting

Govindarajan and Ramamurti (2013) re-engineered business processes by shifting tasks to lower level people with matching of skills and with basics required for these tasks. It is often difficult to attract trained personnel to rural villages. With this resource challenge, LVPEI have hired and trained school graduates from villages to be trained as "vision technicians". They perform tasks in spoke facilities, including some functions of an optometrist.Aravind's Eye Care System of task shifting incorporate paramedics in theatres to carry out a scope of duties normally done by a high paid, short skilled resource. This approach contributes to upskilling of their paramedics and promoting cost efficiencies in their theatre.An extreme form of task shifting is self-service, where patients and family members surmount tasks traditionally performed by hospital staff. At the NH hospital in Mysore, for instance, family members provide non-ICU (intensive care unit) postoperative care. As with other kinds of task shifting, prosperity mainly depends on opportune training. Working with Stanford University, NH developed a four-hour audio and video curriculum that explicates how to care for patients during the three days following heart surgery. Sanctioning family members who provide those services, reduces costs, allows for personalised care, and ascertains continuity of care at home, reducing postsurgical complications.

2.7. PROCESS MAPPING

The diagram in Figure 2.1 below depicts a core process of care Quinn (2016). The clinical process team will evaluate and analyse the process flowcharts for their own centres. This will create a visual display of current work processes and assist with improvement in clinical and financial performance.

In healthcare, Quinn (2016) stated that there must be a shared sense of reality to engage and receive support from all levels of leadership, which comprises the creation of a communication tool based on process knowledge. This article of Quinn (2016) described a framework of healthcare as a system, with tools to help understand the process that make up the system and a method to identify roles that every member plays in the process of improvement.

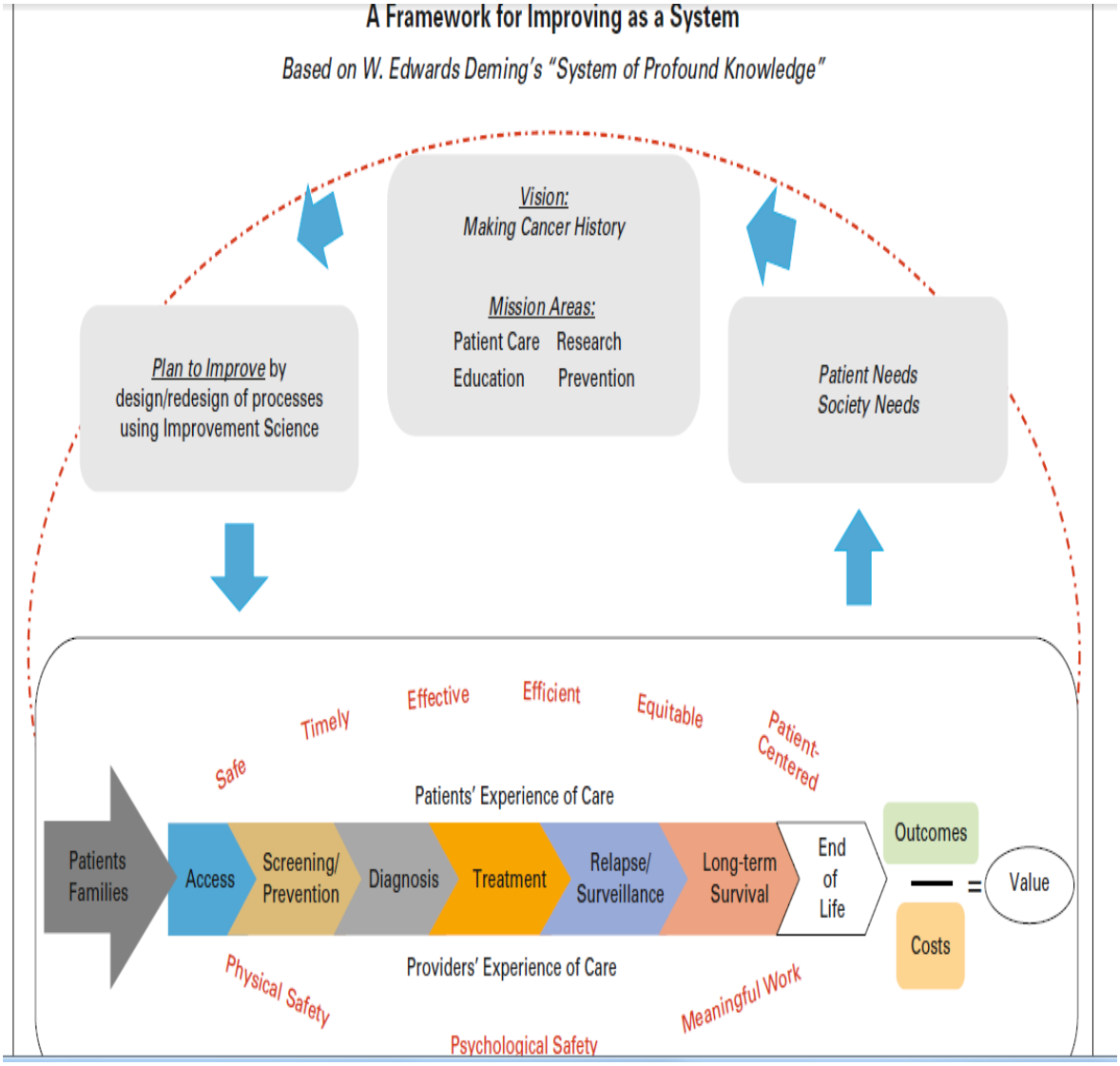


Figure 2.1: MD Anderson Cancer Centre diagram

Source: Adapted from Quinn (2016)

2.8. STANDARDISED HANDOVER

Handovers have been defined Joy, Elliott, Hardy, Sullivan, Backer, and Kane (2011) as "the transfer of professional responsibility and accountability for some or all aspects of care for a patient or group of patients to another person or professional group on a temporary or permanent basis". Figure 2.2 below illustrates a typical handover pathway.

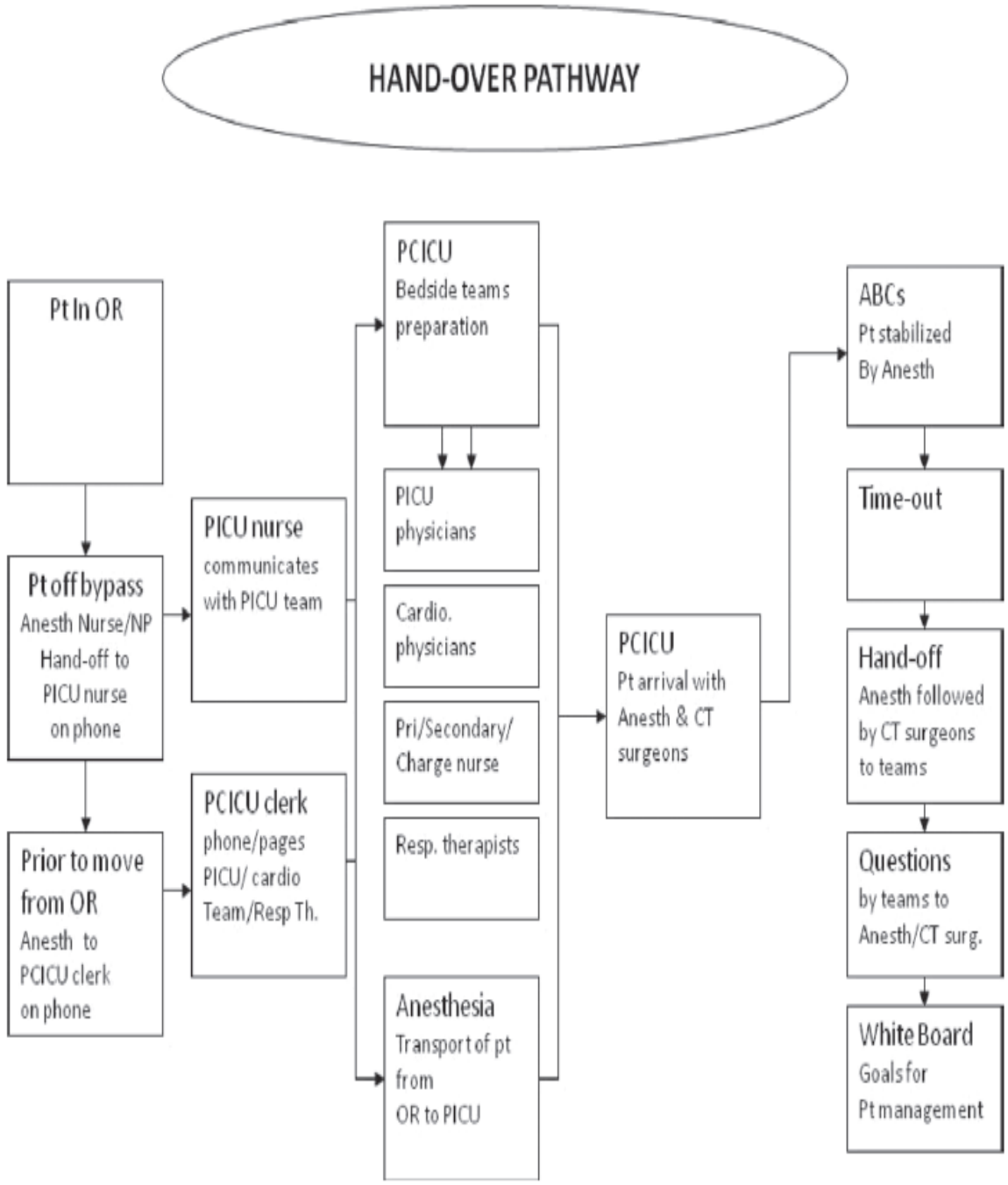
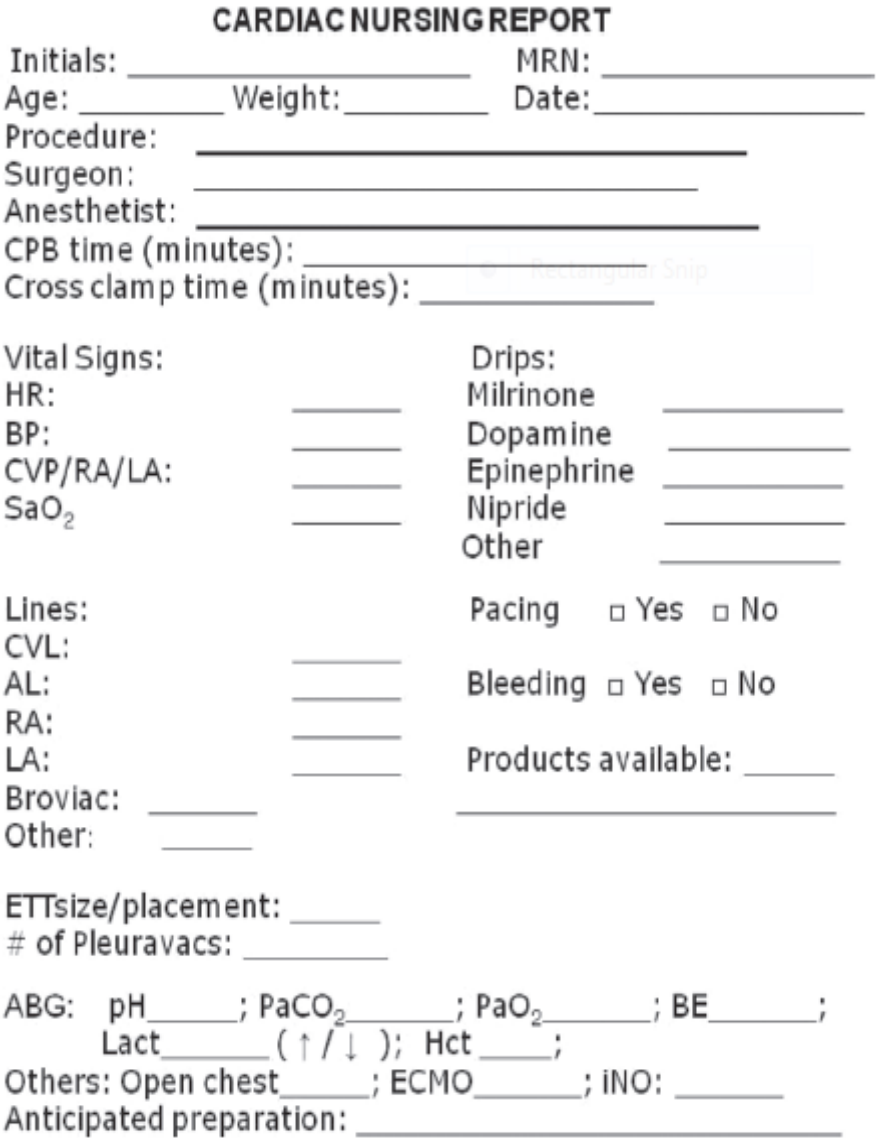


Figure 2.2: Handover pathway

Source: Adapted from Joy (2011)

The handover pathway in Figure 2.2 describes the process followed Joy et al (2011). A telephone call is made from theatre to the paediatric intensive care unit (PICU). When the patient arrives in the PICU, an assessment is conducted to ascertain the airways, breathing, and circulation. Once the assessment reveals the patient is stabilised then they proceed with the handover process to the PICU staff.



CARDIAC NURSING REPORT

Initials: _____ MRN: _____
Age: _____ Weight: _____ Date: _____
Procedure: _____
Surgeon: _____
Anesthetist: _____
CPB time (minutes): _____
Cross clamp time (minutes): _____

Vital Signs:
HR: _____
BP: _____
CVP/RA/LA: _____
SaO_2 _____

Drips:
Milrinone _____
Dopamine _____
Epinephrine _____
Nipride _____
Other _____

Lines:
CVL: _____
AL: _____
RA: _____
LA: _____
Broviac: _____
Other: _____

Pacing ☐ Yes ☐ No

Bleeding ☐ Yes ☐ No

Products available: _____

ETTsize/placement: _____
# of Pleuravacs: _____

ABG: pH_____; $PaCO_2$_____; PaO_2_____; BE_____;
Lact_____ (↑ / ↓); Hct ____;
Others: Open chest_____; ECMO_____; iNO: _____
Anticipated preparation: _____

Figure 2.3: Cardiac nursing report

Source: Adapted from Joy (2011)

The Cardiac Nursing Report (Figure 2.3) Joy et al. (2011) shows the communication between theatre staff and paediatric cardiac intensive care staff, 30 minutes prior to arrival of the patient in PICU. The medical records are updated accordingly. The following notes, as shown in Figure 2.4, have recordings of the cardiopulmonary bypass time, blood pressure, central venous pressure, right and left arterial pressure, central venous lines, arterial line, endotracheal tube, arterial blood gas, base excess or deficit, extracorporeal oxygenation and inhaled nitric oxide.

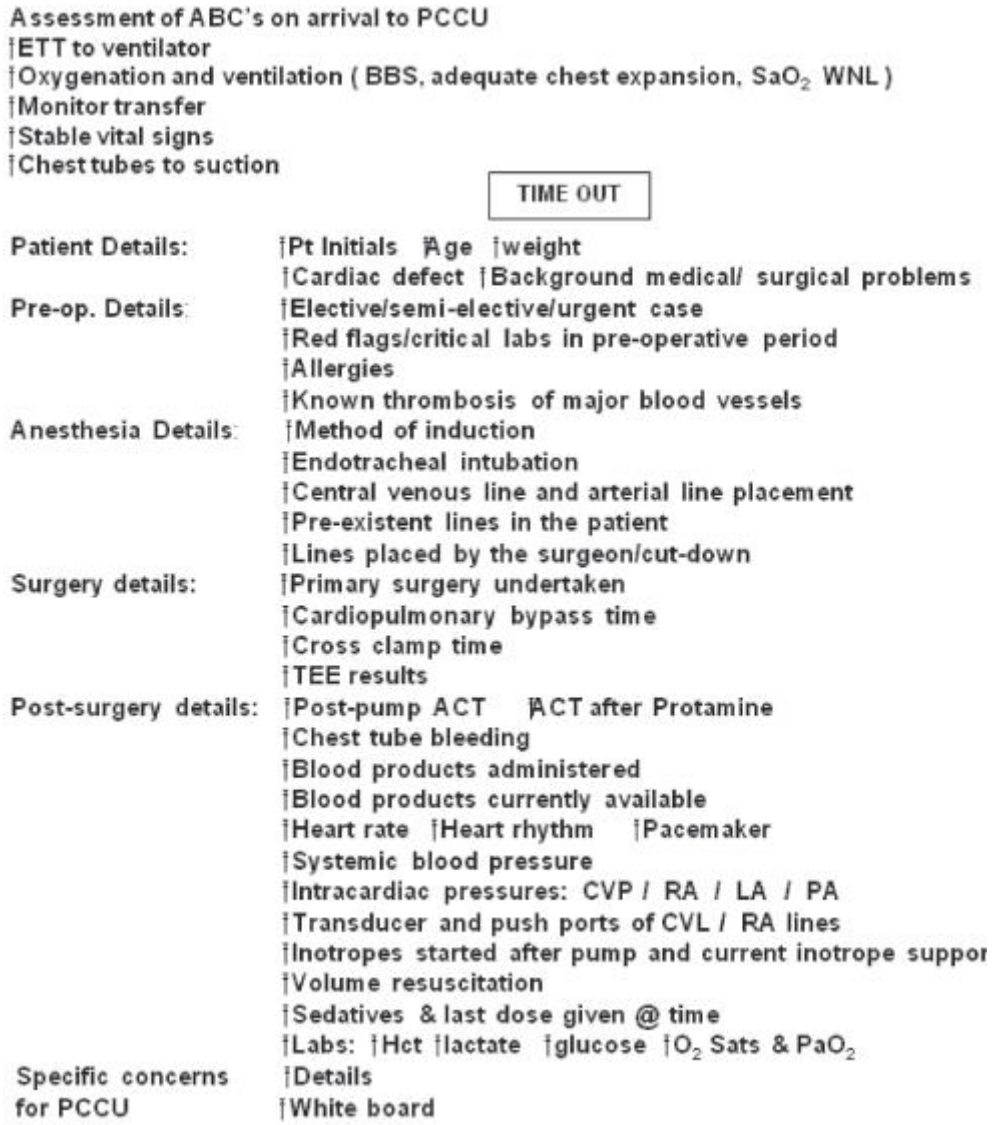


Figure 2.4: Assessment of ABCs on arrival to PCCU

Source: Adapted from Joy (2011)

The Paediatric Cardiac Surgery Handover process: Patient information is communicated face-to-face using a standardised handover checklist tool from the anaesthesia and cardiac surgery teams to the intensive care unit team on arrival of the patient in the intensive care unit. ETT, endotracheal tube; BBS, bilateral breath sounds; WNL, within normal limits; TEE, transesophageal echocardiography; ACT, activated clotting time; CVP, central venous pressure; RA, right atrial; LA, left atrial; PA, pulmonary artery pressure; HCT, haematocrit Joy et al (2011)

The handover process of a patient from the operating room to the Paediatric Cardiac Care Unit is a structured, documented process. The toolkit formulated for the handover pathway describes the step-by-step process followed. Once surgery has been completed and the patient is ready to be transferred from theatre, a telephone call is made to the paediatric

critical care unit (PCCU). The PCCU team comprises of PCCU physicians, cardiac surgeons, anaesthetic doctors, and nurses, who together with the patient, transport the equipment and monitor that the patient is connected to whilst observing the readings at all times for interpretation of changes in condition, and airways, breathing and circulation (ABCs) established. According to Joy et al (2011) a timeout is observed and then any concerns or problems are documented on a whiteboard for monitoring and action.

The handover process of patients is done by telephone by the anaesthesia team from the theatre to the PCCU bedside nursing staff 30 minutes prior to the patient arriving in PCCU. The many shift changes and multiple teams of doctors and disciplines with incorrect instructions and insufficient or non-timeous information sharing to the relevant parties are some of the major risks with this process Joy et al (2011). The implementation and practice of structured handover toolkits and regime will reduce postoperative complications, which could be very costly for the hospital and patient.

2.9. "TIME OUT"

The aim of the electronic whiteboard in the operating theatre, according to Boodman (2011), is to enforce greater compliance with the standardisation of preoperative safety practices which has indicated a decrease in preventable complications, deaths and incorrect surgeries. The Joint Commission International established the Universal Protocol to reduce wrong site, wrong procedure, and wrong person surgeries. The use of the electronic whiteboard in theatre requires staff training and strict adherence to attention to detail. Once the electronic procedure is complete with a check mark, the items turn green and the whiteboard notes revert to a static mode.

Currently, compliance to the existing time out protocol is low Boodman (2011). The Vanderbilt time out process involves a serious of core elements, the presence of the required team who marked the patient, patient identity (name and case number), surgical site and side marking, procedure to be performed, relevant images, availability of necessary blood products, implants, and or devices, allergies, start of antibiotics and discussion of any special considerations (see Figure 2.5).

