# Patient Flow Management in a South African Academic Hospital: The Groote Schuur Hospital (GSH) Case

By

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# Declaration

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# Abstract

It is known that the South African healthcare system is overwhelmed by a relentless burden of infectious and non-communicable diseases, social inequalities, and insufficient human resources to provide healthcare to the growing population. Therefore, patient flow management has become the cornerstone of patient processing and throughput in hospitals in order to alleviate the disproportionately high burden of disease. To compound the issues of patient flow inefficiencies and unexplored South African patient flow practices, healthcare services are continually attempting to improve their systems in order to adequately address the challenges they face. However, the reality of patient flow management in hospitals is heterogeneous and methods to improve patient flow do not result in similar outcomes, but enough evidence exists that patient flow-related methods and techniques can assist hospitals to improve patient flow. Therefore, it is believed that healthcare professionals' perception of patient flow is mainly influenced by their background or work environment.

The goal of this study is to explore the patient flow system of GSH. The researcher describes the current patient flow system of GSH by using information from hospital statistics, reports and project information. A questionnaire and interviews were used to collect empirical data of how nurses, doctors and managers perceive the patient flow system of GSH. The preliminary results of the research show operational employees find it extremely difficult to ensure efficient patient movement without proper patient flow guidelines. It is also revealed that access block is one of the biggest contributors of increased waiting times. Although GSH managers promote innovation and improvements to the patient flow system, operational staff argues that additional tasks hampers their ability to perform their normal duties optimally, which proves that managers and operational staff does not share the same vision. Another interesting result is that patient flow is not being measured at GSH, which makes it difficult to monitor improvement strategies and the impact new innovations have on the patient flow system. Following an in-depth multi-dimensional analysis and discussion of the preliminary research results, suitable recommendations are presented, which could be used to improve the patient flow management system of GSH.

# Opsomming

Dit is bekend dat die Suid-Afrikaanse gesondheidsdiensstelsel oorweldig is deur ’n meedoënlose las van aansteeklike en nie-aansteeklike siektes, sosiale ongelykhede, en onvoldoende menslike hulpbronne om gesondheidsdienste aan die groeiende bevolking te voorsien. Daarom het pasiëntvloeibestuur die hoeksteen van pasiënt-prosessering and -deurvloei in hospitale geword om die oneweredige hoë las van siekte te verlig. Om die kwessies rakende ondoeltreffendhede in pasiëntvloei en onondersoekte Suid-Afrikaanse pasiëntvloeipraktyke saam te vat, poog gesondheidsdienste deurgaans om hul stelsels te verbeter om sodoende die uitdagings wat hul in die gesig staar, aan te spreek. Die realiteit aangaande pasiëntvloeibestuur in hospitale is heterogeen en metodes om pasiëntvloei te verbeter, lei nie tot soortgelyke uitkomste nie, maar genoeg bewyse bestaan wat toon dat pasiëntvloei-verwante metodes en -tegnieke hospitale kan help. Om hierdie rede word daar geglo dat mense se siening van pasiëntvloei hoofsaaklik deur hul agtergrond en werksomgewing beïnvloed word.

Hierdie studie het ten doel om die pasiëntvloeistelsel van GSH te ondersoek. Die navorser beskryf die huidige pasiëntvloeistelsel van GSH deur middel van inligting verkry uit hospitaalstatistieke, verslae en projekinligting. ’n Vraelys en onderhoude is gebruik om empiriese data in te samel oor hoe verpleegsters, dokters en bestuurders die pasiëntvloeistelsel beskou. Die voorlopige resultate van die navorsing toon dat operasionele werknemers dit baie moeilik vind om doeltreffende pasiëntbeweging te versker sonder voldoende vloeiriglyne. Dit word ook getoon dat toegangblok een van die grootste bydraende faktore van verlengde wagtye is. Alhoewel GSH-bestuurders innovasie en verbeterings rakende die pasiëntvloeistelsel ondersteun, redeneer operasionele werknemers dat addisionele take hul vermoë om hul normale pligte na te kom, bemoeilik wat gevolglik bewys dat bestuurders en operasionele werknemers nie dieselfde visie deel nie. Nóg ’n interessante resultaat is dat pasiëntvloei nie by GSH gemeet word nie wat dit moeilik maak om verbeteringstrategieë en die impak van nuwe innovasies op pasiëntvloei te monitor. Na afloop van ’n in-diepte multi-dimensionele analise en bespreking van die voorlopige navorsingresultate word geskikte aanbevelings aangebied wat die pasiëntvloeibestuurstelsel van GSH kan verbeter.

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# Chapter 1: Introduction

## 1.1 Introduction

Patient flow management has become the cornerstone of patient processing and throughput in hospitals. The public needs a health platform that can satisfy scheduled and unscheduled care, which requires a system that can deal with high demand. If people are not processed adequately through the system, others may experience delays in accessing care, causing a ripple down the entire system that can be challenging to resolve. Therefore, patient flow approaches in hospitals refer to methods seeking to detect bottlenecks in the system as well as how to address these effectively and to improve quality of care outcomes.

The purpose of this research is to investigate the patient flow system of a large South African academic hospital, namely GSH in Cape Town. For this investigation, a three-pronged study is used, firstly, to describe and analyse current patient flow management, secondly, explore the opinions of GSH employees on the hospital's patient flow policy implementation and development, and, thirdly, make recommendations to potentially improve patient flow management in GSH and beyond.

The study also seeks to provide hospitals in general, and specifically South African academic hospitals, with tools to measure patient flow performance in order to monitor improvements in patient flow. This study ultimately aims to make recommendations that can be used by hospitals in their effort to improve their patient flow processes.

The goal of this chapter is to provide a brief background and rationale for the study that are supported by a preliminary literature review. The problem statement will be identified and thereafter the research question, the goal of this study and related objectives will be specified. The study design and methodology that are proposed to pursue the goal of this study will also be discussed in this section. The last part of this chapter will provide a brief summary of the succeeding chapters in order to outline the structure of the study.