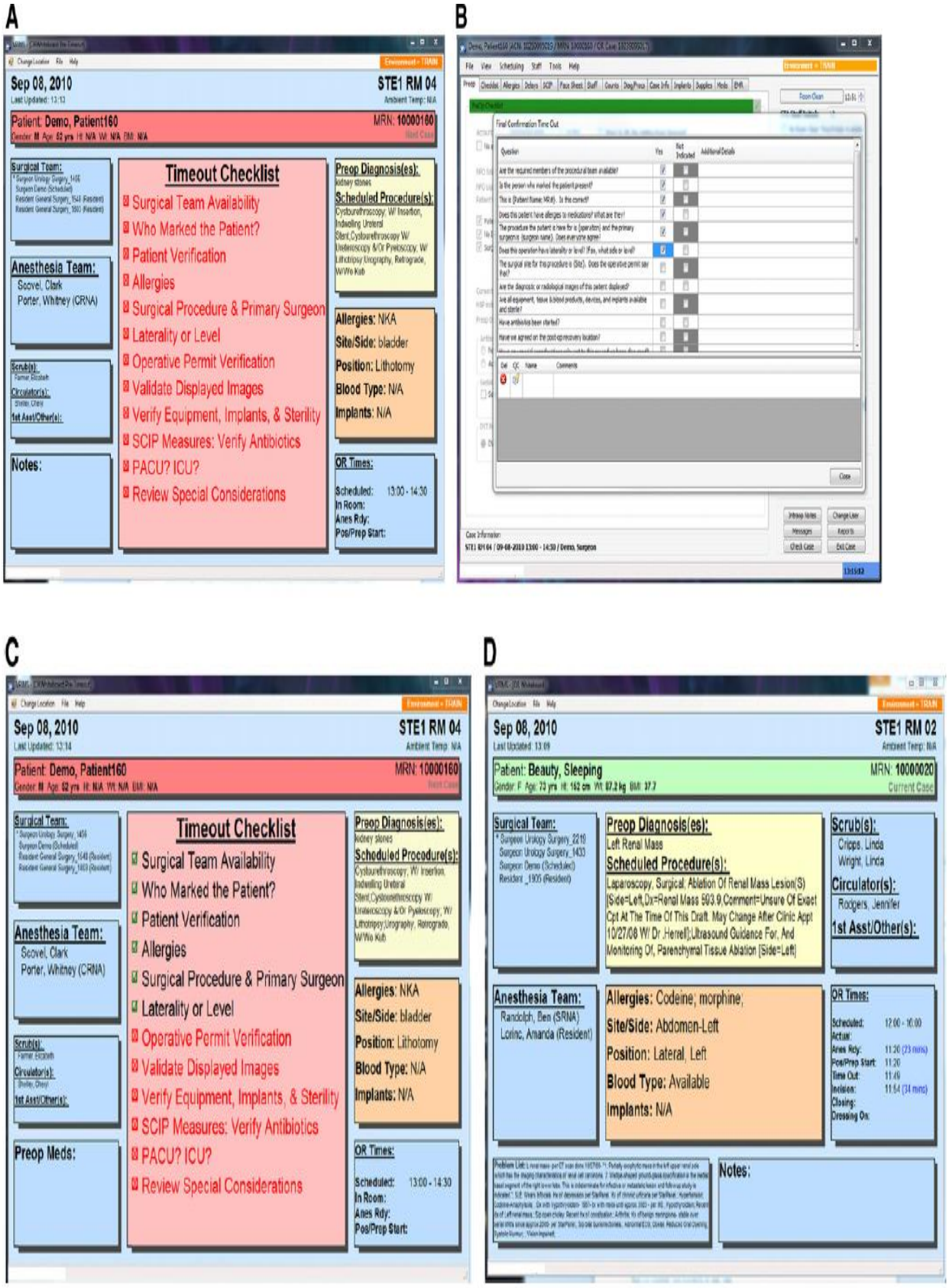


Figure 2.5: Interactive electronic checklist system process

Source: Adapted from Boodman (2011)

2.10. COLLABORATIVE LEADERSHIP MODEL IN THE MANAGEMENT OF HEALTHCARE

2.10.1. Overview of collaboration

Manion (2012) stated that "an operational and evolving healthcare environment needs leaders who can create direction, win commitment from followers and key stakeholders, and influence employees to perform tasks related to the achievement of future strategic vision".

In healthcare, the environment should be synergistic so that several stakeholders can work together for the enhancement and evolution of healthcare Manion (2012). A sustainable encouraged environment with collaboration will influence ongoing integration of ideas and interdependency amongst various stakeholders across the organisation. Collaborative leadership inculcates shared management tactics. When a leader emphasises collaboration in an organisation, other leaders can engage in such a way that both leaders and followers elevate each other's levels of motivation and morality and nurture independencies among multiple parties.

Healthcare is a very personal and service-oriented industry (VanVactor, 2012). Coile (2012) stated that "excellence in service is an achievable goal within today's healthcare services organisations, despite tight budgets and staffing. A set of acceptable organisational values that require a high performance standard from every employee throughout the system can be a springboard for effective process management. Collaborative leadership can be a catalyst for achieving effective change. An organisation's service culture can be the point at which providers, administrators, and ancillary staff collaborate to employ effective communication strategies. By introducing change systemically, management can monitor successes and shortfalls through the employees and consumer feedback".

2.10.2. The Perioperative Surgical Home model

To achieve the triple aim with a surgical patient, the Perioperative Surgical Home (PSH) model aims to uplift the patient experience, and to garner good outcomes for the surgical population while lowering costs.

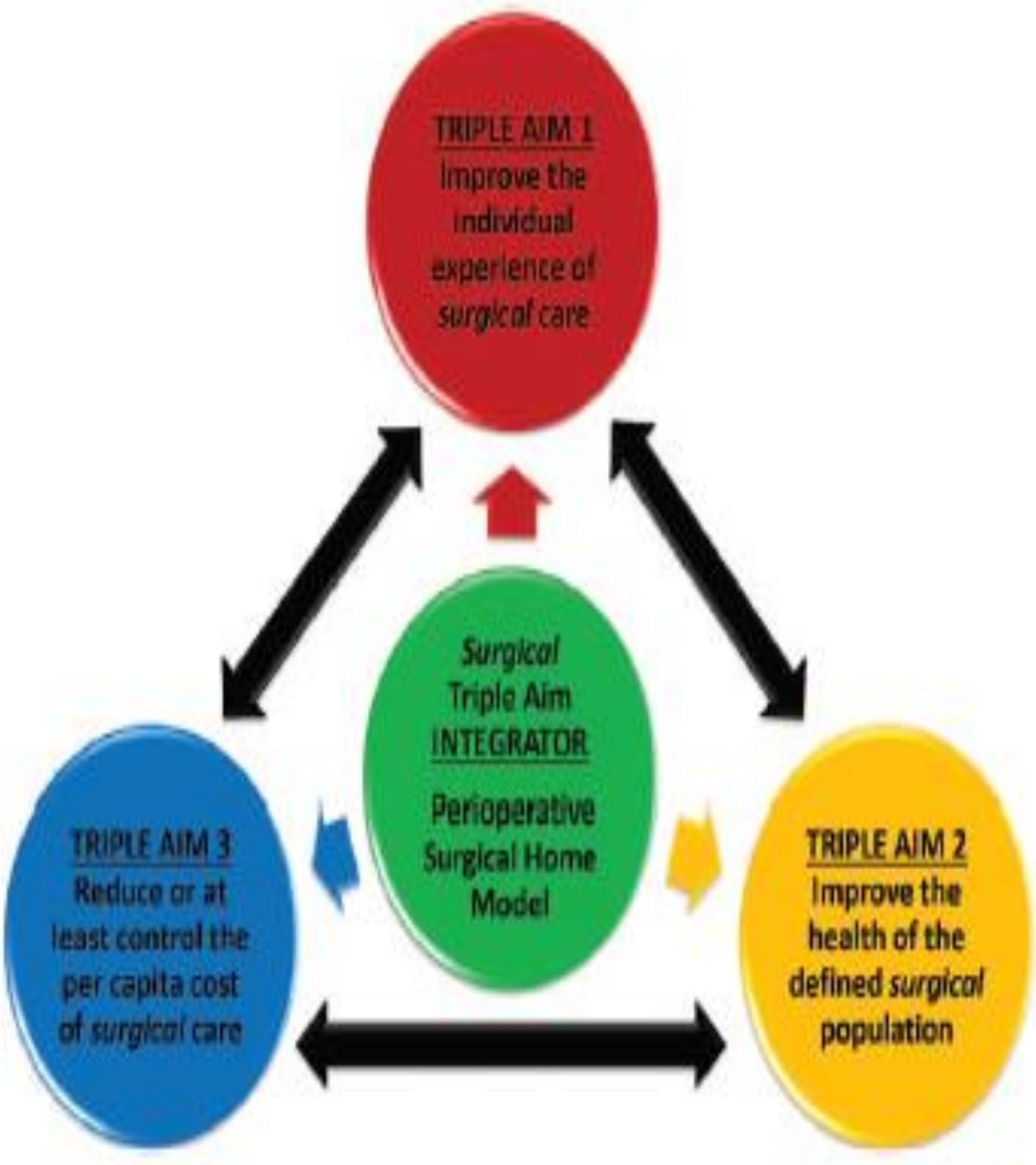


Figure 2.6: The Perioperative Surgical Home model

Source Adapted from Berwick (2008).

The PSH model (Figure 2.6), according to Berwick *et al.* (2008), indeed aims to improve the experience of care for the perioperative patient by shared decision making by like-minded clinicians who work as a team with strong communication promoting trust among clinicians, patients and patients' families. The PSH model also aims to improve the health of the defined population of older age and chronic disease associated with greater morbidity and mortality. The PSH model seeks to reduce or control the per capita costs of care by implementing strategies to optimise clinical outcomes.

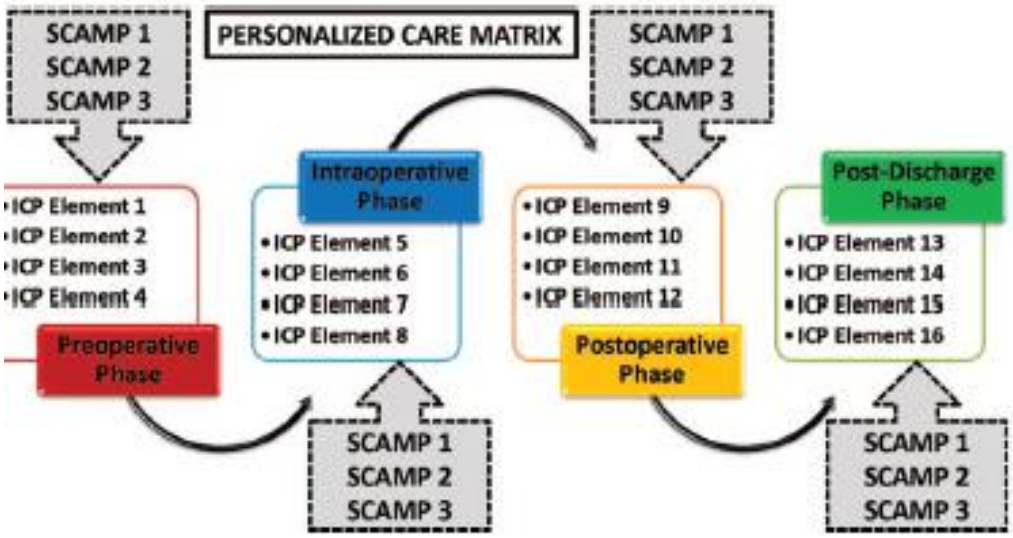


Figure 2.7: SCAMP = standardised clinical assessment and management plan

Source: Aadapted from Berwick (2008)

2.10.3. Standardised clinical assessment and management plans

Standardised clinical assessment and management plans (SCAMPS) are intended to reduce variation and improve care, agued Farias, Jenkins, Lock, Rathod, Newburger *et al.* (2013). The conventional clinical practice guidelines have drawbacks that can limit clinician buy-in. In contrast, SCAMPs offer a clinician-designed and driven approach that accommodates localised individual and population patient differences, respects local providers' clinical acumen, and keeps pace with the rapid growth of medical knowledge.

Examples of perioperative SCAMPs include protocols focused on anaemia and goal-directed blood transfusion, Newburger *et al.* (2013) anticoagulants, nausea and vomiting, multimodal analgesia, delirium and cognitive dysfunction, myocardial injury after non-cardiac surgery, obstructive sleep apnoea, and mode of mechanical ventilation. SCAMPs can play a major and innovative role in the PSH, especially with the multiple effective variants of the PSH concept that are predicated on institutional infrastructure and internal/external forces.In contrast to SCAMPs, integrated care pathways are task-orientated care plans that detail the essential elements in the care of all patients undergoing a specific surgical procedure (e.g. total hip or knee arthroplasty) and then highlight and address any lack of process standardisation and resulting inefficiencies and waste. SCAMPs naturally complement and strengthen such surgical procedure-specific integrated care pathways.

A Personalized Care Matrix can be created by the amalgamation of all the standardised elements of a surgical procedure-specific integrated care pathway and applicable condition-specific SCAMPs Newburger *et al.* (2013).

2.11. IMPACT OF LABOUR COSTS

According to Brimmer (2013), labour costs account for 60% of healthcare operating budgets. It is currently high priority to manage labour costs while improving patient care and maintaining quality. The Department of Health (DOH) requirements of staffing to levels of acceptable ratios without overspending on the budget are a challenge. Accordingly to Rondganger (2013), the primary reason why KwaZulu-Natal is facing a chronic shortage of doctors and nurses could be the affordability of salaries; this was highlighted as one of major factors during a survey by the SA Institute of Race Relations. Another expert view was that the exodus of doctors leaving the country is born from poor treatment of and unrelated lower salaries while in the employ as interns during community service (Child, 2014).

Healthcare is a 24/7 business and needs adequate staffing levels. Technology as an enabler using the Kronos system for the time and attendance management helps to control labour hours and overtime costs. The patients in hospital with high acuity levels require one to one care, which impacts directly on scheduling and staffing costs. Skill mixes required in specialised units; however, there are major skill shortages and this also has a negative impact on labour costs (Healthcare Insights, LLC, 2014).. The staffing levels for hospitals with a set occupancy percentage face major challenges in fixed overhead cost control when there is declining occupancies due to current healthcare challenges. Scheduling of leave and banking time is a systematic way to manage these labour costs.

2.12. TECHNOLOGY AS AN ENABLER

The study by Agartan (2012) argued the importance of Information Technology (IT) in the reduction of soaring healthcare costs and enhanced service quality.Therefore IT is seen as an enabler to solve some of the healthcare issues. IT can assist to streamline and standardise processes, access, share and analyse patient information.

This article by Agartan (2012) discussed an examination of the Turkish healthcare system technology issues. The priority for Turkish healthcare is privacy of healthcare records. There are both privacy and security risks in presenting, sharing and storing personal information. If the information about patients' history and sensitive data about diagnosis,

condition and treatment is violated by unauthorised access, it could result in contravention of the patient privacy act. Quality assurance of healthcare records was noted as another constraint in that healthcare workers' ability and drive to produce quality healthcare records were limited. Therefore, IT investments were made for high quality of records. Turkish Healthcare adopted a piecemeal approach to healthcare information due to the outlay of costs. This imposed health-related information to be managed within a non-integrated system with no guarantee of quality of health records. The process whilst electronic data is collected, transmitted, stored and maintained is subject to internal and external threats as well as viruses, fire, test software and theft of patients' clinical and non-clinical data. The security of this data is high priority amongst most hospital managers. Policies and procedures for securing and protecting electronic health records are still being developed.

Agartan (2012) further argued that electronic medical records (EMRs) are indeed application environments of clinical data and clinical decision support systems. This enables controlled medical vocabulary, order entry; computerised order entry; and pharmacy and clinical documentation applications to support patient care and provide healthcare professionals with tools to document monitor and manage healthcare delivery. EMRs is the support and backbone to computerised health information systems. EMRs can effectively reduce medical errors and contribute to improving the quality and efficiency of patient health. There are implementation barriers to EMRs, namely financial, organisational or behavioural and technical.

The different healthcare facilities in Turkey, according to this study, use different healthcare systems which are a barrier to a system-wide approach to patient healthcare information. Some facilities are purely paper based whilst others have advanced healthcare systems. If a patient has to visit these facilities on different occasions it is impossible to retrieve existing information. Instead, that patient's information has to be recaptured or created; all medical tests would have to be repeated which would increase healthcare expenses. This study by Agartan (2012) suggested that adopting a system-wide approach to patient records and management will be beneficial in offering less costly healthcare services. However, the incompatible infrastructures and inability to reduce switching costs are major barriers.

IT implementations from paper to electronic systems will require adequate training and addressing and preparing the relevant parties for the change. Adoption of a change process is generally met with resistance from doctors and other users; however, if the correct perception is created and the benefits are emphasised, the change will be more acceptable.

Medical errors are common in most healthcare systems throughout the world (Agartan, 2012). The findings highlighted that the top five causes of death are preventable medical errors. Agartan (2012) argued that information technology has the ability to reduce medical errors and improve patient safety through improved and efficient, accessible record keeping.

Another major barrier in Turkish healthcare is the low productivity and provision of healthcare is done by public hospitals with their set ways of doing things. Lengthy employment of staff and stagnancy in the organisation are further reasons for unproductive operations. IT can transform this situation by real time data, which is accurate and relevant, enhancing improved decision-making abilities of managers. Agartan (2012) further argued that Health IT is expected to transform Turkish hospitals to have a more productive and participative management style approach.

2.12.1. Health Cloud

Mathew (2013) quoted that "most healthcare IT infrastructure needs a massive upgrade to capture and share information easily and to make healthcare organizations more intelligent and to manage the data. Cloud computing provides computation, software, data access, and storage services that do not require users' knowledge of the physical location and configuration of the system that delivers the services". Goyen*et* al (2008) confers that the term medical technology, "refers to procedures, equipment, and processes by which medical care is delivered. Hence medical technology innovations can relate to new medical and surgical procedures (e.g., angioplasty, joint replacement), the discovery of new drugs (e.g., biological agents), the implementation of healthcare IT systems (e.g.,electronic medical records and transmission of information, telemedicine) and the development of new medical devices as (e.g., PET/CT systems, MRI/PET systems)".

Slade & Anderson (2001), argue that there is consensus among health economists, that a big proportion of the increase in health expenses is incurred on new medical technologies. In totality the proportions on advancing technology spend equates to half of the healthcare

expenditure with the balance of the other cost drivers making up the balance of expenditure in healthcare services (Civan& Köksal, 2010).

Rettig (cited by Goyen et al, 2008), "describes the process by which new and advancing medical technology affects healthcare costs could be seen new development of new treatments for previously untreatable inoperable conditions, including long-term therapy for treatment of such diseases as diabetes, end-stage renal disease, and AIDS.

2.13. INNOVATION IN HEALTHCARE

2.13.1. Indian Healthcare Delivery Model

A study conducted by Govindarajan and Ramamurti (2013) argued that innovation was the key to healthcare delivery and that this facilitated Narayana Health to have the innovativeness to contract a US company, TriMedx, to double the life of their diagnostic equipment. The strategy was comprised of carefully planning a thorough maintenance and repair schedule to avoid unbudgeted costs. The true innovation stemmed from re-using the single use products. NH hospital sterilised and reused medical devices and ensured stringent adherence to sterilisation procedures. The Joint Commission allows accredited hospitals to reuse devices provided compliance is maintained. There is great emphasis on space optimisation for critical areas like theatres. They choose to lease rather than buy hospital sites to reduce costs. Innovation in LifeSpring hospitals is also in terms of products purchased, with beds being smaller and simpler; however, their theatre operating tables are standard size. Vaatsalya hospitals chose lower resolution, black and white ultrasound and three parameter patient monitors for necessity and low cost products instead of high end ones for aesthetics.

2.13.2. Bundling: A systematic approach

A few essential elements are necessary to start a successful bundled payment programme.

2.13.2.1.Redefining a product with enhanced value

Perhaps one of the easiest ways to consider the implications and potential benefits of switching from a fee for service model of payment to a bundled payment model is to think about it from the perspective of a consumer of healthcare (Sood, Huckfeldt, Escarce, Grabowski, & Newhouse, 2011), rather than as a provider. Payers (insurers, employers, and patients themselves with increasing personal financial responsibility) expect that all

providers of care are examining each service in the care process or a bundle. The purpose, necessity, and value of managing the relevant clinical decision points are expected provisions. New models of payment such as bundled payment are examples of healthcare delivery paradigms that emphasise collaboration to increase value.

2.13.2.2.Gain-sharing within a bundled payment environment

Definition: According to Sood et al (2011) Gain-sharing is one mechanism that can be used to assist in delivering collaboration among physicians and hospitals. It is a process or programme that aligns the incentives of hospitals and physicians to improve the fiscal performance of the hospital and reward physicians for their effort. The DOH and Services Office of the Inspector General define gain sharing as "an arrangement in which a hospital gives physicians a percentage share of any reduction in the hospitals costs for patient care attributable in part to the physicians' efforts". Gain-sharing programmes are about saving money for hospitals and rewarding physicians for achieving the savings.

Physician participation: Physician participation in gain-sharing programmes can be through hospital purchasing programmes or hospital cost-saving programmes. In hospital purchasing programmes, physicians assist hospitals in negotiations with vendors regarding the cost of supplies, devices, implants, and drugs Sood et al (2011). Physicians can also participate in hospital cost-savings programmes that improve efficiency and cost effectiveness such as clinical pathways. When physicians participate in these hospital cost-saving programmes, they achieve an indirect reduction of hospital costs.

Physician re-imbursement: Physician reimbursement for participating in hospital gain-sharing programmes can be by payment of a percentage of dollar savings, payment for time worked, or payment for specific work completed Sood et al (2011). Physicians can be reimbursed with benefits "in lieu of payment" such as increased hospital space, new equipment, and supplies, hospital assistance in the form of physician assistants, nurse practitioners, orthopaedic technicians, and hospitals can share the recruiting costs for new physicians. Physicians can be reimbursed by earning a negotiated portion of bundled payments that are given to the hospital for the service delivered by the hospital and the physician.

Hospital interest: Hospitals are interested in gain sharing because hospital operating margins are decreasing Sood et al (2011). Physicians generate costs for hospitals and

therefore they can control costs. Hospital costs depend on physician orders and physician activity. In most healthcare financing schemes, physicians have no incentive to control hospital costs. One rationale for implementing gain-sharing programmes is to create incentives for physicians to help control hospital costs

AAOS response: In 2006, the American Academy of Orthopaedic Surgeons (AAOS) issued a position statement on gain-sharing programmes (Healy, 2006). The AAOS encouraged orthopaedic surgeons to be knowledgeable regarding medical costs and to collaborate with hospitals on cost containment and quality improvement. The (AAOS) supported hospital purchasing programmes and hospital cost-savings programmes. The AAOS also opposed direct physician payments for participation in gain-sharing programmes and favoured indirect payments to physicians to enhance patient care. In addition, the AAOS expressed opposition to gain sharing if quality of patient care might be compromised, or if restrictions on physician choice of supplies or devices were implemented; they also encouraged orthopaedic surgeons to be objective regarding valid evidence-based measures to evaluate technology. In summary, the AAOS stated that gain sharing can create conflicts of interest for orthopaedic surgeons and conflicts must be resolved in favour of patients.

Government response: Gain-sharing programmes were included in the CMS Medicare Acute Care Episode (ACE) Demonstration in 2009. In 2010, (Healy, 2006) gain-sharing demonstrations were included in the Patient Protection and Affordable Care Act (PPACA). Gain-sharing programmes were allowed to create savings for hospitals if participation in the programmes was voluntary and not coerced; if quality, efficiency and patient satisfaction were measured and methods for improvement were included; and if the programme was completely transparent to all stakeholders.

Total joint arthroplasty (TJA): Gain-sharing programmes may be applicable to the economics of TJA. Total hip arthroplasty (THA) and total knee arthroplasty (TKA) are clinically successful in terms of pain relief, functional improvement, and durability over decades (Healy, 2006). The prevalence of a joint arthroplasty operation is becoming one of the highest Medicare expenditures. Hospital margins for TJA are deteriorating, as revenues are generally fixed and expenses are generally increasing, especially implant costs. In 2013, hospitals needed surgeons to help control the cost of joint implants; however, the surgeons had no incentive to do so. Gain-sharing programmes have the potential to create

incentives for surgeons to control the cost of TJA. Gain-sharing can work if regulatory and tax barriers are modified to allow hospitals and physicians to form partnerships in the best interest of patients, hospitals, and physicians. Gain-sharing can work if gain-sharing programmes are clearly defined and fully disclosed to all stakeholders including patients and the public. These programmes can be used to implement successful bundled payment financing systems and can be applied to TJA. "If a healthcare program can bring physicians and hospitals together to improve quality in patient care align clinical and economic incentives, improve hospital financial performance, and reward physicians for work performed on behalf of the hospital, that program has a chance to succeed and survive in any healthcare economy". Gain-sharing programmes can be such a healthcare programme.

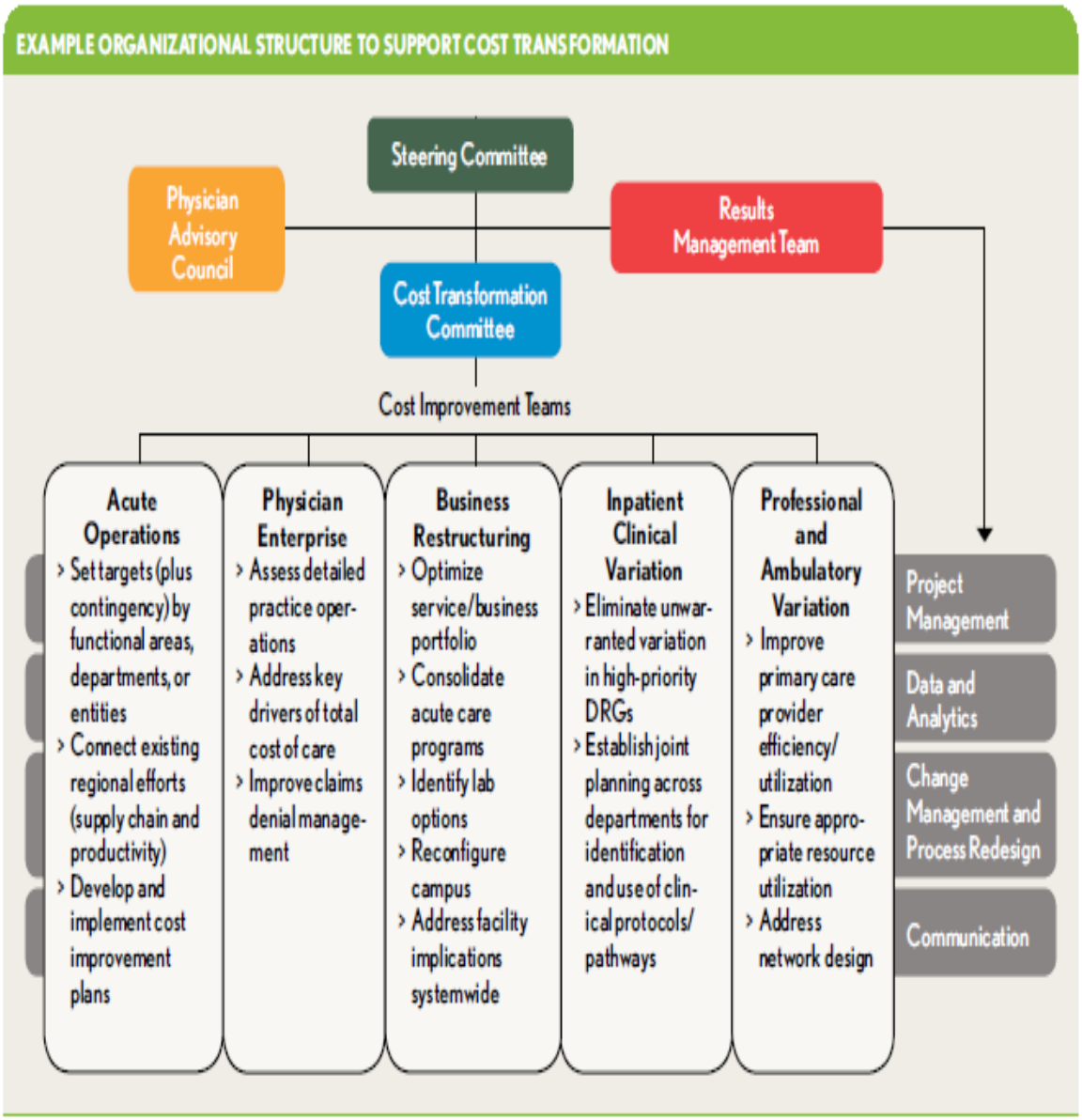
Table 2.3 presents a typical framework for cost transformation, followed by Table 2.4 with an organisational structure to support the cost transformation.

Table 2.3: Framework for cost transformation

FRAMEWORK FOR COST TRANSFORMATION		
Margin Improvement	**Business Restructuring**	**Clinical Transformation**
Productivity	Business lines	Clinical integration
Service delivery costs	Services and products	Clinical variation
Overhead costs	Delivery system	Care delivery efficiency
Revenue cycle	Capital allocation process	Performance of physician operations
Supply chain	Non-operating performance	Care process design
Progress Toward Comprehensive Cost Transformation:		
Hard	**Harder**	**Hardest**

Source: Adapted from Kaufman (2016)

Table 2.4: Organisational structure to support cost transformation



Source: Adapted from Kaufman (2016)

2.14. LOW COST BUSINESS MODEL

Govindarajan and Ramamurti (2013) argued that although India, an unlikely place to find healthcare innovation, is riddled with increased demand and restricted supply, they have developed a regime for healthcare for their population, and whilst targeting the affluent, this has steered them to offer global quality standards.

The data collection indicated their aim to include individuals from all living standard means which placed emphasis on lowering costs intensely. A low cost business model is an

affordable price for all patients both the rich and poor ,and at these Indian hospitals has resulted in increased volumes of patients making the hospital profitable. The hospitals are able to sustain the operations simply by revenues.

2.14.1. Cost-effective Indian Hospital

According to Govindarajan and Ramamurti (2013), the goal was to reduce waste by adopting the Lean approach. Apollo hospitals engaged with suppliers to shorten the length of sutures in every packet and to lower the costs accordingly. They discovered that doctors were consistently discarding one third of each suture after every procedure. The Care Hospitals developed stents that perform as well as imports but imports are exorbitant in price. A subsidiary was set up to manufacture stents, catheters and other medical devices at low costs. Collaborative partnerships were formed with Florida-based IOL International and Aurolab to manufacture intraocular lenses at a phenomenally low price.

2.14.2. Estimates of the total impact of hospital acquired infections

Klevens, Edwards, Richards, Horan, Gaynes (2007) argued that preventable infections arising during acute-care hospitalisation levy huge tolls on patients, families, payers, and the provider hospitals where they occur. Patients who contract these infections suffer worse morbidity and mortality than uninfected patients. They experience longer length of hospital stay (LOS), more intensive care, higher risk of readmission, prolonged recovery time, and greater overall expenses or losses. Providers incur more resource utilisation, and payers absorb more costs.

The literature by Klevens *et al.* (2007) quoted "65% to 70% of cases of catheter-associated bloodstream infection (CABSI) and catheter-associated urinary tract infection (CAUTI) and 55% of cases of ventilator-associated pneumonia (VAP) and surgical site infection (SSI) are preventable with current evidence-based strategies. CAUTI may be the most preventable hospital acquired infection (HAI); the number of avoidable infections ranges from 95,483 to 387,550 per year. This is followed by CABSI, with 44,762–164,127 preventable infections; VAP, with 95,078–137,613 preventable infections; and SSI, with 75,526–156,862 preventable infections. The calculations of this research study demonstrate that CABSI is associated with the highest number of preventable deaths, followed by VAP. If best practices in infection control were applied at all US hospitals, the reduction in the number of cases of CABSI could save as many as 5,520–20,239 lives, and for VAP

13,667–19,782 lives could be saved. The potential to save lives by reducing the number of cases of CAUTI and SSI is smaller: 2,225–9,031 lives annually for CAUTI and 2,133–4,431 lives annually for SSI. Of the HAIs examined, preventable cases of CABSI are likely to have the highest associated costs, ranging anywhere from $960 million to $18.2 billion annually. The hospital costs of preventable VAP are estimated to be $2.19 billion to 3.17 billion dollars annually. Costs of preventable CAUTIs are estimated to be $115 million to $1.82 billion annually, and the costs of preventable SSIs are estimated to be $166 million to $345 million". If the hospital is successful with prevention the result is a cost reduction in hospital stay.

2.15. ACCOUNTABLE CARE ORGANISATIONS

Meyer (2011) argued that Accountable care organisations (ACOs) are an extension of the medical home model. The process in ACOs is where groups of physicians, healthcare providers, and hospitals are aligned to give well-coordinated, high-quality care to their patients both inside and outside the hospital. This model ensures that the patient gets the right care at the right time; with coordinated care, unnecessary duplication of services is avoided reducing healthcare costs. The accountable care organisations model also successfully relies on efficiency, and communication for coordinated care, an up-to-date electronic medical records system with the ability to manage risk.

2.16. VALUE-BASED PURCHASING

Value-based purchasing is a fund devised by the medical aid that measures the outcomes received by service providers before a service provider is paid (Porter, 2009). The patients score the service providers and by measuring and tracking an inpatient quality report programme. For value-based purchasing, a set amount of money will be moved around as penalties and incentives (i.e. some hospitals will be reimbursed at lower rates, whereas others will be eligible for bonuses).

2.17. HOSPITAL READMISSIONS

Hospital readmissions represent a huge health and financial toll. Stone and Hoffman (2010) quoted that "19.6% of Medicare fee-for-service beneficiaries who had been discharged from a hospital were readmitted to the hospital within 30 days, 34.0% within 90 days, and more than half (56.1%) within one year of discharge. In addition, the Medicare Payment Advisory Commission (MedPAC) found that 17.6% of hospital admissions

resulted in readmissions within 30 days of discharge, 11.3% within 15 days, and 6.2% within seven days. Readmissions are a costly component of Medicare-covered hospital services, with Med PAC reporting that readmissions within 30 days accounted for $15 billion of Medicare spending. The HRRP aims to lower excessive costs of readmissions. Under HRRP, payments to hospitals are adjusted on the basis of potentially preventable hospital readmissions. As of October 1, 2012, Medicare has reduced payments to hospitals with higher readmission rates for certain patient populations (acute myocardial infarction, pneumonia, and heart failure); hospitals with excessive readmissions could have lost as much as 2% in 2012, rising to 5% by FY2017.11 On the other hand, Medicare could award bonus payments to hospitals with low readmission rates for these patient populations".

2.18. MALNUTRITION

In the quest for cost containment, it is essential to balance care for treatment of acute conditions with care for prevention and treatment of chronic conditions (Barker, Gout & Crowe, 2011). Nutrition is an important factor for both acute and chronic conditions. Malnutrition can be seen to be a contributing cause or a consequence of many disease conditions. Discussion on hospital malnutrition often concentrates on disease related under nutrition, but health and financial consequences of over nutrition are equally important.

Barker, et al. (2011) stated that "disease-related malnutrition is both common and costly around the world. Disease-related malnutrition (under nutrition) ranges from 30%–50% of patients in hospitals and even higher in patients, with longer hospital stay. In healthcare settings malnutrition is often under recognized and under treated. Malnutrition in the form of under nutrition is particularly common in certain diseases and conditions chronic obstructive pulmonary disease, congestive heart failure, renal disease, with surgery or critical illness, and in people older than 65 years. There is some evidence that nutrition intervention for hospitalised patients has reduced readmissions". Just as the Kaiser (2012) report discusses obesity. Wagner (2009), agrees that obesity has doubled in adults and tripled in children in the last 20 years. It is commonly accepted that obesity increases the risk of a person needing healthcare services, thus further increasing the demand for healthcare in the U.S.

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2.19. CHAPTER SUMMARY

The current healthcare business environment is plagued with pressure from government for National Health Insurance to provide affordable care to all. The government's failure to address poor service delivery and unjustifiable healthcare spend in the public sector has passed the burden to healthcare stakeholders of the private sector for transformation.

While the pertinent literature reviewed provides ample evidence to support the notion of an approach to transformational cost reduction in a private hospital, there is lack of research amongst some areas of technology, standardised process, control of labour and redesign and care coordination. Insightful research is required to bridge this gap, starting with the methodology that is articulated in the next chapter.

CHAPTER 3
RESEARCH METHODOLOGY

3.1. INTRODUCTION

The literature review in the previous chapter suggests there is a gap or research that is lacking for an effective transformational cost reduction in private hospitals. There is ongoing investigation by the South African Government in healthcare expenditure and the imminent National Health Insurance. The government has not addressed the concerns with public healthcare services and therefore the topical debate by leaders in healthcare and medical aids is, “Can a climate of cost reduction create sustainability for healthcare?” Research into the adoption of cost containment measures will enable management, healthcare funders and government in the sustainability of healthcare in South Africa. An argumentative discussion is made to the academic and healthcare sector on the need for this topic.

The structure of this chapter starts with a brief overview, followed by the aims and objectives, type of study, research design used, and a detailed analysis of sampling that was performed. The chapter also presents the data collection strategy, a discussion on the data analysis performed and finally ethical considerations implemented.

3.2. AIM

The aim of this research study was to adopt an approach to transformational cost reduction in a private hospital.The aim of a research study was defined by Farrell (2011) as the purpose of the study which provides planned direction of the research. The description of objectives by Abdulai and Owusu-Ansah (2014) explains how the aim of the research will be achieved by transformation of the aim into functioning declarations

3.3. OBJECTIVES

The objective of this study was to ascertain why the need exists for transformational cost reduction in a private hospital, which should enable future growth and sustainability. Furthermore, this study attempted to establish if standardised processes, control of labour costs, impact of technology and innovative delivery care would result in cost containment. The views of all levels of management were crucial to study their effects and therefore it

was necessary to survey all managers at Ethekwini Hospital and Heart Centre. Due to the large number of healthcare employees, a quantitative study was conducted which provided the conduit for which the objectives of the study could be achieved.

The objectives are listed as follows:

1. To determine the impact that standardised care processes have on reducing unnecessary care and costs.
2. To evaluate the control of labour costs by management.
3. To evaluate the influence that technology has on the healthcare
4. To analyse the innovativeness of the delivery care model and the impact on healthcare.
5. To provide recommendations for transformational cost reduction.

A researcher must devise a plan or method of investigation, to consider theory of world view expectations which will add value the study. Even though philosophical ideas may not be clear in a study, they will have influence during the process of research (Creswell, 2014). The research design is formulated and chosen after the consideration is complete. Table 3.1 below reflects the four worldviews. This research is quantitative and expresses post positivism view.

Table 3.1: Four worldviews

Postpositivism	Constructivism
• Determination • Reductionism • Empirical observation and measurement • Theory verification	• Understanding • Multiple participant meanings • Social and historical construction • Theory generation
Transformative	**Pragmatism**
• Political • Power and justice oriented • Collaborative • Change-oriented	• Consequences of actions • Problem-centered • Pluralistic • Real-world practice oriented

Source: Adapted from Creswell (2014)

3.4. TYPES OF RESEARCH

There are two types of research referred to as applied research; the alternate is referred to as basic or fundamental research (Sekaran & Bougie, 2013). Basic research is to generate a body of knowledge by trying to understand how a problem occurs in an organisation (Creswell, 2014). The differences between basic and applied research are listed in Figure 3.1 below.

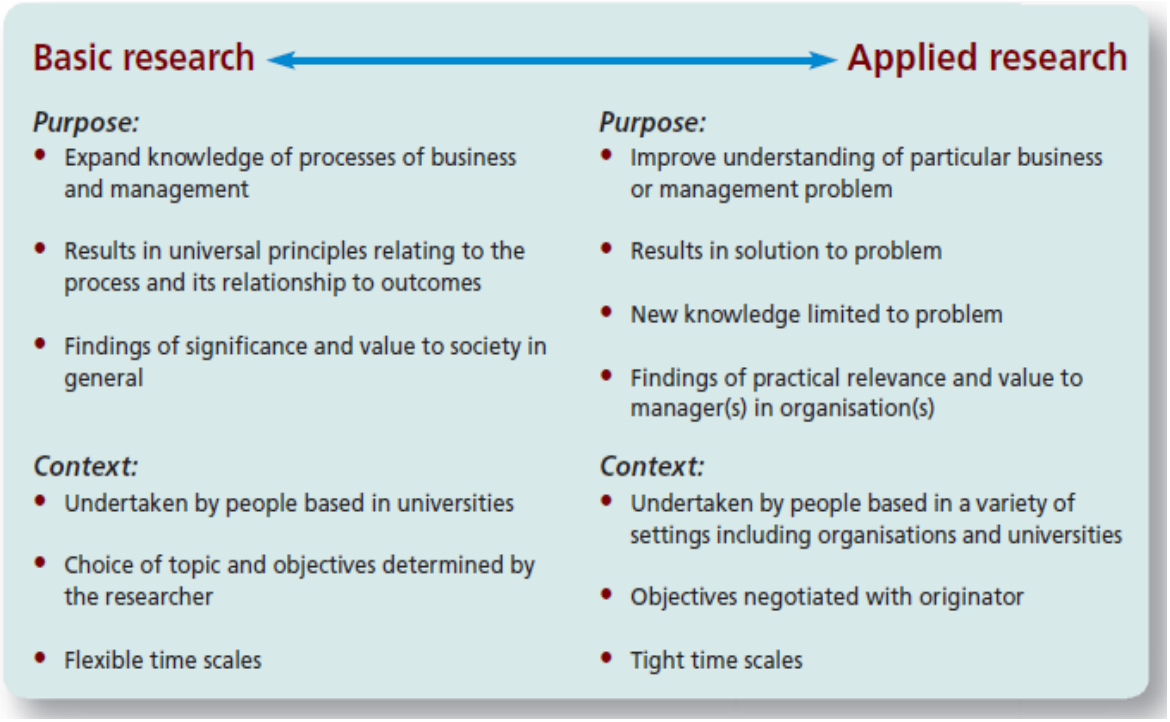

Figure 3.1: Basic and applied research

Sources: Adapted from Easterby-Smith (1991)

3.5. RESEARCH DESIGN AND METHODS

Cooper and Schindler (2014, pp. 139, 727) concurred that a research design is "an activity- and time-based plan; a blueprint for fulfilling research objectives and answering question".