## 1.2 Background

Efficient patient flow management has become a significant factor for most South African hospitals. Emergency Department (ED) overcrowding, patient throughput, staff shortages, average length of stay (as inpatient) and even mortality rates have all been linked to hospital

bed capacity (Anneveld, Van der Linden, Grootendort & Galli-Leslie, 2013:2). The factors mentioned above can simply be perceived as supply meeting daily demand through well-organised internal processes. Long waiting times, delays and cancellations have unfortunately become an accepted part of healthcare, as poor patient flow management can cause patient buildup, which results in staff exhaustion when patient volume peaks (Boyle, Beniuk, Higginson & Atkinson, 2012:1). To compound the issues of patient flow inefficiencies and poorly defined South African patient flow practices, healthcare systems are experiencing continuous pressures in the endeavor to keep up with the growing demand. It can therefore be perceived that methods to improve patient flow can enhance throughput and continuity, but may be contingent on the impact of meticulous methodologies used by hospitals.

This study originated from the distorted patient flow processes of GSH as well as the hospital's outdated bed management policy of 2009. Since the introduction of this policy, the patient flow demand for hospital services increased that lead to the development of additional strategies to accommodate the demand, which potentially contradicts the lack of content in the official policy. It caused various departments in GSH to question the validity of the original policy. In a study conducted by Boyle, Higginson & Atkinson. (2012:2), it was highlighted that policy inputs from few stakeholders seem attractive to policy developers, but it results in weak policy implementation. Although the current patient flow policy of GSH is still the official policy, numerous deficiencies were identified and its value was challenged by various major role players. This happens when policy developers are too optimistic when designing policies and then still do not manage to address all relevant factors (Forero, McCarthy & Hillman, 2011:3). Departments were not conforming to the current patient flow policy and new unofficial patient flow strategies were being implemented. Patient flow reached a point where reactive strategies were being implemented by various departments in order to address short-term difficulties, which resulted in conflict amongst departments as well as poor patient flow throughout the hospital. For instance, the patient flow manager of GSH experienced difficulty exercising his full authority, which further delayed the movement of patients from emergency trolleys to ward beds. The patient flow processes of GSH are in desperate need of refinement to create a patient flow culture that is understood throughout the hospital. The ambiguity of the current patient flow processes is therefore used as motivation to conduct a study to obtain the opinions of GSH employees on current patient flow management.

Patient flow management was initially designed to address the above-mentioned difficulties by providing employees with a guide on how to allocate beds appropriately, how to proactively

pull patients into vacant ward beds and to offer real-time bed status. The theory of matching supply and demand has endless success stories in many industries. For example, the car manufacturer, Toyota, uses Kaizen methodology to promote sustainable improvements throughout the entire organisation by matching supply and demand. This theory has been explored by many industries (Nakip & Kandemir, 2014:66) and was especially useful in healthcare, as indicated by Clancy and Graban (2014:35). The key question for hospitals would be whether a more structured approach to match supply and demand could improve patient flow through policy improvements. According to the patient flow manager of GSH, there is a strong connection between patient flow and overall hospital effectiveness (Adini, Cohen, Laor & Israel, 2011:519), and therefore pursuing new improvement initiatives through process changes and developing policies to standardise patient flow. Focus areas being targeted for patient flow improvements include thorough discharge planning, decongesting EDs, bed management and keeping waiting times as short as possible.

After the appointment of patient flow managers, a culture developed amongst hospital employees that all patient flow problems would be addressed by these managers. More issues developed when decision-making managers had their own notions and ideologies around patient flow, which reduced staff participation when it came to patient movement. It reached a point where the functions of patient flow managers at different hospitals were unrelated and each hospital had an entirely different approach to patient flow. This brings us to the aim of the study, which is to explore the patient flow system of GSH in order to conceptualise the principles used to measure patient flow and to make recommendations that hospitals can adopt to improve their patient flow policies. For the purpose of this study, it is imperative to understand the various concepts explored by patient flow academics as well as experiments conducted by other hospitals. The literature explored attempts to identify how patient flow practices relate to hospital effectiveness.

## 1.3 Global Health

Global health as an endeavour has expanded over the last few decades and offers great potential towards improving healthcare delivery for both developed and developing countries (Kim, Farmer & Porter, 2013:1). It can be assumed that the interest in improving global healthcare is greater than ever, especially to break the cycle of poverty and disease of developing countries (Kim, Farmer & Porter, 2013:1). However, according to Kim, Farmer and Porter (2013:1), the

biggest obstacle facing global health is a failure of service delivery, especially in settings of poverty and social inequality where system-level improvements are not considered a priority.

Another contributing factor towards the demand for healthcare is the growing and ageing population, which makes access to care more difficult (Chan & Green, 2013:1). Beyond subjective evidence, there is increasing empirical evidence of problems accessing healthcare services, particularly through long waiting times that lead to overcrowding (Chan & Green, 2013:1). While healthcare services are struggling with the rising demand, the supply of hospital capacity, doctors, nurses and other essential health resources remains relatively stagnant (Chan & Green, 2013:1). An article on the global supply of health professionals provides substantial evidence that there is indeed a global crisis of severe shortages and mal-distribution of health professionals (Crisp & Chen, 2014:950). According to Crisp and Chen (2014:950), the World Health Organisation has underscored the alarming global 15% shortage of doctors and nurses, which constitutes a shortfall of approximately 4.3 million doctors and nurses worldwide. This deficit mostly affects 57 identified developing countries that are facing severe complications caused by insufficient human resources to meet their minimum healthcare needs (Crisp & Chen, 2014:950). One ramification that affects healthcare delivery in developing countries is the workforce shortages in developed countries which cause the migration of skilled health professionals (Grignon, Owusu & Sweetman, 2013:1). However, Grignon, Owusu and Sweetman (2013:26) also identify that although developing countries are affected by the migration of healthcare professionals, it appears to be only one obstacle of their larger systematic health challenges.

Healthcare facilities worldwide are confronted with various challenges within the environment they operate, which require patients to interact with a number of different types of healthcare professionals in a variety of settings (Thompson, Day & Garfinkel, 2013:183). While the patient is waiting to be attended to, numerous health professionals, advances in support services such as laboratory, radiology and surgical procedures have dramatically increased the number of tests and procedures, as a response to the increasing demand (Thompson, Day & Garfinkel, 2013:183). To further compound these challenges, demographical changes and economic trends are forcing healthcare facilities to improve their quality of care to accommodate more patients at a reduced cost (Thompson, Day & Garfinkel, 2013:183). Due to these pressures, health facilities are attempting to improve their services with existing healthcare resources that may exacerbate access problems (Thompson, Day & Garfinkel, 2013:183). Hospitals are

therefore ultimately forced to improve their internal systems in order to resolve the patient flow challenges they experience daily (Anneveld, Van der Linden, Grootendort & Galli-Leslie, 2013:2).

ED overcrowding is known to be a global issue. However, Flores (2011:59) indicates that despite the well-designed guidelines to support patient flow through facilities, a major concern remains the degree of policy implementation. In hospitals, overcrowding mainly becomes an ED problem which results in a disorderly environment where some patients purposelessly occupy a space in the ED while awaiting their ward bed patients (Boyle, Beniuk, Higginson & Atkinson, 2012:1). Another ripple effect caused by ED overcrowding is staff frustrations that influence patient care quality and their sympathy towards long waiting times of patients (Boyle, Beniuk, Higginson & Atkinson, 2012:1). Kim, Farmer and Porter (2013:9) add another view by indicating that if healthcare delivery can be transformed through sustained investments, a focus on the principle of value, the promise of services and productivity for countries that struggle with health services, it will be a major contribution towards alleviating both poverty and disease.

Furthermore, despite all the healthcare challenges, the Lancet Commissions Report on Global Health 2035 suggests that there are unprecedented opportunities for national governments to tackle healthcare issues through population and clinical innovations, and eliminating wasteful expenditure taking steps to avoid unproductive health cost escalation (Jamison et al., 2013:1916). However, such progress will only be possible through strong health systems that are supported with essential health systems components and the role of policy instruments towards achieving health progress (Jamison et al., 2013:1916). This report also suggested that the focus to deliver better services should not only be the responsibility of hospitals, but rather through stronger primary care clinics that are supported by both community health workers and hospitals (Jamison et al., 2013:1916). Therefore, the importance towards achieving measurable health outcomes should be a priority for national governments that are continually confronted with insufficient resources, skeleton workforce and a growing demand for healthcare services (Jamison et al., 2013:1916).

For much of the world's population, access to healthcare is severely limited and often financially out of reach, thus, healthcare innovations focused on developing creative financial plans that enhance a country's capacity to provide adequate healthcare services while ensuring financial protection for its citizens (Scott, Phil & Jha, 2014:3). Scott, Phil and Jha (2014:3) also

imply that lessons from previous interventions are reminders that augmenting access and improving healthcare services will not be enough to eliminate healthcare pressures for good. In order to alleviate this worldwide apprehension, Scott, Phil and Jha (2014:3) suggest that care provided must be of sufficiently high quality by focusing on the following six key features: healthcare that is safe, effective, patient-centred, efficient, timely and equitable.

In a study by Abo-Hamad and Arisha (2013:1), they revealed that healthcare managers are constantly under pressure to control rapidly escalating expenses whilst simultaneously fulfilling the growing demand for healthcare services. As a result, they are required to continuously study their health systems' efficiency and explore new improvement initiatives that can alleviate the pressure (Abo-Hamad & Arisha, 2013:1). Therefore, due to the limited funds and rising costs, there is an urge for improving hospital efficiency to address the inefficiencies experienced in healthcare delivery (Abo-Hamad & Arisha, 2013:1). According to the results of Abo-Hamad and Arisha's (2013:1) study, by using various improvement models, hospital managers are able to reveal that access block has the highest impact on average length of stay (ALOS) for patients and that attempts to reduce access block exist, especially in situations of ED overcrowding and reduced hospital bed capacity. Jamison et al. (2013:1910) points out that there is a direct link between poor healthcare and high mortality rates and that those countries struggling with poor service delivery should seek to improve their health system by adopting improvement strategies and use resources available within their national boundaries.

## 1.4 South African Health System

In the 22 years since South Africa (SA) underwent a transition from apartheid to a constitutional democracy, considerable social challenges had to be addressed, especially the social determinants of health that are not limited only to the health system (Mayosi & Benatar, 2014:1344). South Africans remain overwhelmed by a relentless burden of infectious and non-communicable diseases, social inequalities, and the insufficient human resources to provide healthcare for the growing population with a rising tide of refugees and economic migrants system (Mayosi & Benatar, 2014:1344). The South African government can therefore acknowledge that in order to address healthcare challenges, the main focus areas should be on staff shortages, retention of scarce resources and, ultimately, to secure the best possible coverage and access for its population to effective and equitable care (Van Rensburg, 2014:1).

Although aspects of the so-called global health challenge are apparent in all countries, the extent and seriousness of their manifestation vary from country to country, and the effects of one country's healthcare struggles may affect another's (Van Rensburg, 2014: 1).

According to Mayosi and Benatar (2014:1344), since the 2008 global economic crisis, reversing the adverse health effects of complex, connected local and global causal factors will be immensely difficult and will take many decades. Like in the case of SA, when extreme poverty affects the greater part of the nation, basic health services is mostly affected by a lack of access to the basic requirements for life. Roux (2014:3) indicates that it is the government's inherent desire to satisfy the needs, wants and material well-being to reach a situation where the country's resources outstrip its demands. Relative and absolute poverty in South Africa share common causes with poverty globally, such as clean water supply, adequate nutrition, effective sanitation, reasonable housing conditions, access to vaccinations, and good schooling (Mayosi & Benatar, 2014:1344). The contribution of unfair distribution of wealth in South Africa is seen as one of the leading causes of poverty and inequality and is indicated by the country's Gini coefficient (ranging from 0 to 1, with 0 indicating total equality and 1 indicating maximal inequality) (Mayosi & Benatar, 2014:1344). In 2014, South Africa had a Gini coefficient of about 0.64 and the top 10% of South Africans earned 58% of the total annual national income, whereas the bottom 70% combined earned a mere 17% (Roux, 2014:50). However, despite the devastating effects sub-Saharan Africa is experiencing economically, Africa is expected to be the land of opportunity by 2060, provided that extreme poverty, a high burden of disease and management of inadequate health resources are addressed urgently (Moosa et al., 2014:2).