3.5.1. Triangulation methods

The understanding people have about the world, and how in turn interpret this understanding Easterby-Smith *et al*. (1991) define the following four types of triangulation:

i. “Data Triangulation: Data is collected at different times and source and combined, or compared to increase confidence;”

ii. “Investigator Triangulation: data is gathered by different investigators, independently and compared/combined to increase confidence;”

iii. “Methodological Triangulation: Using both qualitative and quantitative methods to increase confidence, and”

iv. “Theories Triangulation: using two different theories to explain the same problem”.

This design was chosen to meet the objectives of the study, namely to determine the knowledge and views of healthcare employees on transformational cost reduction in a private hospital.

3.5.2. Quantitative research designs

Quantitative research designs are informed by the positivist paradigm and deductive research approach (Creswell, 2014). They are the following:

- Causal study (explanatory or predictive)
- Survey research design (exploratory study, descriptive study, longitudinal or cross-sectional survey research design, and case study survey research design)
- Mixed methods research design – informed by both deductive and inductive paradigms (convergent parallel mixed methods or explanatory sequential mixed methods or explanatory sequential mixed methods).

3.5.3. Qualitative research designs

Qualitative research designs are informed by the phenomenological (interpretivism) paradigm and inductive research approach (Creswell, 2014). They are the following:

- Action research
- Case study research
- Grounded theory
- Ethnographic research.

Different types of research designs exist based on the nature (type) of the research question (whether crystallised or not), purpose of the study, time frame, breadth and depth (scope) of the study and the research environment.

The most commonly used research designs based on the nature of the research question, purpose and approach used to gather primary data in business studies are the following**:**

- Exploratory research design
- Descriptive research design
- Causal research design (explanatory or predictive)
- Mixed methods research design.

Kothari (2011) categorised the types of research studies into three broad categories, namely exploratory studies, descriptive studies and hypothesis testing studies. Sekaran and Bougie (2013, pp. 96-98) categorised the same three types of studies but they described 37 hypothesis testing studies as causal studies. They stated further that the nature of the study is dependent on how far knowledge of the topic has advanced, with exploratory studies being new areas of business research, to the descriptive studies which comprise a description of phenomena of interest, to the hypothesis testing studies which examine if the inferred relationship exists. Figure 3.2 summarises all three types of studies as found in Kothari (2011) and Sekaran and Bougie (2013, pp. 96-98).

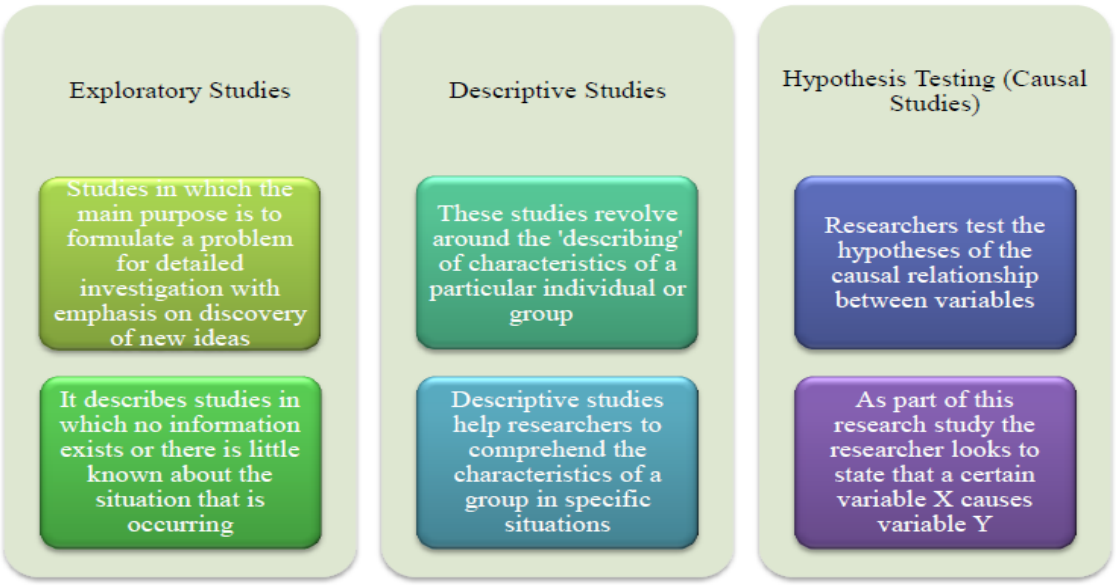

Figure 3.2: Types of research studies

Source: Adapted from Sekaran(2013).

From the research studies listed in Figure 3.2, the most appropriate type of study for this project was deemed to be a descriptive study as the research attempted to ascertain perceptions of the employees in an approach to transformational cost reduction in a private hospital. Hence, as prescribed by Kothari (2011) and Sekaran and Bougie (2013, p. 97), the type of research study selected was a descriptive research study.

3.6. RESEARCH PARADIGM

The method of analysing data using the quantitative form, including the generation of data, is based on the measurement of amounts or quantities of data (Kothari, 2011) and is referred to as the quantitative approach. The qualitative approach in research focuses on subjective views of attitudes, behaviour and opinions which generate a non-quantitative form of results that cannot be interrogated using quantitative analysis. Table 3.2 compares the positivist/conventional approach to the constructivist approach.

Table 3.2: Comparison of positivist/conventional versus constructivist

	Positivist / Conventional	Constructivist
Ontology (nature of reality)	Reality is tangible, exists outside me, is objective, and can be broken into parts; "Truth" exists and can be apprehended and measured.	Reality is constructed, subjective, multiple, relative. Constructions are not more or less "true," only more or less informed.
Epistemology (nature of knowledge)	The knower and the known are independent of each other; the influence of the researcher on the researched can be controlled; replicable findings are "true".	Knower and the known are interactively linked; findings are "created" as research proceeds.
Axiology (role of values)	Inquiry is objective and thus value-free; values and biases can be eliminated through the use of rigorous procedures.	Inquiry is value-bound; values are inherent in the context of the study; the researcher's values affect the study.

Source: Adapted from Creswell (2014)

Furthermore, Figure 3.3 below is an image of a so-called research onion that illustrates how the research methodology can be designed effectively

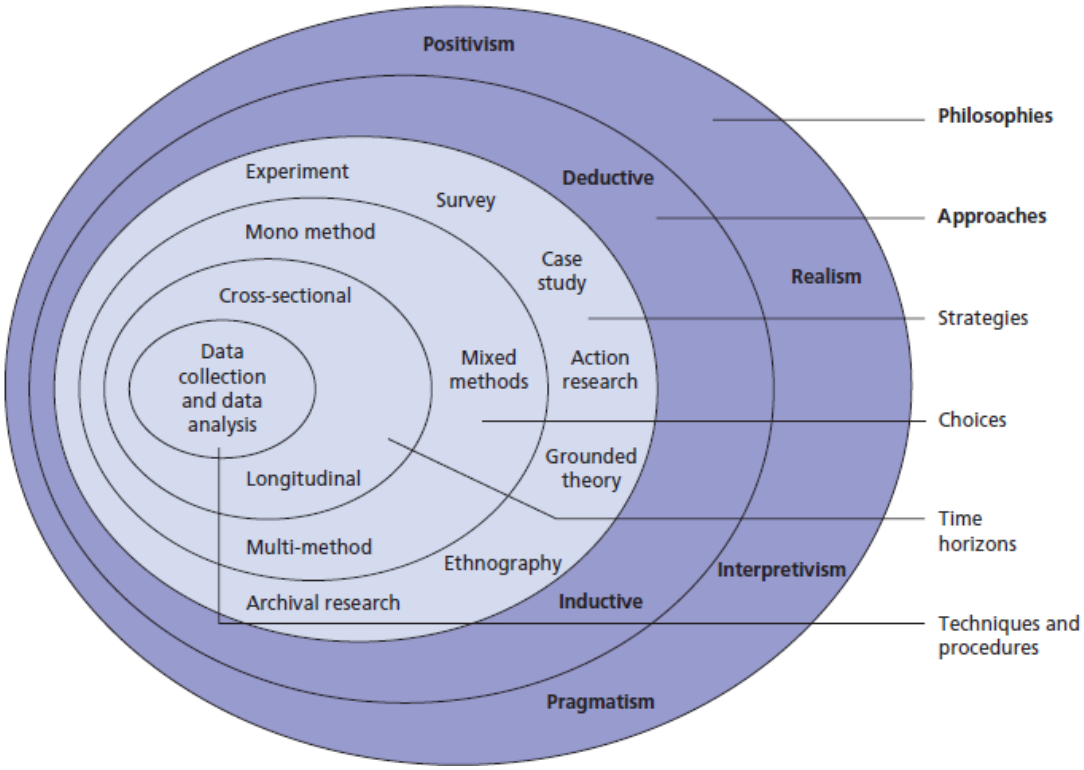

Figure 3.3: The research 'onion'

Source: Adapted from Saunders (2009)

3.7. STUDY SETTING

The survey was conducted at Ethekwini Hospital and Heart Centre which falls under the KwaZulu-Natal Region in South Africa. The hospital is licensed for 250 beds as per license records from Department of Health. It caters for the health needs of people who are referred to it from in and around KwaZulu-Natal.

3.8. POPULATION AND SAMPLE OF THE STUDY

The definition of population from a research perspective is the entire group of people, things or events that the researcher would like to use for their investigation (Sekaran & Bougie, 2013, p.240). The number of employees in the management positions was 85.

3.9. SAMPLING METHOD

Sampling originates from the need for research of a large number of individuals or objects. Sekaran and Bougie (2013, p. 242) defined sampling as the process for selecting the correct individuals or objects as representatives of the entire population. Basically, the sample is a subset of the population that is to be considered. Similarly, Cooper and Schindler's (2014) basic idea of sampling involves the selection of some elements in a population that are used to draw conclusions about the population as a whole. There are a few reasons for the use of sampling in research; the cost of collecting and analysing a large population set being one amongst them.

3.9.1. Reason for sampling

It will be extremely costly and time consuming to collect and analyse each piece of data from the total population. Therefore, researchers use sampling as a means to reduce the amount of data that needs to be collected and analysed (Saunders *et al.*, 2009). Kothari (2011), along with the cost issue, also listed the following reasons for using a sample:

- Saving time. Sample research studies produce results quicker.
- A sample enables more accurate measurement.
- Sampling is the only method that can be used when the population size is infinite.
- Sampling allows for estimation of the sampling errors which in turn helps obtain information on some of the characteristics of the population.

3.9.2. Sampling techniques

Sampling design is defined as the plan by which the sample is obtained from the sampling frame (Kothari, 2011). In sampling design there are two major categories, probability sampling and non-probability sampling. In probability sampling the elements of the population have a known, non-zero probability of being selected in the sample for the research (Sekaran & Bougie, 2013, p. 247). Probability sampling allows for the research to make probability-based confidence estimates (Cooper & Schindler, 2014). In non-probability sampling, the population elements do not have a known chance of being selected (Sekaran & Bougie, 2013, p. 252). Similarly, Cooper and Schindler (2014) described non-probability sampling as a subjective approach in which the probability of an element of the population being selected is unknown. Table 3.3 lists the various probability

and non-probability designs (Kothari, 2011). Thereafter, Table 3.4 lists the various factors that could impact the researcher's choice of probability sampling techniques.

Table 3.3: Probability and non-probability sampling design

	Representation basis	
Element Selection Technique	**Probability sampling**	**Non-probability sampling**
Unrestricted sampling	Simple random sampling	Convenience sampling
Restricted sampling	Complex random sampling (systematic sampling, stratified random sampling, cluster sampling, double sampling)	Purposive sampling (Judgment Sampling, Quota sampling)

Source: Adapted from Cooper(2014)

Table 3.3 briefly explains the difference in probability and non-probability sampling design. Probability is represented by simple random sampling compare to non-probability which is more convenience sampling.

Table 3.4: Impact of various factors on choice of probability sampling techniques

Sample technique	Sampling frame required	Size of sample needed	Geographical area to which suited	Relative cost	Easy to explain to support workers?	Advantages compared with simple random
Simple random	Accurate and easily accessible	Better with over a few hundred	Concentrated if face-to-face contact required, otherwise does not matter	High if large sample size or sampling frame not computerised	Relatively difficult to explain	–
Systematic	Accurate, easily accessible and not containing periodic patterns. Actual list not always needed	Suitable for all sizes	Concentrated if face-to-face contact required, otherwise does not matter	Low	Relatively easy to explain	Normally no difference
Stratified random	Accurate, easily accessible, divisible into relevant strate (see comments for simple random and systematic as appropriate)	See comments for simple random and systematic as appropriate	Concentrated if face-to-face contact required, otherwise does not matter	Low, provided that lists of relevant strata available	Relatively difficult to explain (once strata decided, see comments for simple random and systematic as appropriate	Better comparison and hence representation across strata. Differential response rates may necessitate re-weighting

Source: Adapted from Saunders(2009)

This study did not restrict the population to specific subsets and therefore the choice of sampling design was restricted to simple random sampling for probability sampling or convenience sampling for non-probability sampling (as seen in Table 3.3). Sekaran and Bougie (2013, p. 247) defined simple random sampling as a sampling design in which every element of the population has an equal and known probability of being chosen. They noted that this type of sampling allows for the least bias as well the most generalisability but the process can be expensive and requires that the entire population list is available. Convenience sampling is the collection of information from the population who are available to supply it (Sekaran & Bougie, 2013, p. 252). This sampling design has low generalisability but is the most convenient, time and cost effective sampling method. Therefore convenience sampling with a population size of 85 was the sampling design used for this study

3.10. CONSTRUCTION OF INSTRUMENT

Sekaran and Bougie (2013, p. 149) listed three areas of focus for the questionnaire design/construction, with the first being the wording of the questions. They listed what the content of the questions should comprise, how the questions are worded, the type and sequencing of the questions as well as the consideration of personal data that is needed from respondents as important factors to consider.

The questionnaire was compiled and discussed with input and approval of the researcher's supervisor. (Appendix D). The content of the questionnaire was linked to each objective as follows:

- Determine the impact that standardised care processes have on reducing unnecessary care and costs – Questions 1, 3, 5, 7, 17.
- Evaluate the control of labour costs by management – Questions 4, 8, 12, 13, 16.
- Evaluate the influence that technology has on the business – Questions 2, 11, 15, 18, 19.
- Analyse the innovativeness of the delivery care model and the impact on healthcare – Questions 6, 9, 10, 14, 20.
- Details regarding the attributes of questionnaires are listed in Table 3.5 below.

- The consideration of these attributes included Population's characteristic, size of sample, the likely response rate, feasible length of questionnaire, time take to complete and collect all these attributes have materialised during the survey process in this study of the EThekwini managers.

Table 3.5: Main attributes of questionnaires

Attribute	*Internet- and intranet-mediated*	*Postal*	*Delivery and collection*	*Telephone*	*Structured interview*
Population's characteristics for which suitable	Computer-literate individuals who can be contacted by email, internet or intranet	Literate individuals who can be contacted by post; selected by name, household, organisation, etc.		Individuals who can be telephoned; selected by name, household, organisation, etc.	Any; selected by name, household, organisation, in the street etc.
Confidence that right person has responded	High if using email	Low	Low but can be checked at collection	High	
Likelihood of contamination or distortion of respondent's answer	Low	May be contaminated by consultation with others		Occasionally distorted or invented by interviewer	Occasionally contaminated by consultation or distorted/invented by interviewer
Size of sample	Large, can be geographically dispersed		Dependent on number of field workers	Dependent on number of interviewers	
Likely response rate[a]	Variable, 30% reasonable within organisations/via intranet, 11% or lower using internet	Variable, 30% reasonable		High, 50–70% reasonable	
Feasible length of questionnaire	Conflicting advice; however, fewer 'screens' probably better	6–8 A4 pages		Up to half an hour	Variable depending on location
Suitable types of question	Closed questions but not too complex, complicated sequencing fine if uses IT, must be of interest to respondent	Closed questions but not too complex, simple sequencing only, must be of interest to respondent		Open and closed questions, including complicated questions, complicated sequencing fine	
Time taken to complete collection	2–6 weeks from distribution (dependent on number of follow-ups)	4–8 weeks from posting (dependent on number of follow-ups)	Dependent on sample size, number of field workers, etc.	Dependent on sample size, number of interviewers, etc., but slower than self-administered for same sample size	
Main financial resource implications	Web page design, although automated expert systems providers are reducing this dramatically	Outward and return postage, photocopying, clerical support, data entry	Field workers, travel, photocopying, clerical support, data entry	Interviewers, telephone calls, clerical support. Photocopying and data entry if not using CATI.[c] Programming, software and computers if using CATI	Interviewers, travel, clerical support. Photocopying and data entry if not using CAPI.[d] Programming, software and computers if using CAPI
Role of the interviewer/ field worker	None		Delivery and collection of questionnaires, enhancing respondent participation	Enhancing respondent participation, guiding the respondent through the questionnaire, answering respondents' questions	
Data input[b]	Usually automated	Closed questions can be designed so that responses may be entered using optical mark readers after questionnaire has been returned		Response to all questions entered at time of collection using CATI[c]	Response to all questions can be entered at time of collection using CAPI[d]

Source: Adapted by Dillman (2007)

3.11. THE SAMPLING PROCESS

Sekaran and Bougie (2013, p. 244) designed the sampling process that allows for the sample to be constructed from the right elements, so that it can be used to generalise the characteristics of the population. This process starts with the definition/description of the population of the study.

3.11.1. Defining the target population

A target population was defined by Creswell (2014) as "all individuals, objects, events or substances that meet the sample criteria for inclusion in the research". The target

population for this study comprised the employees holding the junior and senior management positions at Ethekwini Hospital and Heart Centre during 2017. The number of employees in the management positions was 85 according to their payroll system.

3.11.2. Determining the sampling frame

Sampling is the statistical process of selecting a subset of a population of interest for purposes of making observations and statistical inferences about that population (Creswell, 2014). A sampling frame is where the sample is drawn from and can be considered as a list of all those within a population who can be sampled (Sekaran & Bougie, 2013). The study was based at Ethekwini Hospital and Heart Centre and therefore the population from which the sample was drawn was the employees who held junior and senior management positions at the hospital during the time of the study.

3.11.3. Selecting a sampling technique

The main goal of data collection is to ensure that the researcher is able to maximise precision, and collect the data in an accurate manner. As previously stated, there are two main types of sampling design, namely probability and non-probability sampling (Sekaran & Bougie, 2013).

3.11.4. Determining an appropriate sample size

Kothari (2011) defined sample size as the number of items that are selected from the population to make up the sample. Sekaran and Bougie (2013, p. 266) considered precision (which is the closeness of the estimate to the true population characteristics) and confidence (which is the certainty that the estimate will be found to be true for the population) in determining the sample size. Sekaran and Bougie (2013, p. 268) created a table that lists a guideline of sample sizes for specific population sizes.

The researcher decided to sample the entire population of 85 individuals. A final total of 52 individuals from the population of 85 took part in the survey.

3.11.5. Carrying out the sampling process

The research was conducted at Ethekwini Hospital and Heart Centre. Employees in the junior and senior management positions at Ethekwini Hospital and Heart Centre were the

required participants for the research. Data collection took place over a period of three weeks, from the 19th May 2017 till the 7th June 2017.

The respondents were advised and given the link on QuestionPro to conduct the survey. The literature review indicated that there is a gap or research that is lacking for an effective transformational cost reduction in private hospitals. This study attempted to identify reasons why, throughout the world, escalating healthcare costs are forcing healthcare systems to the brink of fiscal crisis.

3.12. DATA COLLECTION

Data collection is the task that starts when the research problem is defined and the research design is completed (Kothari, 2011). Sekaran and Bougie (2013, p. 113) listed two forms of data:

- Primary data is data which the researcher collects to address the specific research problem and which is sourced from individuals, focus groups and specific panels.
- Secondary data refers to data that already exists. This is sourced from company records or industry analysis.

The primary data collection methods, as listed in Wilson (2014), are as follows:

- Interviews. This is a common tool for business and management students for data collection and includes face-to-face, telephonic and focus group interviews.
- Questionnaires. This data collection method comprises a series of questions that are designed to illicit information suitable for achieving the objectives of the study. It includes postal, email, online or faxed questionnaires.
- Observation. This method is used mainly for qualitative research. It entails the observation and recording of subjects that are part of the study.

Kothari (2011) stated that questionnaires are used extensively for business and economic surveys and that an advantage of this data collection method is that the respondents have sufficient time to provide well thought out answers. Sekaran and Bougie (2013, p. 147) remarked that questionnaires are an efficient method of data collection for descriptive studies.

They further stated that questionnaires are considered less costly and time consuming; however, this method does suffer from large numbers of non-responses. The data collection method used for this study was a questionnaire. This method is the most effective seeing that interviewing or observing such a large number of individuals (sample of 357) is inefficient and time intensive. The types of instruments are personally administered questionnaires, mailed (postal, faxed or couriered) questionnaires as well questionnaires distributed through electronic means (Sekaran & Bougie, 2013, p. 147).

3.13. CHARACTERISTICS OF A QUESTIONNAIRE

3.13.1. Instrument

Personally administered questionnaires are best used when the research is restricted to a specific area allowing for the questionnaire to be administered and collected personally (Sekaran & Bougie, 2013, p. 147). The shortfall of this instrument is that the environment where the questionnaire is to be administered needs to be free of distraction for the respondents (Cooper & Schindler, 2014). Mailed questionnaires have the drawback of needing follow-up procedures for non-responses (Sekaran & Bougie, 2013, p. 148). The instrument of choice for this study was an electronic questionnaire. Advantages of electronic questionnaires can be seen by the ease of administering the questionnaire, the global reach of the questionnaire, the fast delivery as well as the cost effectiveness of the electronic questionnaire.

The question content and wording also need to consider certain factors, as suggested by Cooper and Schindler (2014), such as the following:

- Double-barrelled questions – Questions must not require multiple answers or too much information.
- Presumed knowledge – Questions must not assume prior knowledge that respondents may not have.
- Objectivity – The questions must not include the researcher's bias.
- Sensitivity – Questions should not ask respondents to reveal sensitive information about the person or the business.

Shared vocabulary – Questions should be structured to not have a different meaning for the respondent than for the researcher.

- Each participant enters their responses on the questionnaire, saving the researcher time, compared to the time required to conduct personal interviews.
- It is less expensive than conducting personal interviews.
- Respondents feel that they remain anonymous and can express themselves in their own words without fear of identification.
- Data on a broad range of topics may be collected within a limited period.

3.13.2. Administration of survey

The actual administration of the survey is the final stage of the data collection process. Saunders *et al.* (2009) suggested that for internet- or intranet-related questionnaires, a timetable should be created to identify tasks that are needed to be completed. They further suggested that follow-up emails should be sent after the survey has been sent to ensure that respondents who have not completed the questionnaire are reminded to complete this task.

The questionnaire for this study, the letter of consent, and a cover letter were created and sent using the online research tool, QuestionPro. The questionnaire was administered via email. Each respondent received a hyperlink to the questionnaire in their email Saunders *et al.* (2009). By selecting the hyperlink the respondents were directed to the QuestionPro website with the questionnaire loaded for their input.

3.14. DATA ANALYSIS

Sekaran and Bougie (2013, p. 276) stated that once the data has been collected, it must be coded, keyed in and edited before analysis can take place. They described coding as assigning a number to the respondents' responses and keying it in as the entry of the data into a database. The editing of the data allows for corrections if the data was coded incorrectly or the data entry was incorrectly performed (Saunders *et al*., 2009). Data editing also allows for data anomalies like blank responses or inconsistent data to be checked, followed up and corrected if necessary (Sekaran & Bougie, 2013, p. 279). The use of technology assists in the reduction of data handling errors and decreases time spent between data collection and analysis (Cooper & Schindler, 2014).

Using the online software tool, QuestionPro, the data for this study was automatically coded and captured when the respondents entered their data on the QuestionPro website. This is in line with the suggestion of Cooper and Schindler (2014) to use technology to

limit data handling errors. After the coding and any data editing, the data can be transferred to a statistical package like SPSS for analysis (Abdulai & Owusu-Ansah, 2014).

3.15. RELIABILITY AND VALIDITY

To ensure the credibility of a research finding, two particular areas need emphasis, those being reliability and validity (Saunders *et al*., 2009). According to Sekaran and Bougie (2013, p. 225), validity tests how well the instrument that is developed for the research study measures the concepts it is meant to measure and reliability tests how consistently the instrument measures the concepts it is meant to be measuring. They stressed the importance of reliability and validity of a research study seeing that this attests to the scientific rigour of the study. Cooper and Schindler (2014) classified validity into three forms:

- Content validity. This is the extent to which the measuring instrument provides sufficient coverage of the research questions that guide the study. This can be achieved through the use of a panel of individuals to judge the content validity of the instrument or through the judgment of the research designer.
- Criterion-related validity. This validity reflects how successful the measures that are used can predict or estimate. The criterion measures must be judged in terms of relevance, being free of bias, reliability and availability.
- Construct validity. The validity here evaluates the theory and the measuring instrument being used. This validity is established using convergent validity which is the degree to which one scale's score correlates with other scales that assess the same construct or discriminant validity were the scale's scores do not correlate with scores from scales that measure different constructs.

The research study questionnaire can be judged on content validity where the content of each question is linked to the objectives of the study.

According to Sekaran and Bougie (2013), reliability can be gauged through the stability of the measure (ability of the measure to remain unchanged over time) and the internal consistency of the measure (the homogeneity among items in the measure, which taps the construct). Stability can be tested by means of the following (Sekaran & Bougie, 2013, p 229):

- Test-retest reliability, in which a questionnaire is administered twice to the same set of respondents in the space of a few weeks with the correlated scores between the two times indicating stability of the measure over time.
- Parallel-form reliability, were two comparable measures that tap the same construct are highly correlated (8 and above).

Internal consistency of measures can be examined using the following (Sekaran & Bougie, 2013, p. 229):

- Internal consistency reliability which tests the consistency of the respondents' answers to all items in the measure. Cronbach coefficient alpha is the most popular test of internal consistency.Spilt-half reliability which indicates the correlation between two halves of the instrument.

The research study made use of Cronbach's alpha after the data had been collected.

3.16. PRETESTING THE QUESTIONNAIRE

According to Saunders *et al*. (2009), the questionnaire should be pilot tested prior to the questionnaires being used for data collection. They described the purpose of the pilot study as the refinement of the questionnaire such that the respondents will not have any issues answering the questions. This includes discovery of questions that are ambiguous or to determine that the questionnaire has not included major topics and that the instructions are clear and the layout of the questionnaire attractive. Cooper and Schindler (2014) stressed the importance of pretesting or pilot testing the questions before the start of the study as a means to improve the survey/questionnaire. They stated that pretesting allows for the discovery of ways to increase respondents' interest, being able to ascertain the engagement levels of the respondents, finding out problems in question content and wording (like discovering double-barrelled questions) and exploring improvements that can be made to enhance the quality of the data from the questionnaire. The pretesting or pilot study may be skipped if the research attempts to compress the research time frame (Cooper & Schindler, 2014).

3.17. BIAS

During the sampling process there is a possibility of sampling biases occurring. Sampling bias is consistent error that arises due to the sample selection. Sampling bias has the

potential to seriously undermine the integrity of data that is collected. The researcher took the necessary steps, which were developed by Fink (2013), to prevent or avoid sampling biases to affect the study.

3.18. ETHICAL CONSIDERATIONS

Permission to conduct the study at Ethekwini Hospital and Heart Centre was obtained from the Hospital Manager (Appendix A). Permission from each respondent was requested via an informed consent letter. Ethical clearance (Appendix B) was obtained from the University of KwaZulu-Natal.

3.19. CHAPTER SUMMARY

This chapter has described the chosen research design and methodology in detail and has justified the process chosen by the researcher. A quantitative method in the form of a questionnaire was used to investigate the research objectives. Data was then analysed by the means of descriptive and inferential statistics. Conclusions of the research are based on the information obtained by the descriptive and inferential statistics.

CHAPTER 4
PRESENTATION OF RESULTS

4.1. INTRODUCTION

The key findings of the research are summarised and discussed in this chapter. This chapter provides the analytics of the primary data collected. The data collection was performed as per guidelines listed in Chapter 3. The data collected from the responses to the questionnaire that was administered to the junior and senior management of Ethekwini Hospital and Heart Centre was analysed and presented in the form of descriptive and inferential statistics using the SPSS software package. The information obtained provided the researcher a basis to articulate the theory with regards to an approach to transformational cost reduction in a private hospital.

This chapter is divided into three different sections. The data collected in terms of frequencies, percentages, charts and descriptive statistics is presented in the first and second section. The third section reflects the inferential statistics. The sections that follow are linked to each objective of the study; thus the findings are related to objectives. The discussions of these results follow relevant prior research as explained in Chapter 2.

The reliability of the questionnaire was determined by the Cronbach Alpha coefficient.

4.2. PARTICIPATION

As mentioned previously, the researcher decided to sample the entire population of 85 individuals. A final total of 52 individuals from the population of 85 took part in the survey by attempting to complete the questionnaire.

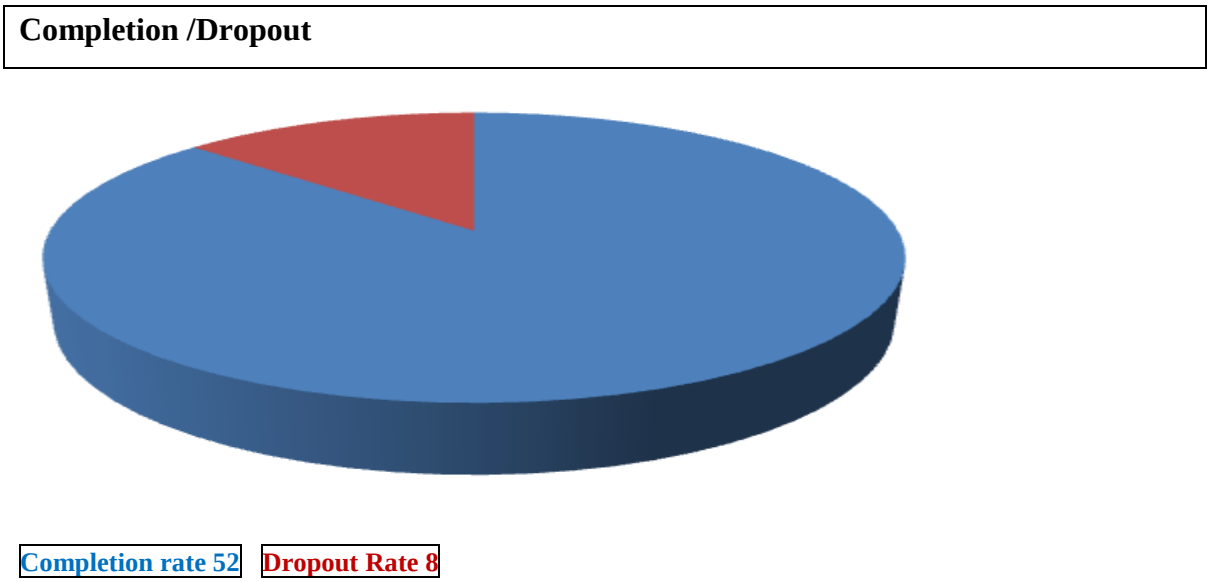

Figure 4.1: Final completion of questionnaire statistics

4.3. RESULTS

A total of 52 participants completed the self-administered questionnaire. The reliability analysis indicated that the data were reliable as the Cronbach's Alpha was 0.852 (Table 4.1).

Table 4.1: Reliability analysis output

Reliability statistics	
Cronbach's Alpha	N of Items
.852	20

Table 4.2 below shows the summary of the socio-demographic variables. It was found that three-quarters of the participants (75%) were older than 35 years, and more than two-thirds (69%) had a nursing qualification. Most of the participants (77%) were from the nursing department, and 79% had 10 or less years of experience.

Table 4.2: Summary of socio-demographic information

Demographic variables	Frequency	Percentage
Age group		
20 - 25	1	1.92%
26- 35	12	23.08%
36 - 45	14	26.92%
46 - 55	19	36.54%
55 or more	6	11.54%
Qualification		
Nursing	36	69.23%
Degree in Nursing	10	19.23%
MBA	0	0.00%
Doctorate	0	0.00%
Executive/Head of Division	6	11.54%
Current department		
Nursing	40	76.92%
Administration	1	1.92%
Pharmacy	1	1.92%
Facilities/Maintenance	1	1.92%
Management/Executive	9	17.31%
Period of employment in years		
0 - 5	24	46.15%
6 -10	17	32.69%
11 - 15	3	5.77%
16 - 20	3	5.77%
21 or more	5	9.62%

The following sections discuss how the questions/statements in the questionnaire were posed in order to obtain the participants' input and how this could contribute to answering each objective of the study.

4.3.1. Determine the impact that standardised care processes have on reducing unnecessary care and costs – Questions 1, 3, 5, 7, 17

To determine the impact that standardised care processes have on reducing unnecessary care and costs, a total of five Likert type statements were made for the respondents to comment on. The summary of the statements is shown in Figure 4.2 below. It was found that most of the participants agreed or strongly agreed to all the statements. For example,

about half of the participants (48%) strongly agreed that the ageing population and lifestyle disease increase hospital admissions, and almost all (48%) positively reported that there is growing concern that cost drivers affect business strategy in healthcare. The majority agreement concurs with the summation made by Kaiser (2012) the under lying chronic conditions, such as diabetes, lung and heart diseases, or hyper tension, are a few examples of diagnostic events that cost significant amounts of money to be treated and as much as 75 per cent of healthcare expenditures in the U.S. are related to chronic conditions. It is also understood that chronic conditions also exist more frequently in older people, thus this could burden any healthcare system. Just as the Kaiser (2012) report discusses obesity. Wagner (2009) agrees that obesity has doubled in adults and tripled in children in the last 20 years. It is commonly accepted that obesity increases the risk of a person needing healthcare services, thus further increasing the demand for healthcare. The PSH model also aims to improve the health of the defined population (Berwick *et al*., 2008) of older aging and chronic diseases, resulting in a higher morbidity and mortality rate. The PSH model seeks to reduce or control the per capita costs of care by implementing strategies to optimise clinical outcomes.

A similar summation by Richen and Steinhorst (2005) defined standardisation as generating identical business processes through all departments in the business. The risk of failure is decreased through repetitive standardised processes. Each business unit can share expenses and with the expansion business process management results in economies of scale. The aggregated mean from the five statements was found to be 1.82 which indicates that standardised care processes have a positive impact on reducing unnecessary care and costs.

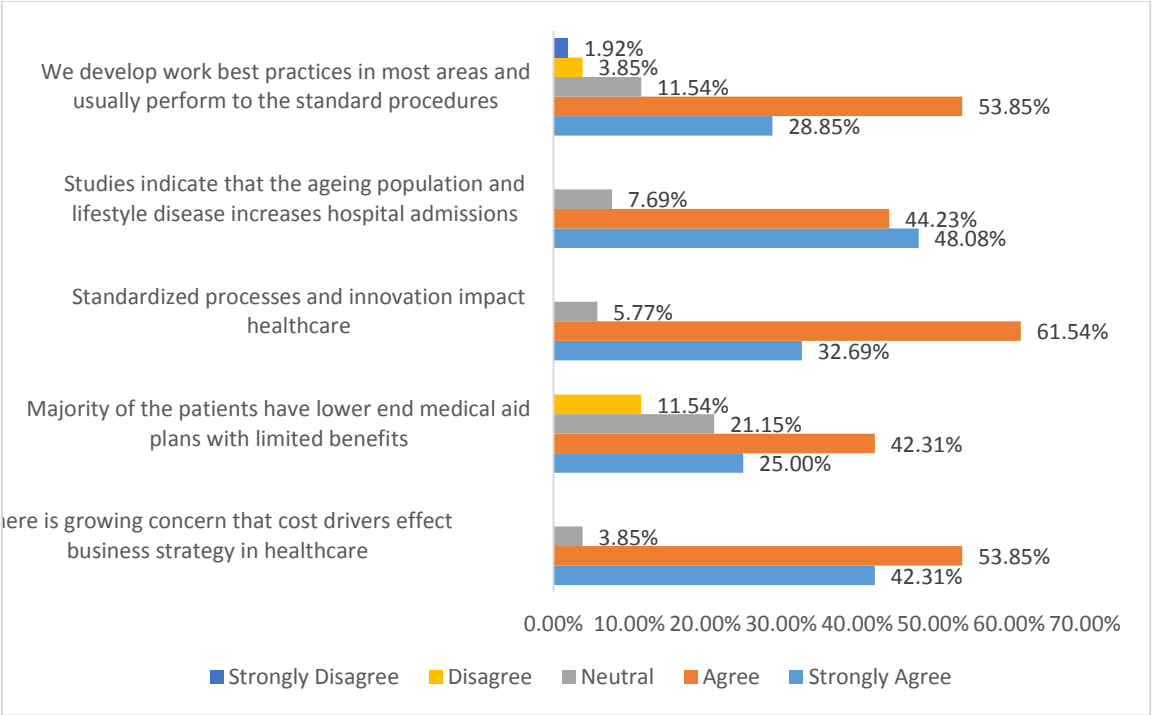

Figure 4.2: Statements regarding the effect of standardised care processes on reducing unnecessary care and costs

4.3.2. Evaluate the control of labour costs by management – Questions 4, 8, 12, 13, 16

To evaluate the control of labour costs by management, five statements were given for the participants to comment on. Results show that the majority of the participants responded positively to all the statements. About half of the participants (46% respectively) strongly agreed that salaries and skilled resources are major cost drivers in healthcare, accordingly to Rondganger (2013), the primary reason why KwaZulu-Natal is facing a chronic shortage of doctors and nurses could be the affordability of salaries; this was highlighted as one of major factors during a survey by the SA Institute of Race Relations. Another expert view was that the exodus of doctors leaving the country is born from poor treatment of and unrelated lower salaries while in the employ as interns during community service Child (2014). The representation of these results confirms the discussion adapted from the white paper (Healthcare Insights, LLC, 2014).

Studies indicate that the hospital acquired infections increase length of stay (Figure 4.3). The analysis is consistent with the literature by Klevens *et al*. (2007) quoted "65% to 70% of cases of catheter-associated bloodstream infection (CABSI) and catheter-associated

urinary tract infection (CAUTI) and 55% of cases of ventilator-associated pneumonia (VAP) and surgical site infection (SSI) are preventable with current evidence-based strategies. CAUTI may be the most preventable HAI; the number of avoidable infections ranges from 95,483 to 387,550 per year. The hospital costs of preventable VAP are estimated to be $2.19 billion to 3.17 billion dollars annually. Costs of preventable CAUTIs are estimated to be $115 million to $1.82 billion annually, and the costs of preventable SSIs are estimated to be $166 million to $345 million". This provides support to the survey that HAIs increase the length of stay, thereby increasing labour and hospital costs.

The aggregated mean from the five statements was found to be 1.80 which indicates that management controls the labour costs quite well.