The population in SA currently exceeds 53 million, and only 29% of people 20 years and older have obtained a matric certificate, while about 12% have a higher-education qualification (Roux, 2014:62). However, investment in education is a key requirement for growth and job creation in South Africa, but it depends greatly on the perceptions foreign investors have on the South African economy (Roux, 2014:184). Therefore, according to Roux (2014:186), despite the current health challenges that sub-Saharan Africa faces, by 2030, the population of sub-Saharan Africa will probably be in excess of 1.2 billion (contrasting the current just over 800 million, with the majority of people currently under 15 years old). One potential benefit would be to educate them properly and appropriately to address poverty challenges. Regrettably, the lavish lifestyles of many high-earning South Africans, including those in

leadership positions, government's wasteful consumption patterns and corruption are at the root of South Africa's decay (Mayosi & Benatar, 2014:1350). Thus, Mayosi and Benatar (2014:1350) suggest that in order to address South African health challenges appropriately, disparities in wealth, health, and education should be narrowed to generate opportunities for South Africans to reach their full human potential, towards living healthy, productive lives.

Another area of concern for South African healthcare is the difficulty for the South African government to retain their highly skilled health professionals (Moosa et al., 2014:8). South Africa incurs the highest cost for health professional education and the greatest loss on returns on investment for all health professionals currently working in developed countries, such as Australia and Canada (Mayosi & Benatar, 2014:1348). According to Marten et al. (2014:2168), the issue is not only the migration rate of qualified health professionals, there is also an uneven distribution of health professionals between sectors and geographical areas in South Africa. The inequality across geographical areas hinders the government's ability to provide adequate access to healthcare for all, despite the fact that it is a constitutional obligation (Marten et al., 2014:8). Hence, when the South African government falls short in provision of equitable healthcare access, it is the unemployed, low and middle income citizens that suffer the consequence. The richest people are covered by private insurance and others are reliant on poorly resourced public sector services (Marten et al., 2014:8). Although it can be argued that the poorest groups have lower rates of health service use, they receive fewer benefits from health services, despite the burden of disease being far greater amongst these groups (Marten et al., 2014:8).

In addition to South Africa's poor people, urbanisation presents considerable challenges when it comes to living conditions, housing and public services in the main cities (Turok & Borel-Saladin, 2014:2). What makes urbanisation in South Africa so complicated is the legacy of institutionalised racism, urban exclusion and rural deprivation of the past that released the migratory pressures when apartheid was abolished (Turok & Borel-Saladin, 2014:2). However, the liberty of urban migration caused deep social inequalities, land shortages, inadequate housing and pressured basic services that forced the government to improve their current service delivery around urban areas (Turok & Borel-Saladin, 2014:2). Although there is insignificant evidence of excessive urbanisation in the major South African cities, growth in the workforce is continuously outstripping growth in jobs, which in turn, adds to poverty in these cities (Turok & Borel-Saladin, 2014:11). Furthermore, the provision of urban

infrastructure has also kept pace with population growth and access to essential services has improved, but urban cities still require detailed research to unravel the dilemmas to assist decision-makers in identifying realistic opportunities to make progress (Turok & Borel-Saladin, 2014:11). A big area of concern as identified by Turok and Borel-Saladin (2014:10) is that urbanisation levels can increase to the point of overcrowding, which can create health problems and spread infectious diseases, especially if migrants cannot share the fresh water supply and sanitation services in the main dwellings. In situations of overcrowding, policy-makers should establish appropriate contingency measures that allow the government to provide universal access to affordable basic services that is in line with the Constitutional guidelines (Turok & Borel-Saladin, 2014:12).

In a response to the health challenges in South Africa, in 2011, the National Department of Health created the National Core Standards (NCS) for health establishments as a statement of what is expected, and required, to deliver adequate, safe and quality healthcare services (Department of Health, 2011). Each health establishment will be formally assessed against these NCS by an external body and for those establishments that do not meet the necessary standards, the relevant governance structures and managers will be expected to make rapid improvements in service delivery to achieve compliance or face progressive punitive measures (Department of Health, 2011). The key challenges to be addressed is to bridge the policy-implementation gap and improving the health system effectiveness, through focusing on improvement strategies regarding the values and attitudes of staff, cleanliness, patient waiting times, patient safety, infection control and resource supplies (Department of Health, 2011). Managers are therefore expected to ensure that they are compliant with the above-mentioned improvement strategies to achieve the best results possible with their available resources (Department of Health, 2011). A framework developed in 2014 by the Western Cape Department of Health complements the principles of the NCS by placing the patient at the centre of healthcare (Western Cape Department of Health, 2014).

## 1.5 Western Cape Healthcare Challenges

By establishing a patient-centred health service in the Western Cape, the focus of the Healthcare 2030 plan is not only towards providing adequate emergency care, but rather to make the patient the centre of all health initiatives, resulting in the desired health outcomes as well as a superior experience of a complete patient journey (Western Cape Department of Health, 2014). To have a patient-centred experience means that the patients utilising health

services feel that they receive effective treatment, are involved in making decisions, have fast access to reliable healthcare advice, receive services in a clean and safe environment and experience a continuity of care and smooth transitions throughout the health system (Western Cape Department of Health, 2014). Healthcare 2030 signals an important shift from illness to wellness. Therefore, the conventional approach of health services with the focus on curative healthcare is not sustainable or desirable in the face of the increasing burden of disease. It requires more collective commitment from our staff, partners and stakeholders as well as the cohesive functioning of all parts of the health system (Western Cape Department of Health, 2014). This strategy is in line with the guidelines set out by the National Health Act (Act 61 of 2003) that provides a framework for a structured, uniform health system that takes into account the obligations imposed by the Constitution of the Republic of South Africa (Act No 108 of 1996) and other laws, with regard to health services.

The Western Cape is experiencing a constant increase in patient volumes. The province experience further pressure because of the migration patterns to the Western Cape from other provinces, thus placing a burden and pressure on service delivery in healthcare (Jacobs, 2014:1). According to a study conducted on migration patterns to the Western Cape, Jacobs (2014:1) found that there were 312 013 in-migrants to the Western Cape from other provinces between 2001 and 2011, of which 162 380 originated from the Eastern Cape. This study also revealed that the dominant motivation factor of mainstream migration was productionism, as migrants continued to migrate to the primate city of Cape Town (Jacobs, 2014:1). This contributed to a 5% annual increase of attendances at hospital emergency departments which are often experiencing levels of occupation well over 100% (Emergency Case Load Management Policy, 2012).