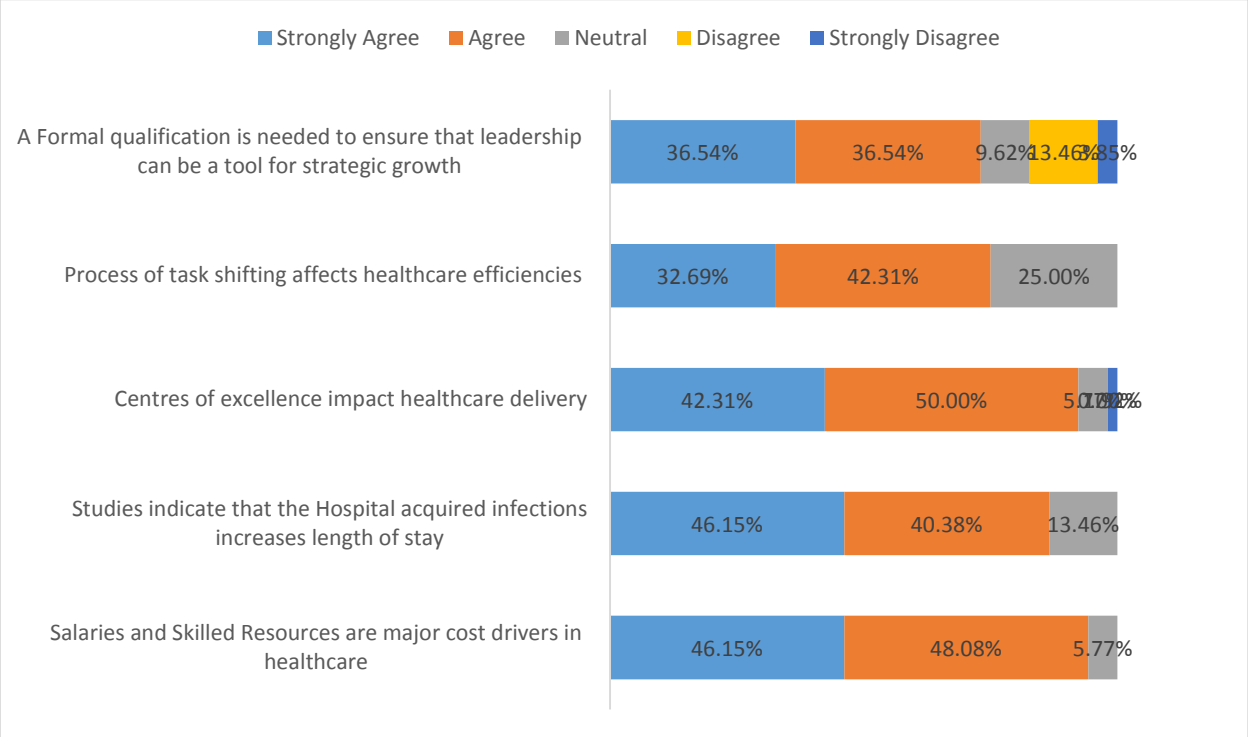

Figure 4.3: Statements regarding the control of labour costs by management

4.3.3. Evaluate the influence that technology has on the business – Questions 2, 11, 15, 18, 19

To evaluate the influence that technology has on the business, five statements were made for the participants comment on. The majority of the participants responded positively to all the statements. For example, half of the participants (50%) strongly agreed that medical aid companies have a significant impact on healthcare sustainability according Marivate

(2010), most funders are looking for innovative mechanisms to reduce cost for managed care because with the current reimbursement models, and 44% strongly agreed that innovation has a significant impact on healthcare processes (Figure 4.4). The aggregated mean from the five statements was found to be 1.78 which indicates that technology positively influences the business. This is in keeping with summation; Agartan (2012) argued that electronic medical records (EMRs) are indeed application environments of clinical data and clinical decision support systems. Therefore, adopting the use of IT will make a meaningful difference in the healthcare sector because IT can be used effectively to enable and support many aspects. A few examples are that IT can contribute to more effective medical processes and procedures, to more apt decision making, to better allocation of resources and to more timely and appropriate information regarding the needs of patients. The use of IT will thus ensure vastly improved healthcare services for all patients and enable smooth collaboration among the healthcare resources.

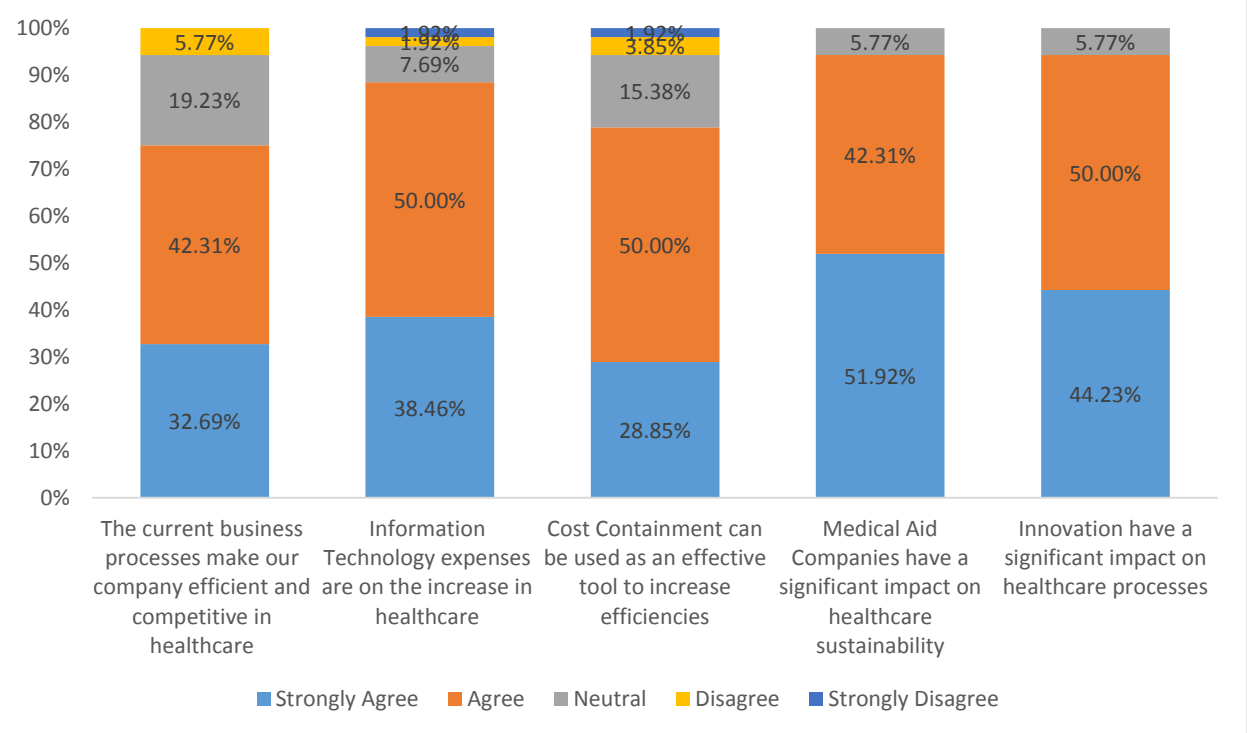

Figure 4.4: Evaluating the influence that technology has on the business

4.3.4. Analyse the innovativeness of the delivery care model and the impact on healthcare – Questions 6, 9, 10, 14, 20

To investigate the innovativeness of the delivery care model and the impact on healthcare, a total of five statements were asked to the participants. The majority of the participants responded positively to all the statements. For example, more than half of the participants (52%) agreed that limits on medical aid reimbursements from medical funders affect business profitability; the current managed care models are taking a strong stance for healthcare providers to take an active role in controlling their own care. According to McAuliff *et al* (2014), funders are seeking a connected network of providers based on reducing healthcare costs and this could have far reaching consequences for companies that do not get contracted to these networks, and 50% agreed that health delivery care innovation has a significant impact in controlling healthcare costs (Figure 4.5). Redefining a product with enhanced value: Perhaps one of the easiest ways to consider the implications and potential benefits of switching from a fee for service model of payment to a bundled payment model is to think about it from the perspective of a consumer of healthcare (Sood *et al*., 2011), rather than as a provider. Payers (insurers, employers, and patients themselves, with increasing personal financial responsibility) expect that all providers of care are examining each service in the care process or a bundle. The purpose, necessity, and value of managing the relevant clinical decision points are expected provisions. The aggregated mean from the five statements was found to be 2.04 which indicate that the innovativeness of the delivery care model impacts positively on healthcare. A few essential elements are necessary to start a successful bundled payment programme. New models of payment such as bundled payment are examples of healthcare delivery paradigms that emphasise collaboration to increase value.

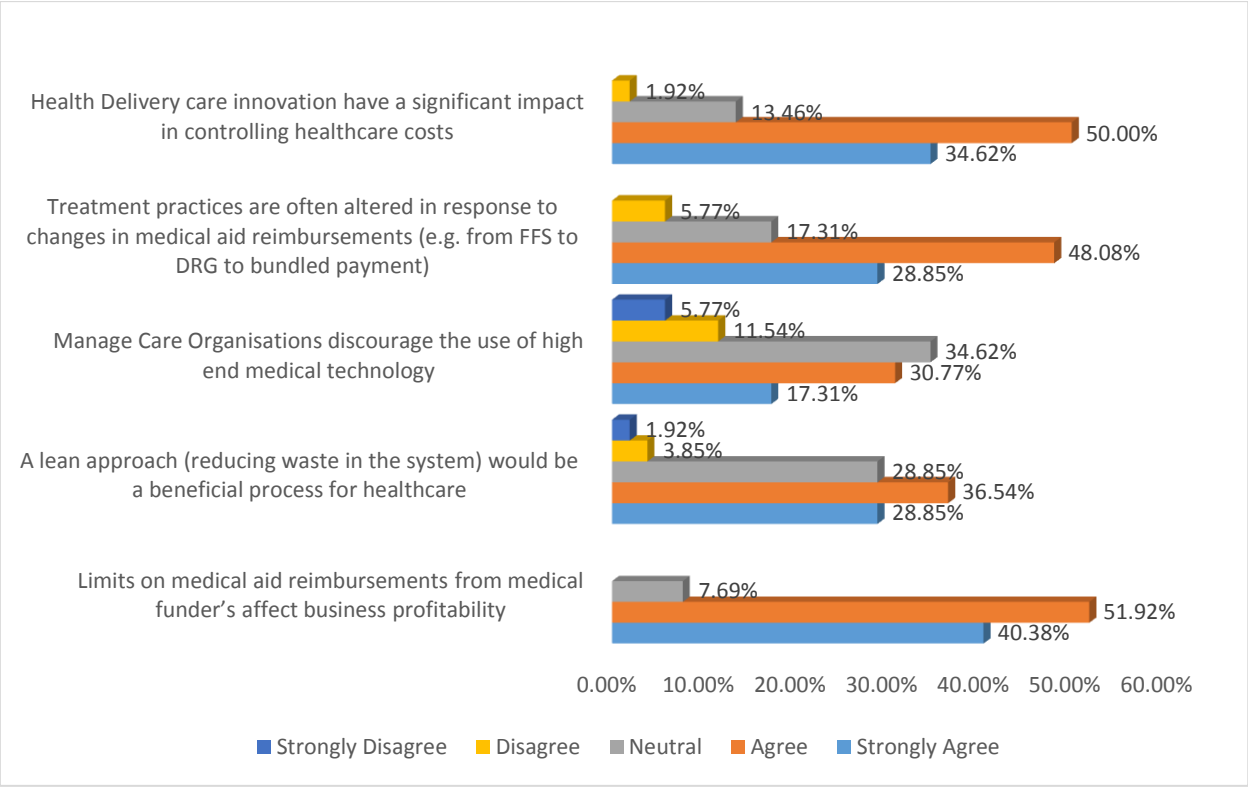

Figure 4.5: The innovativeness of the delivery care model and the impact on healthcare

4.3.5. Further analysis

With regards to construct 1, the descriptive analysis showed that all the statements had a mean score <2.5 which meant that more participants agreed or strongly agreed to all the statements. This information is indicative that all research objectives were met. The lowest mean value was 1.60 for the statement of "Studies indicate that the ageing population and lifestyle disease increase hospital admissions" The majority agreement concurs with the summation made by Kaiser (2012) as mentioned under standardised processes and ageing patient profile. "There is growing concern that cost drivers affect business strategy in healthcare" participants strongly agreed that salaries and skilled resources are major cost drivers in healthcare, according to Rondganger (2013), mentioned above under control of labour costs, having a mean value of 1.62.

Table 4.3: Descriptive statistics

	Mean	Std. Deviation
There is growing concern that cost drivers affect business strategy in healthcare	1.62	.565
Majority of the patients have lower end medical aid plans with limited benefits	2.19	.951
Standardised processes and innovation impact healthcare	1.73	.564
Studies indicate that the ageing population and lifestyle disease increase hospital admissions	1.60	.634
We develop work best practices in most areas and usually perform to the standard procedures	1.96	.862

KMO and Bartlett's test was conducted to find important factors from the construct. Result show that the data was adequate for factor analysis.

Table 4.4: Kaiser-Meyer-Olkin (KMO) and Bartlett's test

KMO and Bartlett's test		
Kaiser-Meyer-Olkin measure of sampling adequacy		.558
Bartlett's test of sphericity	Approx. Chi-Square	34.805
	df	10
	Sig.	.000

Results indicate that there were two components which could explain 60% variability of the construct. This concurs with summation by Richen and Steinhorst (2005) the standardised processes will allow for the business unit to meet its goals and budgets due to a systematic process being practised. Sturdy (2011) argued that management innovation is supported by specialists who endorse “new” ideas. This article debating innovation compared to standardisation alluded to standardisation suppressing innovative thinking. Most patients have lower end medical aid plans with limited benefits and this limit effects length of stay which affects quality of care given. According Marivate (2010), most funders are looking for innovative mechanisms to reduce cost for managed care because of the current reimbursement models.

Table 4.5: Total variance explained

Total variance explained						
Component	Initial eigenvalues			Rotation sums of squared loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	1.927	38.543	38.543	1.870	37.400	37.400
2	1.077	21.545	60.088	1.134	22.687	60.088
3	.952	19.032	79.120			
4	.682	13.634	92.754			
5	.362	7.246	100.000			
Extraction method: Principal component analysis.						

The two most important variables were "Standardised processes and innovation impact healthcare" show that Ethekwini managers suggest this to be most important component analysis, a similar summation to Richen and Steinhorst (2005) and "Majority of the patients have lower end medical aid plans with limited benefits" as they had the highest value concurs with Marivate (2010),

Table 4.6: Rotated component matrix

Rotated component matrix[a]		
	Component	
	1	2
There is growing concern that cost drivers affect business strategy in healthcare	.796	-.085
Majority of the patients have lower end medical aid plans with limited benefits	.093	.790
Standardised processes and innovation impact healthcare	.821	.324
Studies indicate that the ageing population and lifestyle disease increase hospital admissions	.743	-.047
We develop work best practices in most areas and usually perform to the standard procedures	-.040	.629
Extraction method: Principal component analysis. Rotation method: Varimax with Kaiser normalisation.		
a. Rotation converged in 3 iterations.		

With regards to construct 2, the lowest average values were for the following statements: "Medical aid companies have a significant impact on healthcare sustainability" followed

by “Innovation has a significant impact on healthcare processes” as 1.54 and 1.62 respectively. The descriptive analysis indicated that more participants agreed or strongly agreed with all the statements. The above constructs indicates the participants from Ethekwini were aware that all the statements below has an impact in cost reduction in private hospitals concurs with summation by Kaiser (2012)

Table 4.7: Descriptive statistics

	Mean	Std. Deviation
The current business processes make our company efficient and competitive in healthcare	1.98	.874
Information technology expenses are on the increase in healthcare	1.79	.825
Can cost containment be used as an effective tool to increase efficiencies?	2.00	.886
Medical aid companies have a significant impact on healthcare sustainability	1.54	.609
Innovation has a significant impact on healthcare processes	1.62	.599

KMO and Bartlett's test indicated that the data were adequate to run factor analysis.

Table 4.8: KMO and Bartlett’s test

KMO and Bartlett's Test		
Kaiser-Meyer-Olkin measure of sampling adequacy		.650
Bartlett's test of sphericity	Approx. Chi-Square	54.298
	df	10
	Sig.	.000

Results indicate that two of the statements could explain 64% of the variability of the constructs as they have an eigenvalue >1. It could be concluded from the analysis that the two most important statements from the constructs were “Medical aid companies have a significant impact on healthcare sustainability” this component analysis concurs with finding by Kaiser (2012) and “The current business processes make our company efficient and competitive in healthcare” this component analysis concurs to Business Process Management which gives a company’s best operating practice process advancement and progressive improvement. This uplifting could eliminate inefficiencies and reduce costs while

reducing wasted activities Kemsley (2015), as they had the highest value from the principal component analysis

Table 4.9: Total variance explained

Total variance explained						
Component	Initial eigenvalues			Rotation sums of squared loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	2.177	43.550	43.550	2.021	40.420	40.420
2	1.018	20.356	63.906	1.174	23.486	63.906
3	.934	18.679	82.585			
4	.614	12.277	94.862			
5	.257	5.138	100.000			
Extraction method: Principal component analysis.						

Table 4.10: Rotated component matrix

Rotated component matrix[a]		
	Component	
	1	2
The current business processes make our company efficient and competitive in healthcare	-.077	.852
Information technology expenses are on the increase in healthcare	.756	-.202
Can cost containment be used as an effective tool to increase efficiencies?	.241	.472
Medical aid companies have a significant impact on healthcare sustainability	.848	.260
Innovation has a significant impact on healthcare processes	.817	.343
Extraction method: Principal component analysis. Rotation method: Varimax with Kaiser normalisation.		
a. Rotation converged in 3 iterations.		

Descriptive analysis for construct 3 found that the following statements had the lowest average value: “Salaries and skilled resources are major cost drivers in healthcare” this component analysis concurs with summation by Rondganger (2013), followed by “Studies indicate that the hospital acquired infections increase length of stay” agrees with the analysis and is consistent with the literature by Klevens *et al*. (2007) The overall mean score was below two indicating more participants were in agreement with all the statements.

Table 4.11: Descriptive statistics

	Mean	Std. Deviation
Salaries and skilled resources are major cost drivers in healthcare	1.60	.603
Studies indicate that the hospital acquired infections increase length of stay	1.67	.706
Centres of excellence impact healthcare delivery	1.69	.755
Process of task shifting affects healthcare efficiencies	1.92	.763
A formal qualification is needed to ensure that leadership can be a tool for strategic growth	2.12	1.166

KMO and Bartlett's test found that the data were adequate for factor analysis.

Table 4.12: KMO and Bartlett's test

KMO and Bartlett's test		
Kaiser-Meyer-Olkin measure of sampling adequacy		.488
Bartlett's test of sphericity	Approx. Chi-Square	31.837
	df	10
	Sig.	.000

Principal component analysis identified three statements that could explain 79% of the variability of the constructs. The three most important statements were found to be "Process of task shifting affects healthcare efficiencies", a similar summation from Govindarajan and Ramamurti (2013). "Salaries and skilled resources are major cost drivers in healthcare" concurs with finding by (Child 2014) and "A formal qualification is needed to ensure that leadership can be a tool for strategic growth" as they had the highest value from the analysis links with the findings that respondents agreed in some form or another that a formal qualification for a manager or leader is needed to for strategic growth. Schultz *et* al. (cited in Schmitt 2012), debated the issue of a type of qualification (business degree or medical degree) needed for a successful leader in healthcare. Their conclusion was that none of the two (business degree or medical degree) should play prejudice the selection of the candidate with the consistent factor of an educational qualification being the crucial factor

Table 4.13: Total variance explained

Total variance explained						
Component	Initial eigenvalues			Rotation sums of squared loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	1.866	37.323	37.323	1.470	29.396	29.396
2	1.082	21.641	58.964	1.394	27.877	57.273
3	1.002	20.031	78.995	1.086	21.722	78.995
4	.664	13.279	92.274			
5	.386	7.726	100.000			
Extraction method: Principal component analysis.						

Table 4.14: Rotated component matrix

Rotated component matrix[a]			
	Component		
	1	2	3
Salaries and skilled resources are major cost drivers in healthcare	-.061	.890	.192
Studies indicate that the hospital acquired infections increase length of stay	.404	.757	-.176
Centres of excellence impact healthcare delivery	.803	.157	.248
Process of task shifting affects healthcare efficiencies	.809	.036	-.114
A formal qualification is needed to ensure that leadership can be a tool for strategic growth	.054	.046	.972
Extraction method: Principal component analysis. Rotation method: Varimax with Kaiser normalisation.			
a. Rotation converged in 4 iterations.			

With regards to construct 4, the descriptive analysis showed that the lowest average value was found for the following statements: “Limits on medical aid reimbursements from medical funder’s affect business profitability” and “Health delivery care innovation has a significant impact in controlling healthcare costs respectively”. Overall, more participants responded positively to all the statements. The participants responded positively to higher mean value of 2.13 “A Lean approach (reducing waste in the system) would be beneficial process for healthcare concurs with Cookson *et al*(2011) concurs that “Lean Thinking” is a philosophy and a management culture which can be used as a driver for process improvement that relies on waste reduction and seamless flow within a system.

Table 4.15: Descriptive statistics

	Mean	Std. Deviation
Limits on medical aid reimbursements from medical funders affect business profitability	1.67	.617
A lean approach (reducing waste in the system) would be a beneficial process for healthcare	2.13	.950
Managed care organisations discourage the use of high end medical technology	2.58	1.091
Treatment practices are often altered in response to changes in medical aid reimbursements (e.g. from FFS to DRG to bundled payment)	2.00	.840
Health delivery care innovation has a significant impact in controlling healthcare costs	1.83	.734

KMO and Bartlett's test found that the data were adequate for factor analysis.

Table 4.16: KMO and Bartlett's Test

KMO and Bartlett's Test		
Kaiser-Meyer-Olkin measure of sampling adequacy		.717
Bartlett's test of sphericity	Approx. Chi-Square	57.438
	df	10
	Sig.	.000

Principal component analysis identified two statements that could explain 70% of the variability of the constructs. The two most important statements were found to be "Health Delivery care innovation has a significant impact in controlling healthcare costs" Studies by Govindarajan and Ramamurti (2013) concur with the statements above and have revealed that in India, higher volumes of patients have ignited innovation into pioneering the "beating heart method of surgery", without shutting down the patient's heart. This cardiac surgery is performed without using the very expensive heart lung machine which is routinely used in most other countries of the world. This method has resulted in fewer complications, thus reducing length of stay in hospitals, which directly impacts reduced hospital acquired infections, thus increasing the time for recovery.