In reaction to the rising demand for healthcare, the Western Cape Department of Health developed the Emergency Case Load Management Policy (ECLMP) to guide hospitals to improve emergency department efficiency, to address flow of patients through the hospital, and to reduce inequities in the distribution of patients across the emergency service delivery platform in the Western Cape while maintaining patient centeredness (ECLMP, 2012). This document focuses both on patient flow in the emergency department of hospitals as well as patient flow beyond these emergency departments (ECLMP, 2012). It is also clearly stated in this document that hospital patient flow management should consider the entire patient journey

throughout the hospital and should define and improve each step of this journey to cater for the rising demand for healthcare (ECLMP, 2012).

While communication problems are considered the most persistent root cause of poor patient flow, insufficient information, resource constraints and lack of patient engagement all contribute to constricted patient flow (Patient Flow Challenges Assessment, 2012:7). Although each hospital has its own specific challenges, most hospitals agree that poor patient flow diminishes patient satisfaction, hospital reputation and staff morale. This highlights how patient flow relates to hospital effectiveness (Patient Flow Challenges Assessment, 2012:9). The trade-off between long waiting times for patients boarding in the ED and discharge operations at ward level became the top concerns for patient flow improvements, as the patient journey affects the entire hospital system (Patient Flow Challenges Assessment, 2012:10). Hospital professionals see patient flow as more than just moving patients from one point to another; instead, they view it as rather an important component of patient care that reflects heavily the quality of care and effectiveness of a hospital (Patient Flow Challenges Assessment, 2012:13). Therefore, it is vital for health professionals to understand that although all hospitals experience similar patient flow challenges, each hospital has its own unique problems regarding patient movement that should first be assessed and unpacked before they can be addressed (Patient Flow Challenges Assessment, 2012:13).

## 1.6 Problem Statement

According to the Department of Health (2011), the main purpose of the National Core Standards is to develop a uniform understanding of quality care for all health establishments and continually assess the health system for weaknesses as well as appraise its strengths. The World Health Organisation (2006:9–10) defines quality as being effective, efficient, accessible, acceptable, patient-centred, equitable and safe. In order for hospitals to accomplish the above criteria of quality, they should have a patient flow system that promotes short waiting times and rapid patient throughput while maintaining quality care that satisfies patient experience. Patient flow management is one of the most important aspects of hospital effectiveness, since poor patient flow management will result in poor patient throughput. However, South African hospitals are continually confronted with large patient numbers, long waiting times and fragmented patient flow systems. There is still an existing gap regarding patient waiting times, bed availability and conflicting opinions on patient flow management. In response to this

problem, the purpose of this study is to explore the patient flow systems of GSH and to determine how patient flow effectiveness can be measured and improved. A need therefore arises for recommendations that GSH and other hospitals can adopt to improve their current patient flow systems and to strengthen policy development.

## 1.7 Research Question and objectives

The research question for this study is:

**What is the current state of patient flow performance in GSH and what knowledge, measurements and strategies are needed to improve the current patient flow system at GSH?**

The goal of this study is to explore the patient flow system of GSH holistically, to establish patient flow performance measures and to formulate supporting recommendations that can be used by other hospitals to improve their patient flow systems. The following objectives will be pursued to accomplish the goal of this study:

- To define a theoretical framework on patient flow systems, especially within the hospital setting in the public sector.
- To describe the current patient flow system of GSH.
- To explore and describe the employees' perspectives on the current patient flow system of GSH.
- To analyse the patient flow system of GSH, this will be guided by the results of the preceding chapters.
- To formulate findings, draw final conclusions, rising from findings and formulate final recommendations towards achieving the goal of this study.

## 1.8 Research design and Methodology

A brief overview of the research methodology and design applied in this study is provided in this chapter and the detail is provided in Chapter 4. The following design and methodology will be followed to obtain the relevant data in order to accomplish the goal of this study.

### 1.8.1 Design

The preceding research question and objectives will be used to articulate an explorative study that consists of both quantitative and qualitative approaches to obtain the opinions of GSH employees on patient flow policy implementation, to describe patient flow measuring tools and

to formulate final recommendations that could potentially improve patient flow. This explorative study will be conducted in both an empirical and non-empirical manner and will have a mixed (qualitative and quantitative) approach to achieve the desired goal. Ethical clearance will be sought first. The non-empirical or secondary data will be obtained in the form of a literature review to provide a comprehensive understanding of patient flow techniques and methods used by other hospitals. The data collection instrument that will be used to collect the empirical or textual data will be in the form of a perception survey, by using semi-structured questionnaires that will comprise of close-ended and open-ended questions. To substantiate the survey result, more empirical data will be collected by conducting semi-structured expert interviews on the culture of patient flow in GSH. The entire pool of data (quantitative and qualitative), which will be obtained from the results of the questionnaire, and interviews, as well as the reviewed literature will be used to formulate final recommendations to improve patient flow. This research approach will allow the researcher to accomplish the ultimate goal of this study.

### 1.8.2 Methodology

The study will be conducted in the medical, surgical and emergency departments of GSH, a central hospital in the Cape Metropole region. For the purpose of this study, the target population will consist of GSH employees, i.e. managers, doctors, nurses and selected departmental specialists. No particular sampling method will be used to obtain a large enough sample from the population. The researcher will distribute questionnaires to all the departments and hope for a large enough response to validate the patient flow opinions of GSH employees. This means that the sample size will be dependent on the participant response rate and the researcher anticipates a better sample size by using this approach. The reason for this approach is the poor responses from prior studies conducted by the researcher within the hospital setting. Questionnaires will be made available for completion by the researcher to nurses and doctors who work in the selected departments. The data obtained will be analysed with the help of IBM SPSS Statistics in order to categorise, manipulate and summarise it in meaningfully. Through this analysis, the researcher will convert the collected data into a numerical form, which will be presented in the form of tables, graphs and histograms.