Table 4.17: Total variance explained

Total variance explained						
Component	Initial eigenvalues			Rotation sums of squared loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	2.433	48.666	48.666	2.186	43.726	43.726
2	1.049	20.977	69.643	1.296	25.917	69.643
3	.629	12.575	82.219			
4	.528	10.557	92.776			
5	.361	7.224	100.000			
Extraction method: Principal component analysis.						

"Managed care organisations discourage the use of high end medical technology" as they had the highest value from the analysis. Many respondents agreed that new medical technology inflates expenses in healthcare. Rettig (cited by Goyen et al, 2008), concurs that technology increases costs because of the development of new treatments for previously untreatable inoperable conditions, including long-term therapy for treatment of such diseases as diabetes, end-stage renal disease, and AIDS. Szczerba & Huesch (2012), argue that this could be seen as the "treatment expansion effect".

Table 4.18: Rotated component matrix

Rotated component matrix[a]		
	Component	
	1	2
Limits on medical aid reimbursements from medical funders affect business profitability	.821	-.144
A lean approach (reducing waste in the system) would be a beneficial process for healthcare	.608	.567
Managed care organisations discourage the use of high end medical technology	.008	.934
Treatment practices are often altered in response to changes in medical aid reimbursements (e.g. from FFS to DRG to bundled payment)	.674	.228
Health delivery care innovation has a significant impact in controlling healthcare costs	.830	.171
Extraction method: Principal component analysis. Rotation method: Varimax with Kaiser normalisation.		
a. Rotation converged in 3 iterations.		

Spearman's rho correlation test was conducted to find a relationship among the constructs. Results show a significantly positive correlation exists among the constructs ($p<0.05$). This means there is satisfactory reliability of results and all research objectives has been met.

Table 4.19: Correlations

Correlations						
			objective1	objective2	objective3	objective4
Spearman's rho	objective1	Correlation coefficient	1.000	.580**	.376**	.567**
		Sig. (2-tailed)	.	.000	.006	.000
		N	52	52	52	52
	objective2	Correlation coefficient	.580**	1.000	.511**	.782**
		Sig. (2-tailed)	.000	.	.000	.000
		N	52	52	52	52
	objective3	Correlation coefficient	.376**	.511**	1.000	.525**
		Sig. (2-tailed)	.006	.000	.	.000
		N	52	52	52	52
	objective4	Correlation coefficient	.567**	.782**	.525**	1.000
		Sig. (2-tailed)	.000	.000	.000	.
		N	52	52	52	52
**. Correlation is significant at the 0.01 level (2-tailed).						

4.4. CHAPTER SUMMARY

Chapter 4 presented the data and discussed the results that had been analysed. The data collected by the researcher was reliable and the questionnaire developed was aligned appropriately to obtain the information required to meet the researcher's objectives.

The discussion has highlighted the reasons for an approach to transformational cost reduction in a private hospital. Moreover, it has been shown that there is a positive correlation relationship occurring between the levels of awareness of an approach to transformational cost reduction in a private hospital. Thus, by improving the awareness level of transformational cost reduction in the hospital, the effectiveness of the cost containment will improve.

The next chapter presents the researcher's key findings, based on the review of literature for this study. It also states the limitations of this research as noted by the researcher. Furthermore, Chapter 5 also offers suggestions of possible research that can be developed from this study and lastly it presents the researcher's recommendations for Transformational cost reduction in the hospital and the final conclusion that has been reached in this study.

CHAPTER 5
DISCUSSION

5.1. INTRODUCTION

This chapter provides a discussion of the research findings for this study. The interpretation and explanations of these findings, in conjunction with readings, case studies, company reports and previous research conducted both locally and internationally. The purpose of examining previous works and research is to either refute or concur with the findings of this study in order to make more meaningful contributions to the business, consumers, society and to provide a framework for extensive future research into this field.

5.2. KEY FINDINGS AND DISCUSSION

Key findings from the four objectives that was the focal point of this study are:

5.2.1. Objective 1- Determine the impact that standardised care processes have on reducing unnecessary care and costs

- A similar summation by Richen and Steinhorst (2005) defined standardisation as generating identical business processes through all departments in the business. The risk of failure is decreased through repetitive standardised processes. Each business unit can share expenses and with the expansion business process management results in economies of scale. The aggregated mean from the five statements was found to be 1.82 which indicates that standardised care processes have a positive impact on reducing unnecessary care and costs.
- Sturdy (2011) argued that management innovation is supported by specialists who endorse "new" ideas. This article debating innovation compared to standardisation alluded to standardisation suppressing innovative thinking. That is thinking as opposed to standard approaches however according to Radnor *et al*(2009), the adoption of a Lean philosophy could create many challenges that hospitals may experience.
- During a comprehensive study by Radnor *et al* (2009), they identified five readiness factors critical for implementation which are:
- "Linking Lean with the overall strategy of the hospital".

- "Understanding the different customer groups that a ward, department or a hospital has and what is valued by each of these customer groups".
- "Taking an end-to-end process view when undertaking improvement projects".
- "Matching demand and capacity levels across the hospital".
- "Having trained staff, providing opportunity for them to be engaged in improvement activities/Lean projects and recognizing/rewarding their efforts".
- "Matching demand and capacity levels across the hospital".
- "Having trained staff, providing opportunity for them to be engaged in improvement activities/Lean projects and recognizing/rewarding their efforts".
- Farsi *et al* (2014) conclude that "Lean Thinking", has proved to be an invaluable asset in the cost containment area of healthcare operations globally. Their pilot project "to demonstrate how the principles of Lean Thinking can be applied to Oman's healthcare sector" can result in more efficient healthcare but most importantly it improves patient care for the residents of Oman.
- Hub & Spoke – Rural Healthcare Service delivery, exemplar Indian hospitals created a spoke facility around urban hubs Govindarajan and Ramamurti (2013)
- Sophisticated technology at centre of excellence, Govindarajan and Ramamurti (2013), in an aim to reduce cost expensive hospital equipment are not fitted in the individuals hospitals instead they are installed only in centres of excellence.
- Process of promoting innovation that suits local conditions Govindarajan and Ramamurti (2013), "beating heart method of surgery" without shutting down the heart, reduces costs by R6 million rands as the heart lung machine is not required promoting innovative surgical technique.
- Process mapping depicts a core process of care Quinn (2016). The clinical process team will evaluate and analyse the process flowcharts for their own centres. This will create a visual display of current work processes and assist with improvement in clinical and financial performance.
- The aim of the electronic whiteboard in the operating theatre, according to Boodman (2011), is to enforce greater compliance with the standardisation of preoperative safety practices which has indicated a decrease in preventable complications, deaths

and incorrect surgeries. The Joint Commission International established the Universal Protocol to reduce wrong site, wrong procedure, and wrong person surgeries.

- Standardised clinical assessment and management plans (SCAMPS) are intended to reduce variation and improve care, agued Farias, Jenkins, Lock, Rathod, Newburger *et al.* (2013). The conventional clinical practice guidelines have drawbacks that can limit clinician buy-in. In contrast, SCAMPs offer a clinician-designed and driven approach that accommodates localised individual and population patient differences, respects local providers' clinical acumen, and keeps pace with the rapid growth of medical knowledge.

5.2.2. Objective 2- Evaluate the control of labour costs by management

- Process of task shifting, re-engineered business process by shifting tasks to lower level people with matching skills and with basics required for this task. Govindarajan and Ramamurti (2013), using training of village girls to become "vision technician" this process immediately allows for reduction in salaries due to cheaper lower level staff costs.
- Aravind's Eye Care System of task shifting incorporate paramedics in theatres to carry out a scope of duties normally done by a high paid, short skilled resource. This approach contributes to upskilling of their paramedics and promoting cost efficiencies in their theatre.
- An extreme form of task shifting is self-service, where patients and family members surmount tasks traditionally performed by hospital staff. At the NH hospital in Mysore, for instance, family members provide non-ICU (intensive care unit) postoperative care. As with other kinds of task shifting, prosperity mainly depends on opportune training. Working with Stanford University, NH developed a four-hour audio and video curriculum that explicates how to care for patients during the three days following heart surgery. Sanctioning family members who provide those services, reduces costs, allows for personalised care, and ascertains continuity of care at home, reducing postsurgical complications.

- According to Brimmer (2013), labour costs account for 60% of healthcare operating budgets. It is currently high priority to manage labour costs while improving patient care and maintaining quality.
- Accordingly to Rondganger (2013), the primary reason why KwaZulu-Natal is facing a chronic shortage of doctors and nurses could be the affordability of salaries; this was highlighted as one of major factors during a survey by the SA Institute of Race Relations. Another expert view was that the exodus of doctors leaving the country is born from poor treatment of and unrelated lower salaries while in the employ as interns during community service (Child, 2014).

5.2.3. Objective 3 - Evaluate the influence that technology has on the business

- Agartan (2012) further argued that electronic medical records (EMRs) are indeed application environments of clinical data and clinical decision support systems. This enables controlled medical vocabulary, order entry; computerised order entry; and pharmacy and clinical documentation applications to support patient care and provide healthcare professionals with tools to document monitor and manage healthcare delivery. EMRs is the support and backbone to computerised health information systems. EMRs can effectively reduce medical errors and contribute to improving the quality and efficiency of patient health. There are implementation barriers to EMRs, namely financial, organisational or behavioural and technical.
- Goyen*et* al (2008) confers that the term medical technology, "refers to procedures, equipment, and processes by which medical care is delivered. Hence medical technology innovations can relate to new medical and surgical procedures (e.g., angioplasty, joint replacement), the discovery of new drugs (e.g., biological agents), the implementation of healthcare IT systems (e.g,electronic medical records and transmission of information, telemedicine) and the development of new medical devices as (e.g., PET/CT systems, MRI/PET systems)".
- Slade & Anderson (2001), argue that there is consensus among health economists, that a big proportion of the increase in health expenses is incurred on new medical technologies. In totality the proportions on advancing technology spend equates to half of the healthcare expenditure with the balance of the other cost drivers making up the balance of expenditure in healthcare services (Civan& Köksal, 2010).

- Rettig (cited by Goyen et al, 2008), "describes the process by which new and advancing medical technology affects healthcare costs could be seen new development of new treatments for previously untreatable inoperable conditions, including long-term therapy for treatment of such diseases as diabetes, end-stage renal disease, and AIDS.

5.2.4. Objective 4 - Analyse the innovativeness of the delivery care model and the impact on healthcare

- The Perioperative Surgical Home model also aims to improve the health of the defined population of older age and chronic disease associated with greater morbidity and mortality. The PSH model seeks to reduce or control the per capita costs of care by implementing strategies to optimise clinical outcomes.
- Indian Healthcare delivery model, a study conducted by Govindarajan and Ramamurti (2013) argued that innovation was the key to healthcare delivery and that this facilitated Narayana Health to have the innovativeness to contract a US company, TriMedx, to double the life of their diagnostic equipment. The strategy was comprised of carefully planning a thorough maintenance and repair schedule to avoid unbudgeted costs. The true innovation stemmed from re-using the single use products. NH hospital sterilised and reused medical devices and ensured stringent adherence to sterilisation procedures.
- Bundling: A Systematic approach Redefining a product with enhanced value Perhaps one of the easiest ways to consider the implications and potential benefits of switching from a fee for service model of payment to a bundled payment model is to think about it from the perspective of a consumer of healthcare (Sood, Huckfeldt, Escarce, Grabowski, & Newhouse, 2011), rather than as a provider. Payers (insurers, employers, and patients themselves with increasing personal financial responsibility) expect that all providers of care are examining each service in the care process or a bundle. The purpose, necessity, and value of managing the relevant clinical decision points are expected provisions. New models of payment such as bundled payment are examples of healthcare delivery paradigms that emphasise collaboration to increase value.
- According to Sood et al (2011) Gain-sharing is one mechanism that can be used to assist in delivering collaboration among physicians and hospitals. It is a process or

programme that aligns the incentives of hospitals and physicians to improve the fiscal performance of the hospital and reward physicians for their effort. The DOH and Services Office of the Inspector General define gain sharing as "an arrangement in which a hospital gives physicians a percentage share of any reduction in the hospitals costs for patient care attributable in part to the physicians' efforts". Gain-sharing programmes are about saving money for hospitals and rewarding physicians for achieving the savings.

- Physician participation: Physician participation in gain-sharing programmes can be through hospital purchasing programmes or hospital cost-saving programmes. In hospital purchasing programmes, physicians assist hospitals in negotiations with vendors regarding the cost of supplies, devices, implants, and drugs Sood et al (2011). Physicians can also participate in hospital cost-savings programmes that improve efficiency and cost effectiveness such as clinical pathways. When physicians participate in these hospital cost-saving programmes, they achieve an indirect reduction of hospital costs.
- Physician re-imbursement: Physician reimbursement for participating in hospital gain-sharing programmes can be by payment of a percentage of dollar savings, payment for time worked, or payment for specific work completed Sood et al (2011). Physicians can be reimbursed with benefits "in lieu of payment" such as increased hospital space, new equipment, and supplies, hospital assistance in the form of physician assistants, nurse practitioners, orthopaedic technicians, and hospitals can share the recruiting costs for new physicians. Physicians can be reimbursed by earning a negotiated portion of bundled payments that are given to the hospital for the service delivered by the hospital and the physician.
- Hospital interest: Hospitals are interested in gain sharing because hospital operating margins are decreasing Sood et al (2011). Physicians generate costs for hospitals and therefore they can control costs. Hospital costs depend on physician orders and physician activity. In most healthcare financing schemes, physicians have no incentive to control hospital costs. One rationale for implementing gain-sharing programmes is to create incentives for physicians to help control hospital costs
- AAOS response: In 2006, the American Academy of Orthopaedic Surgeons (AAOS) issued a position statement on gain-sharing programmes (Healy, 2006). The AAOS

encouraged orthopaedic surgeons to be knowledgeable regarding medical costs and to collaborate with hospitals on cost containment and quality improvement. The (AAOS) supported hospital purchasing programmes and hospital cost-savings programmes. The AAOS also opposed direct physician payments for participation in gain-sharing programmes and favoured indirect payments to physicians to enhance patient care. In addition, the AAOS expressed opposition to gain sharing if quality of patient care might be compromised, or if restrictions on physician choice of supplies or devices were implemented; they also encouraged orthopaedic surgeons to be objective regarding valid evidence-based measures to evaluate technology. In summary, the AAOS stated that gain sharing can create conflicts of interest for orthopaedic surgeons and conflicts must be resolved in favour of patients.

- Government response: Gain-sharing programmes were included in the CMS Medicare Acute Care Episode (ACE) Demonstration in 2009. In 2010, (Healy, 2006) gain-sharing demonstrations were included in the Patient Protection and Affordable Care Act (PPACA). Gain-sharing programmes were allowed to create savings for hospitals if participation in the programmes was voluntary and not coerced; if quality, efficiency and patient satisfaction were measured and methods for improvement were included; and if the programme was completely transparent to all stakeholders.

- Studies indicate that the hospital acquired infections increase length of stay (Figure 4.3). The analysis is consistent with the literature by Klevens *et al*. (2007) quoted "65% to 70% of cases of catheter-associated bloodstream infection (CABSI) and catheter-associated urinary tract infection (CAUTI) and 55% of cases of ventilator-associated pneumonia (VAP) and surgical site infection (SSI) are preventable with current evidence-based strategies. CAUTI may be the most preventable HAI; the number of avoidable infections ranges from 95,483 to 387,550 per year. The hospital costs of preventable VAP are estimated to be $2.19 billion to 3.17 billion dollars annually. Costs of preventable CAUTIs are estimated to be $115 million to $1.82 billion annually, and the costs of preventable SSIs are estimated to be $166 million to $345 million". This provides support to the survey that HAIs increase the length of stay, thereby increasing labour and hospital costs.

- Meyer (2011) argued that Accountable care organisations (ACOs) are an extension of the medical home model. The process in ACOs is where groups of physicians,

healthcare providers, and hospitals are aligned to give well-coordinated, high-quality care to their patients both inside and outside the hospital. This model ensures that the patient gets the right care at the right time; with coordinated care, unnecessary duplication of services is avoided reducing healthcare costs.

- Value-based purchasing is a fund devised by the medical aid that measures the outcomes received by service providers before a service provider is paid (Porter, 2009). The patients score the service providers and by measuring and tracking an inpatient quality report programme. For value-based purchasing, a set amount of money will be moved around as penalties and incentives (i.e. some hospitals will be reimbursed at lower rates, whereas others will be eligible for bonuses).
- Hospital readmissions represent a huge health and financial toll. Stone and Hoffman (2010) quoted that "19.6% of Medicare fee-for-service beneficiaries who had been discharged from a hospital were readmitted to the hospital within 30 days, 34.0% within 90 days, and more than half (56.1%) within one year of discharge. In addition, the Medicare Payment Advisory Commission (MedPAC) found that 17.6% of hospital admissions resulted in readmissions within 30 days of discharge, 11.3% within 15 days, and 6.2% within seven days. Readmissions are a costly component of Medicare-covered hospital services, with Med PAC reporting that readmissions within 30 days accounted for $15 billion of Medicare spending.
- In the quest for cost containment, it is essential to balance care for treatment of acute conditions with care for prevention and treatment of chronic conditions (Barker, Gout & Crowe, 2011). Nutrition is an important factor for both acute and chronic conditions. Malnutrition can be seen to be a contributing cause or a consequence of many disease conditions. Discussion on hospital malnutrition often concentrates on disease related under nutrition, but health and financial consequences of over nutrition are equally important. Just as the Kaiser (2012) report discusses obesity. (Wagner 2009) agrees that obesity has doubled in adults and tripled in children in the last 20 years. It is commonly accepted that obesity increases the risk of a person needing healthcare services, thus further increasing the demand for healthcare in the U.S.

5.3. CHAPTER SUMMARY

This chapter is a summation of the aims and objectives the study intended to achieve, the data collected conclusively supports the results collected from the participants in the survey. There has been a unanimous agreement with the objectives, by way of the strongly agree and agree percentages being the highest score of the component analysis thus verifying all objectives for the study have been met.

CHAPTER 6
CONCLUSION AND RECOMMENDATIONS

6.1. INTRODUCTION

This chapter provides a comparative study of the literature reviewed, and an interpretation of the findings in conjunction with readings, case studies company reports and previous research both locally and internationally. The purpose of examining previous works and research is either to refute or concur with the findings of this study in order to make more meaningful contributions to the business, consumers, society and to provide a framework for more extensive research into this field.

6.2. CONCLUSION

The results and presentation and discussion of results in Chapter 4 have surmised that research objectives have been met; confirmation from the survey and the Cronba Alpha survey confirms the validity and reliability of the research results.

6.3. IMPLICATIONS OF THE RESEARCH

The policy makers, government, medical aids, managed care companies, and all stakeholders in the private healthcare sector have a responsibility in stabilising health reform to a sustainable level for the whole population. There are enough research findings that can be adopted to transform from dwindling margins and revenue to profitability once again. However, key is the low cost models, cost reductions from standardised processes, labour costs, full implementation of IT, E-health and electronic medical records as well as the innovative delivery care models. Gain sharing and bundled payments are the catalyst to affordable healthcare for all with improved outcomes and quality.

6.4. LIMITATIONS OF THE RESEARCH

During the research process, the researcher had little influence or control over the research environment. Elements of collusion and discussion of answers to survey questions can also present themselves as limitation of the study. These may be seen as shortcomings that place restrictions on the researcher's methodology and conclusions.

The researcher was able to conduct the survey and gain results to support the objectives; however, there were some limitations.

The research was conducted in a hospital environment amongst lower to senior management. These employees, due to 24-hour operations, have full work schedules; their free time is limited to the nature of business, caring for the sick people. Therefore, the researcher chose a quantitative method using the survey instrument as it is the simplest method to collect data from such a sample of employees.

The researcher was aware that there are weaknesses associated with the use of a survey. Firstly, it does not allow for an in-depth analysis of the problem. Secondly, there was the possibility of bias occurring during drafting of the questionnaire through the self-selecting nature of respondents, the period during design of questionnaire and when the survey was conducted.

The research was limited only to Ethekwini Hospital and Heart Centre and is not the reflection or opinions of other private hospitals or public hospitals. Therefore it does not provide a holistic view.

6.5. RECOMMENDATIONS TO SOLVE THE RESEARCH PROBLEM

The following sections provide recommendations for each of the study's objectives and key findings with the theory source from Chapter 5:

Objective 1: To determine the impact that standardised care processes have on reducing unnecessary care and costs

- Standardised processes should be adopted across the spectrum of the hospital environments, as this will reduce costs and result in best practices that will create efficiencies.
- Facilities have energy consumption performance metrics, such as an Environmental Protection Agency's rating to measure savings through electricity and water. Energy saver bulbs, LED lighting, minimise usage, thus enabling savings.
- Fitment of special flow shower heads, water pressure restrictors, transforming to heat pumps from geysers – these standardised processes in hospitals contribute largely to cost containment. Further savings can be measured in megawatts through the elimination of pumps in chilled water cooling units by transforming them from a primary-secondary-tertiary chilled water pumping system to a variable primary system.

- For occupancy adjustments that occur sporadically, this study recommends the use of controls that allow scheduling. In the operating theatre when not in use, savings can result by reducing the air changes per hour from 15-20 down to eight between 10pm and 6am. An affordable solution for the irritating noise of air handler units whenever bearings and motor end bell brackets fail, is to merely replace brackets and bearings instead of replacing motors due to bad bearings and worn out brackets.
- Another way to save in the mechanical department is to ensure routine maintenance and upkeep of equipment which will maximise efficiency and life.
- A waste management standardised process for legal compliance from cradle to grave is essential as non-compliance to dumping of medical waste results in large fines.
- Although there is a structured process during handover and the accountability is placed on shift leaders or registered nurses, for reduction in complications and goods, it is necessary to refute this research finding as private hospital practices reveal low compliance with the current handover tool. Although a Situation, Background, Assessment, Recommendation (SBAR) report exists for handover and the information is recorded, important information is lost between shift changes; patient condition is not timeously communicated to doctors resulting in tests not conducted; doctors' orders are not carried out, sometimes to detriment of patients, resulting in increased hospital stay and costs. Further research is required.
- 'Time out' procedures in theatre involve the novel whiteboard and once all categories have been checked and ticked, the categories change to green indicating that it is safe to proceed with surgery. There is low compliance with this, based on the research findings. In reality, all the blocks ticked does not guarantee that the tasks have been done – often due to human error. Therefore, it is still found that sometimes the wrong site is used, or wrong surgeries are performed, resulting in increased hospital costs, litigation, and remedies needed to perform correct site surgery. Further research relating to this study is recommended to bridge the gap of maintaining consistency in standardised processes, conscientiously and practically.
- "Lean" is actually the best alternative to staff reduction. It's all about encouraging everyone to participate in process improvement.
- An "adverse event" includes falls, infections, erroneous amputations and other small-to-large-scale disasters. Reducing these events is best for patients, but there's also

financial pressure to reduce adverse events. Pressure ulcers and bedsores, for example, are viewed as preventable. They shouldn't happen if a standardised process is followed, like patients being repositioned. Improving quality in general saves hospitals more so than by staff reductions since "adverse events" occur when an understaffed hospital cannot be attentive enough the patients' needs.

- It is important to consider looking at supply chain improvements such as a more effective material restocking process. For example, more frequent smaller batch deliveries or rotating supplies more quickly reduces both the amount of space used in internal warehouse and cash tied-up in inventory. The exemplar Indian hospital implemented shorter length sutures after studying the wastage by surgeons after each procedure. They established their own subsidiary to manufacture medical products.
- A trend in the last few years has shown that hospitals use Lean to increase capacity by using current equipment and available space. Lean makes better use of existing resources as an alternative to increasing capital spending and therefore it delays or cancels construction and expansion.
- Reducing overtime is a great opportunity to help make improvements with Lean that doesn't alienate people the way retrenchments do. Essentially, people want to get home to have dinner with their families in a predictable or consistent way. If the hospital can improve charting during the process, for example, instead of having nurses do it afterwards, they can improve staff satisfaction while trimming down overtime, which results in both morale and cost savings. It's a win-win opportunity.
- This certainly isn't about pushing patients home before they're ready. It is recommended that the length of stay is reduced through preventing errors that would extend a stay or delay a discharge when patients are medically ready to go home. Because of miscommunication, poor planning, or when families or nursing homes aren't yet ready to take on the person being discharged, a four-day stay can suddenly turn into a five- or six-day stay. These occurrences are not medical issues, but they often extend length of stay which can cost millions.
- A number of hospitals are trying to be responsible stewards of healthcare currency by reducing inappropriate usage of lab testing and diagnostic imaging. For example, through medical evidence it has been shown that when a patient comes in with back

pain more often than not what they need is physical therapy not a fast pass to a CT scan.

- It is recommended that hospitals reuse the single use items as per Indian exemplar hospitals; however, a stringent sterilization process should be followed, for example metal clamps should be reused in operations, reducing wastage.
- There are a tremendous number of delays in billing, including too many people involved during different parts of the process. It is recommended that there should be a better flow, with people handing over the work to the next person in the chain immediately so that bills go out in a couple of days instead of a couple weeks. It is also important to make sure that billing is being done properly. If mistakes are made and proper pre-authorisations are not followed, but procedures are done anyway, the hospital will be losing revenue.
- It is recommended that the hospital should adopt the exemplar Indian Hub and Spoke Architecture; prevent duplicate equipment in spoke facilities. Sophisticated expensive technology should only be used at the centre of excellence.
- The hospital should offer MRI services to patients at lower rates at night.
- It is important to consider pioneering "beating heart surgery" without shutting down the patient's heart and without expensive heart lung machines.
- The hospital should use the wrist instead of groin technique for angioplasties which will reduce recovery time and hospital costs.
- It is recommended that Aravind Eye Care Systems are adopted as they comprise the specialised "small incision technique" for cataract surgery with a cheaper lens instead of the current phacoemulsification technique with a more expensive lens. The cheaper lens with the small incision technique is a solution to the common cataract problem and it can also be done in volumes, providing coverage to the population at an affordable rate.
- Another recommendation is to adopt Deccan Hospital's peritoneal dialysis as a home-based treatment for patients with chronic kidney disease. This practice will be cheaper instead of the more expensive hospital-based haemodialysis. Medical aids will encourage home-based care, currently not adopted but which is more affordable for patients.

- In order to provide transplants to many patients instead of just one, the hospital should adopt the method from LVPEI with the ability to slice the cornea.
- The exemplar Indian hospitals process of task shifting should be adopted as it provides upskilling for many lower categories of staff. For example train village school graduates to be "vision technicians".
- The hospital should adopt the Aravind Eye Care System of task shifting paramedics in a theatre role.
- Furthermore, it is recommended that the hospital adopt the Narayan Health non-ICU postoperative care process where family members receive an audio video curriculum that explains how to care for patients during three days following heart surgery. Family members who provide those services will help to reduce costs and allow for personalised care, ascertaining continuity at home and thus reducing post-surgical complications.

Therefore the conclusion from objective 1, to determine the impact that standardised care processes have on reducing unnecessary care and costs, the study revealed that stakeholders need to enforce compliance to best operating and standardised processes, apply lean methodology in healthcare, adopt a system that allows innovation and innovative techniques to yield maximum results in cost containment.

Objective 2: To evaluate the control of labour costs by management

- The labour costs research finding argues that detailed monitoring and analysis of overtime, agency usage, skill mix, and pay rate decisions provide a guide for hospital managers to better balance the mix of employed to supplemental staff, and to exert more cost-effective control over staffing in response to fluctuating patient census reports and patient acuity. According to the Labour Management Institute (LMI) analysis, overtime above 5% of total worked hours per period is associated with increased medical errors and patient fall or sentinel events.
- The largest component of expenses is fixed overheads, salaries or labour costs. The research findings are that hospital acquired infections which are preventable infections arising during acute-care hospitalisation levy huge tolls on patients, families, payers, and the provider hospitals where they occur. Patients who contract these infections suffer worse morbidity and mortality than uninfected patients. They

experience longer length of hospital stay (LOS), more intensive care, higher risk of readmission, prolonged recovery time, and greater overall expenses or losses. Providers incur more resource utilisation, and payers absorb more costs. The hospital industry is facing the greatest challenge of maintaining these fixed costs with declining occupancies. The stringent infections control measures on hospital acquired infections resulting in increased readmission and labour costs definitely require further extensive research as these are preventable infections arising during hospitalisation.

- The acceptable ratio of nurses to patients is a requirement by the DOH during commissioning and during re-licensing of hospitals. This has been a major concern due to skill shortage; however, in the current climate a trend of fixed labour misalignment is observed. Should occupancy and revenue reflect no improvement a crisis of business sustainability will exist. The study therefore recommends that improvement to occupancy and revenue is a priority.
- The outsource services of catering, cleaning and security have a fixed component of labour which also negatively impacts the income statement if the occupancy is not relative. Further research should be done in the essential area to assist with cost containment and to close the gap of the inflated fixed overheads in relation to revenue and occupancy or a variable model for labour costs should be further investigated.

  Therefore the conclusion from objective 2, to evaluate the control of labour costs by management, the study revealed that stakeholders should apply timeous and accurate monitoring of salary costs as the account for the 60% of fixed overheads, apply a system of task shifting although it may be in its infancy stage here in South Africa. Also to obtain maximum cost containment the rate of Hospital Acquired Infections should be reduced drastically.

Objective 3: To evaluate the influence that technology has on the business

- This area of full IT implementation and integration requires extensive further research to close the gaps that could restore the balance to the healthcare landscape and promote a sustainable healthcare environment for all stakeholders. The researcher is of the opinion that the findings of this research will add value to reducing healthcare costs.

- The adoption of best practices and low cost models is recommended as this will allow South African policy makers, government, medical aids, and managed care organisations to work towards co-creation, convergence and collaboration to increase healthcare coverage to the uninsured population.
- Technology as an enabler to provide real time labour cost information for accurate staffing levels, acuity of patient and skill mix would be a start for additional research. A daily online toolkit to assist in resource management will further assist in this area.
- The complete adoption and implementation of IT, E-health and electronic medical records in the healthcare industry will be the solution for both private and public healthcare systems. This will provide a flow of information from admission to discharge. Both pharmacy and general procurement can be standardised to gain optimal buying power, fixed pricing and negotiations for formulary compliance based on buying power. The logistics fees from distributors can be eliminated by purchasing directly from manufacturer in bulk at lower prices for a spectrum of healthcare products
- The medical aids currently provide efficiency reports to private hospitals to monitor doctor behaviour in relation to cost per event, and they employ actuaries for interpretation and compilation of these stats. If it were possible to have an IT infrastructure that can compare data amongst all stakeholders, then in turn it would be possible to argue against the concepts of "over-servicing", benchmarked cost per event, doctor behaviour and "supply induced demand".
- The electronic data will be evidenced based, preventing any one stakeholder from becoming an expert and exploiting the other stakeholders. Everyone subscribes to making profits, business sustainability and growth. Currently, staff at the private hospitals are being held ransom by medical aids; managed care organisations for increased healthcare costs, resulting in rapidly declining margins in revenue and growth. Each stakeholder has an interest in sustainable healthcare, despite the increased fraud; everyone should collaboratively engage to end this fiscal healthcare crisis.

Therefore the conclusion from objective 3, to evaluate the influence that technology has on the business, the study revealed that the key ingredient is to adopt a fully integrated IT systems that is scalable and all electronic medical records that are

available can be interfaced into IT systems from medical aids, X-Rays, Laboratory, keeping a track on treatment patterns this will yield the necessary cost containment.

Objective 4: To analyse the innovativeness of the delivery care model and the impact on healthcare

- Currently the medical aids have negotiated lower pricing with certain hospitals and refer to them as designated service providers. If the patient chooses a hospital that is not a designated service provider, the patient is charged a co-payment. This is anti-competitive behaviour as the patient should be allowed to choose which doctor and hospital they require for medical services. The model of value-based purchasing by the patient should be a priority as that is where the outcomes and quality are best provided by the hospital.
- It is recommended that the hospital adopts process mapping which depicts the core of process of care.
- Accountable care organisations help organisations benefit from their own cost reduction efforts and will do so in a way that does not short-change what the patient needs.
- It is also recommended that the hospital should adopt the perioperative surgical home as the triple aim is to improve the experience of care for the perioperative patient.
- Furthermore, they should adopt SCAMPs as they are intended to reduce variation and improve care as conventional clinical practice guidelines have drawbacks that can limit clinician buy-in. In contrast, SCAMPs offer a clinician-designed and driven approach that accommodates localised individual and population patient differences, respects local providers' clinical acumen, and keeps pace with the rapid growth of medical knowledge.
- Malnutrition is a hidden component of hospital costs and can be seen as a contributing cause or a consequence of disease conditions. Further research is required as there is some evidence that nutrition intervention for hospitalised patients has reduced readmissions.
- The researcher concurs with the findings and supports a shift from fixed fees which are unsustainable, to bundled payments and gain-sharing models. The bundled payments and gain sharing should be adopted on a larger scale in South African

private hospitals. The collaboration of the physician and surgeon will be required to improve fiscal performance of hospitals through a cost containment committee focusing on low cost models, improved outcomes and improved quality. With the achievement of these the models, gain sharing can be adopted as compared to the other countries.

- Further research into the bundled payments and gain sharing should be investigated to enable streamlined transformation and sustainability of healthcare in both the private and the public sector in South Africa.

Therefore the conclusion from objective 4, to analyse the innovativeness of the delivery care model and impact on healthcare. The study revealed that key to successful cost containment is collaboration of stakeholders, such as physician and hospitals to adopt value based offerings and gain sharing models that will increase reimbursements from medical aids thereby averting the impending fiscal crisis.

6.6. RECOMMENDATIONS FOR FUTURE STUDIES

- The study focused predominately on EThekwini Hospital and Heart Centre and restricted to the Durban area.
- It would be interesting to note the responses from middle managers from other hospital groups such as the Netcare, Life and Mediclinic hospital groups.
- A triangular approach would be best suited in order to gain more insight into strategic levers such as standardised process, labour cost, and influence of technology, innovative delivery care models strategies in the company. The results of the current study give a strong indication that these strategic levers can be used as a means to get efficiencies and effectiveness however more research is needed to extract the differences between hospitals that belong to the corporates or independents.

This study can be replicated for other stakeholders in the private healthcare industry that work under the confines of funders. These would include doctors, pathologists, radiography units, etc. Research is required to compare the strategic levers against performance, in order to verify the results of this study

6.7. CHAPTER SUMMARY

This chapter has encapsulated the research findings, recommendations and recommendations for future research to ensure that the transformation with change in culture and technology is embraced by key stakeholders to jointly and collaboratively prevent further fiscal crisis in healthcare. The policy makers, government, medical aids, managed care companies, and all stakeholders in the private healthcare sector have a responsibility in stabilising health reform to a sustainable level for the whole population. There are enough research findings that can be adopted to transform from dwindling margins and revenue to profitability once again. However, key is the low cost models, cost reductions from standardised processes, labour costs, full implementation of IT, E-health and electronic medical records as well as the innovative delivery care models. Gain sharing and bundled payments are the catalyst to affordable healthcare for all with improved outcomes and quality.

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APPENDIX A:

PERMISSION TO CONDUCT THE STUDY

PR NO. 0305251

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Physical Address 11 Riverhorse Road,
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ethekwini
HOSPITAL & HEART CENTRE

27 February 2017

University of Kwa Zulu Natal
Graduate School of Business

Dear Sirs

CONSENT TO CONDUCT RESEARCH

I am the General Manager of, **Ethekweni Hospital and Heart Centre** and hereby grant consent for Thirumalay (Vino) Moodley, Student No 215077190, to conduct a research entitled, **An approach to transformational cost reduction in a Private Hospital**

This is subject to the researcher, Thirumalay (Vino) Moodley signing a letter concerning our ethics and issues of confidentiality concerning the company.

Yours faithfully

[redacted]

Niresh Bechan
General Manager

APPENDIX B:

ETHICAL CLEARANCE LETTER

UNIVERSITY OF KWAZULU-NATAL
INYUVESI YAKWAZULU-NATALI

12 April 2017

Mrs Thirumalay (Vino) Moodley (215077190)
Graduate School of Business & Leadership
Westville Campus

Dear Mrs Moodley,

Protocol reference number: HSS/0334/017M
Project title: An approach to transformational cost reduction in a Private Hospital

Full Approval – Expedited Application

In response to your application received on 31 March 2017, the Humanities & Social Sciences Research Ethics Committee has considered the abovementioned application and FULL APPROVAL for the protocol has been granted.

Any alteration/s to the approved research protocol i.e. Questionnaire/Interview Schedule, Informed Consent Form, Title of the Project, Location of the Study, Research Approach and Methods must be reviewed and approved through the amendment/modification prior to its implementation. In case you have further queries, please quote the above reference number.

PLEASE NOTE: Research data should be securely stored in the discipline/department for a period of 5 years.

The ethical clearance certificate is only valid for a period of 3 years from the date of issue. Thereafter Recertification must be applied for on an annual basis.

I take this opportunity of wishing you everything of the best with your study.

Yours faithfully

[redacted]
.....
Dr Shamila Naidoo (Deputy Chair)

/ms

Cc Supervisor: Dr Abdulla Kader
Cc Academic Leader Research: Dr Muhammad Hoque
Cc School Administrator: Ms Zarina Bullyraj

Humanities & Social Sciences Research Ethics Committee
Dr Shenuka Singh (Chair)
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APPENDIX C:
PROOF OF EDITING

PROOF OF EDITING CERTIFICATE

TO WHOM IT MAY CONCERN

Language editing

I, Jeanne Enslin, acknowledge that I did the language editing of **Vino Moodley's** dissertation submitted in partial fulfilment of the requirements for the degree of Master of Business Administration.

The title of the dissertation is:

An approach to transformational cost reduction in a private hospital

If any significant text changes are made to the electronic document that I sent to Vino Moodley on 16 July 2017, I cannot be held responsible for any errors that are made. Alternatively, the document needs to be returned to me to check the language of the changes. The quality of the final document, in terms of language and technical editing, remains the student's responsibility.

Detailed feedback of all the language editing done has been provided to Vino in writing and is evident in the dissertation in track changes with comments.

Jeanne Enslin
Language editor
082-6961224.

Technical editing

I, Ronel Gallie, acknowledge that I did all aspects of the technical formatting, checking of reference list and cross-referencing of **Vino Moodley's** dissertation submitted in partial fulfilment of the requirements for the degree of Master of Business Administration. Detailed feedback about the work done has been provided to Vino.

Ronèl Gallie
Technical editor
084 7780 292

J H Enslin BA (US); STD (US); Hons Translation Studies (UNISA)

APPENDIX D:

QUESTIONNAIRE

Part 1: ***Demographic data***

Q1

First Name: _____

Last Name: _____

Q2 What is your age group?

20-25	26-30	31-35	36-40	41-45	55 or more
☐	☐	☐	☐	☐	☐

Q3 Your Current Qualification:

Nursing	Nursing Degree/B.Compt	MBA	Doctorate	Executive Head of Division
☐	☐	☐	☐	☐

Q4 Your Current Department:

Nursing	Administration	Pharmacy	Facilities/Maintenance	Management/Executive
☐	☐	☐	☐	☐

Q5 Your Current Period of Employment

0 - 5	6 - 10	11-15	16-20	20 or more years
☐	☐	☐	☐	☐

Part 2: ***Statements about an approach to transformational cost reduction in a Private Hospital.***

Instruction

The following statements describe some of the components associated with ***transformational cost reduction*** and its influence in process management at your business unit. Kindly examine these statements and signal, based on your experience, the degree with which you agree or disagree with the statements. Please respond to the statements by placing a cross (X) in the applicable box.

No	Statement Made	Strongly Agree	Agree	Neutral	Dis-Agree	Strongly Dis-Agree
1.	There is growing concern that cost drivers effect business strategy in healthcare					
2.	The current business processes make our company efficient and competitive in healthcare					
3.	Majority of the patients have lower end medical aid plans with limited benefits					
4.	Salaries and Skilled Resources is major cost driver in healthcare					
5.	Standardized processes and innovation impact healthcare					
6.	Limits on medical aid reimbursements from medical funder's effect business profitability					
7.	Studies indicate that the ageing population and lifestyle disease increase hospital admissions					
8.	Studies indicate that the Hospital infections increase LOS					
9.	A lean approach (reducing waste in the system) would be a better process for healthcare					
10.	Manage Care Organisations discourage the use of high end medical technology					
11.	Information Technology expenses are on the increase in healthcare					
12.	Centres of excellence impact healthcare delivery					
13.	Process of task shifting affects healthcare efficiencies					
14.	Treatment practices are often altered in response to changes in medical aid reimbursements (e.g. from FFS to DRG to bundled payment)					
15.	Can Cost Containment be used as an					

	effective tool to increase efficiencies					
16.	A Formal qualification is needed to ensure that leadership can be a tool for strategic growth					
17.	We develop work best practices in most areas and usually perform to this standard set					
18.	Medical Aids have a significant impact healthcare sustainability					
19.	Innovation have a significant impact on healthcare processes					
20.	Health Delivery care innovation have a significant impact in controlling healthcare costs					