A non-probability purposive sampling method will be used to conduct the expert interviews with three identified participants. The interviews will take place in the comfort of their offices

after the consent form is signed and official appointments are finalised. The participants identified to participate in these interviews will remain anonymous, thus giving participants the liberty to express themselves freely, allowing the researcher to obtain extensive insight on the culture of patient flow in GSH. If any additional information is required, the researcher will communicate with the interviewees through the exchange of emails.

After ethical clearance is obtained, the time frame for data collection will be one month, which includes the dissemination and collection of questionnaires and conducting the expert interviews. The data obtained from the interviews will be used together with the data analysed from questionnaires. In addition, the survey of the literature will identify measuring tools that can be used to monitor patient flow performance. The current patient flow system, the results described obtained from this study, as well as the literature explored will be used to formulate recommendations that hospitals can use to improve their patient flow practices.

## 1.9 Thesis outline

The chapters described below will be used to achieve the goal of this study.

**Chapter 1: Background Rationale for the study**

Chapter 1 provides the context and rationale for this study and will act as a summary chapter for the proposed research. The subsections will include the background and motivation, the preliminary literature review, the research problem, the research question and study objectives, research methodology as well as the outline of the study.

**Chapter 2: Patient flow management systems: Literature review**

Chapter 2 reviews relevant literature from existing studies on patient flow management in hospitals. The review draws on available literature to identify new patient flow concepts that are implemented by hospitals to improve their patients' journey. This chapter will focus on the relevance of patient flow management, newly developed patient flow strategies and the impact of patient flow on quality of care. There will also be a strong focus on patient flow policy development, implementation and revision. Various process improvements that relate to hospital design and mapping of patients will also be discussed.

**Chapter 3: The challenges of patient flow in GSH: The current reality.**

This chapter will consist of an in-depth description of the current patient flow system of GSH. The main focus will be on the conflict caused by patient flow policy implementation, push-and-pull factors, daily hospital supply and patient demand, and the effects that patient flow has on GSH patients. The financial implications caused by the current patient flow system will also be addressed in this chapter.

**Chapter 4: Patient flow in GSH: A User's perspective.**

This chapter will consist of an in-depth description of the research methodology and design used in this study. It also has an analytical component to describe the results relating to the current patient flow reality of GSH. This includes the data analysis, interpretation and discussion on the results of the expert interviews conducted as well as the completed questionnaires. Recommendations will be made to improve the current patient flow reality of GSH.

**Chapter 5: Final discussion on patient flow practices at GSH**

The fifth chapter will comprise the final discussions on patient flow practices at GSH. This discussion will be derived from the literature review, analysed results and the results of the expert interviews conducted. In this chapter, the researcher will also compare the challenges identified in chapter 3, the perceptions of the doctors and nurses, as well as the results from the interviews conducted.

**Chapter 6: Summary and final discussion**

This will be the closing chapter consisting of final discussions, conclusions reached and where final recommendations will be made from the results obtained in the preceding chapters.

## 1.10 Significance of the study

While working as a patient flow manager at GSH, the researcher experienced multiple practices regarding patient flow that were opposing the official patient flow policy guidelines. This hampered patient flow in GSH, which is to the detriment of the patients, as contradicting perceptions of patient flow amongst employees caused prolonged patient movement through the hospital. It is therefore important to identify the factors that may contribute to patient flow inefficiencies in order to reduce ED overcrowding, reduce waiting times for patients, reduce staff frustration, lessen average length of stay of inpatients and even decrease mortality rates.

## 1.11 Conclusion

This chapter provided a thorough background and rationale to clarify the purpose of this study. A preliminary literature review was conducted to further describe the rationale. The problem statement, research question and objectives were clearly specified in this chapter in order to define the ultimate goal of this study. The design and methodology proposed to pursue the goal were also briefly described, followed by the outline of the study, containing the chapter outlines of this thesis.

# Chapter 2: Theoretical analysis on patient flow management

## 2.1 Introduction

The goal of this chapter is to focus on theoretical and conceptual approaches that form the basis for understanding patient flow in hospitals and other healthcare facilities. To explain and contextualise the true meaning of patient flow management, a comprehensive review of the existing literature on patient flow methods is necessary. In order to achieve this goal, a series of questions is posed in an attempt to clarify the concepts of patient flow management.

The first of these questions is: What is patient flow? This leads to the next question: How does patient flow management work? This directs us to the final question: Why do hospitals need an effective patient flow system?

The initial theoretical framework will attempt to address the first two of the above-mentioned questions by critically considering some of the more prevalent theoretical concepts, models and strategies available on the subject of patient flow management in hospitals. By exploring some of these views, it will provide greater understanding with regard to patient movement in hospitals as well as how to address bottlenecks affecting holistic patient flow systems.

The second part of the theoretical framework will attempt to address the last question of the above-mentioned questions by exploring some of the potential benefits of patient flow management. Thereafter, this chapter will review how patient flow management can be measured and effectively convert it into meaningful admissible material in order to illustrate patient flow improvements.

This chapter will conclude with a brief discussion on the theoretical literature explored as well as its relevance for addressing the questions explored in this chapter.

## 2.2 Defining patient flow management

Since the 1990s, the literature has been increasingly recognising the movement of patients through healthcare facilities as an important issue, largely because of the frequent imbalance between hospital demand and capacity, as explained Chapter 1 (California Health Care Foundation, 2006:28). It has been identified by De Silva (2013:4) that patient flow is heterogeneous and it is not possible to say that all patient flow-related methods result in similar outcomes in different healthcare settings. Therefore, different people will define patient flow according to their different backgrounds or work environments. According to Cote (2000:8), patient flow can be defined from a clinical as well as an operational perspective. Cote (2000:8) defined these perspectives as follows:

> From a clinical perspective, patient flow represents the progression of a patient's health status. As such, an understanding of patient flow can offer education and insight to health care providers, administrators, and patients about the health care needs associated with medical concerns like disease progression or recovery status. From an operational perspective, patient flow can be thought of as the movement of patients through a set of locations in a health care facility.

Alternatively, patient flow can be seen from a behavioural perspective where staff, patients, and facilities interact in such a manner that it creates speciality-specific streams of flow

(Marshall, Vasilakis & El-darzi, 2005:215). Regardless of approach to define patient flow, Pearson (2008:16) identified that all patient flow systems share common characteristics such as an entrance, an exit and a connecting path between them that has healthcare elements that are constantly changing (Kocher & Asplin, 2012:687). Pearson (2008:16) suggests that good patient flow allows patients to move through the various parts of the hospital system without delay, providing benefits to patients and a hospital that includes improved clinical outcomes, eliminates delays, and saves time and costs. However, it should also be noted that patient flow has no ideal cycle time and a good patient flow system should not be defined in terms of patient demand. Therefore, each healthcare facility must define patient flow in terms of the nature of its own population, its internal clinical practices as well as the facility's strategic goals (Backer, 2002:45). Litvak et al. (2007:28) clearly support the above-mentioned statement and at the same time enhance the argument by stating the imbalance between hospital demand and capacity that can obscure the true meaning of patient flow. This means action must be taken by healthcare facilities to ensure that patients are treated safely, effectively, and with compassion in a system on which they can depend (Edwards et al., 2013:316). Even more important, Viccellio et al. (2008:5) argue that, before action can be taken to address patient flow challenges, all stakeholders must agree that the problem is systematic and hospital-wide. For example, Figure 1 demonstrates a very basic generic patient flow system (Hall, Belson, Murali & Dessouky, 2006:16) that can be useful to determine whether bottlenecks exist in the system (Villa, Prenestini & Guisepi, 2014:198).

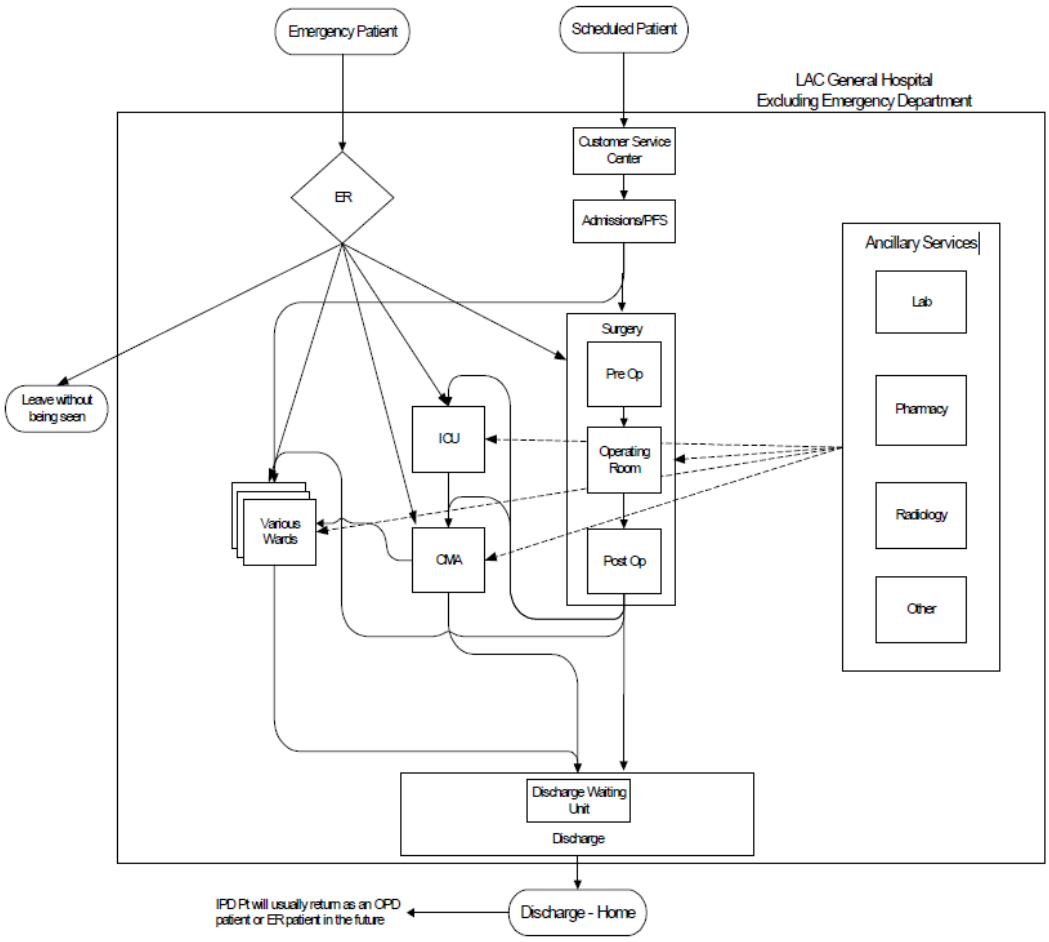


**Figure 2.1: Generic patient flow system**

(Hall, Belson, Murali & Dessouky, 2006:16)

Bottlenecks can be described as system constraints that affect the performance of the entire system and are usually viewed in hospitals as the interdependent coordination amongst departments (Haraden, Resar & Henderson, 2004:4). Backer (2000:46) therefore believes that in order for hospitals to make meaningful improvements to their patient flow system, they need to understand their current processes well enough to identify bottlenecks, which will enable them to identify the root causes of their system errors. The usual response to patient flow bottlenecks is to add capacity, thinking that it will solve the problem or relieve overcrowding (Livtak et al., 2007:40). Livtak et al. (2007:40) provide us with the following example to clarify how additional capacity can create even more difficulties: "[W]hen ED overcrowding is caused by the inability to move patients to inpatient units (e.g. ICU or telemetry), then expanding capacity in the ED only serves to put greater pressure on the inpatient unit without solving the ED overcrowding problem." For the same reason, Mishra et al. (2014:5) indicate that by eliminating unforeseen bottlenecks, the system will become more efficient and will decrease

wasteful utilisation of resources. Therefore, long waiting times, backlogs, treatment delays and bottlenecks are not the result of lack of effort from employees, but the source lies in the very first law of improvement as stated by Haraden, Resar and Henderson (2004:4): "Every system is perfectly designed to achieve the results it achieves." In other words, patient flow bottlenecks cannot be solved simply by adding more beds or employees. The answer starts with redesigning the overall system in such a way that the right patient is in the right place with the right provider and the right information at the right time (Haraden, Resar & Henderson, 2004:4). Bottlenecks can occur anywhere in the patient flow system, but are more prevalent in the ED, where patients are usually boarding due to access block that eventually leads to overcrowding (Nugas et al., 2014:5).

## 2.3 Overcrowding and access block

Nugas et al. (2014:3) identify that overcrowding occurs when the number of patients in a particular department exceeds the number of allocated staff, physical resources that allow for adequate treatment, and the inability of patients to be granted a ward bed which is also known as access block. Therefore, access block is perceived as one of the leading causes of ED overcrowding and can be defined as the situation where patients are waiting for ward beds but are unable to gain access within a reasonable time frame (Forero & Hillman, 2008:4). In an evaluation done by Chan et al. (2014:26), it was identified that the most time-consuming factor contributing to poor patient flow occurs when patients complete their ED journey and ward access is preventing patients' movement. This is confirmed by Pines et al. (2011:1359) who argue that a third of the patients in the ED are usually waiting for ward admission. They Pines et al. (2011:1359) further state that proactive discharge planning is the key to reduce access block.

Many studies that were done in hospitals have shown that there is a significant correlation between the ED and inpatient length of stay. For instance, Nippak, Isaac, Ikeda-Douglas, Marion and Van den Broek (2014:13) argue that patients who spend more than eight hours in the ED stay longer as inpatients and the longer a patient spends on a trolley in the ED, the longer the duration as an inpatient becomes. In an attempt to address access block and ED overcrowding in Australia, the Australian government introduced a four-hour rule where patients must either be discharged home or admitted to a ward within four hours of entering the ED (Geelhoed & De Klerk, 2012:124). This rule was introduced in six hospitals, which

provided evidence that if patients spend four hours or less in the ED, they have an average length of stay (ALOS) of 0.39 days and if their time spent in the ED was 12 hours or more, their ALOS increased to 2.35 days (Geelhoed & De Klerk, 2012:124).

The consequences of overcrowding, as described by Adini, Laor and Israeli (2011:523), strongly relate to patient and staff satisfaction. The growing demands of patients may result in rising stress levels of employees, instigation of conflict situations, and, in worse case scenarios, employees being verbally or in some cases physically abused by the frustrated patients (Bateman, 2009:567). These factors lower the morale of the ED staff members and affect absenteeism that directly compromise the standard and quality of care patients received. This argument was strengthened by Magana (2013:16) who implies that employee burnout and job dissatisfaction can lead to medical and legal errors. All these factors lead to the ED being managed under undesirable conditions that impede the quality of care. Negative patient-orientated outcomes include poor patient satisfaction and delays in antibiotics and pain medication dispensing that can lead to unwanted medical errors – all resulting from overcrowding (Pines et al., 2011:1359). Therefore, the urge to alleviate access block should be a priority for hospitals and can only occur if both ends of the patient flow journey are improved.

According to Ferero et al. (2010:120), access block and consequent overcrowding are usually associated with increased patient mortality, especially when hospitals operate above the recommended occupancy rate of 85%. At the same time, Ferero et al. (2010:120) indicate that results of many studies concerning access block and overcrowding have estimated that there is approximately a 20%–30% excess to the mortality rate annually attributable to access block and overcrowding. Therefore, Ferero, McCarthy and Hillman (2011:5) imply that if access block is considered as a disease, we would be forced to treat the symptoms, but the fundamental condition would remain unaffected. However, the focus of addressing access block and overcrowding should not only demonstrate an emphasis on waiting times alone. Instead, it should concentrate on normal work practices, hospital and system processes, proactive discharge planning and the effective use of resources that may result in a reduced waiting period for a ward bed (Ferero, McCarthy & Hillman, 2011:4). In addition, Estella (2011:1) reports that there is an ethical justification that carries weight with regard to access block and overcrowding, where service and patient safety is compromised and the risk of early detection of time-dependent diseases are delayed. Further, Estella (2011:1) reminds us that an ED was initially designed to accommodate patients while diagnostic uncertainties were being resolved

and acute processes were being treated rapidly; therefore, the ED was not to be used as an area where patients wait long hours to be admitted to a ward bed.

In a study by Boyle, Benuik, Higginson and Atkinson (2012:1), they indicate that in many countries ED overcrowding is the equilibrium state of their current health system and they also stress the fact that overcrowding impairs patient dignity, privacy, and completeness of care. Furthermore, Boyle et al. (2012:2) suggest that a poor infrastructural design of an ED does not support the uninterrupted flow of patients, or overcrowding, as available space in the ED is greatly dependent on the processes within the ED. Therefore, it is recommended by Boyle et al. (2012:6) that hospitals should have full capacity protocols and related policies, defined by a managerial process agreed upon by all staff members involved in the reactive chain.

Although good policies are developed to address ED overcrowding, Forero et al. (2011:3) stress the fact that policy analysers are too optimistic when developing policies and that the implementation of these policies are perceived to be impractical. This is supported by research conducted by Parr (2010:42) who states that although major stakeholders provide their input when designing a policy, implementation issues still occur due to operational employees not understanding the policy context. Parr (2010:42) goes even further by implying that top management usually becomes uninvolved after introducing a policy and does not provide the necessary support to operational employees after the commencement of policy implementation. This view is supported by Pearce, Hall and Philips (2010:27) when they indicate that policies have unintended consequences and may be selectively interpreted or undermined at ground level, as many people perceive their reality differently to policy analysts. If patient flow policies are poorly implemented, they will affect the entire patient flow system and may negatively impact on patient conditions, especially when it comes to ED patients waiting long hours for ward admission due to access block.

As mentioned earlier, patient flow is heterogeneous, as methods and techniques used to analyse or alter patient flow does not always result in similar outcomes, but evidence does exist where patient flow-related methods and techniques can improve throughput and continuity as well as reduce waiting times and length of stay (De Silva, 2013:23).

## 2.4 Approaches to patient flow

There are hundreds of different methods, models, techniques, strategies, theories and concepts to assess or address patient flow in hospitals. Firstly, this literature review is not exhaustive, as more than five thousand studies have been published about methods to assess or improve patient flow (De Silva, 2013:23). In addition, only the more common or most recently researched approaches will be discussed. It has been established by De Silva (2013:3) that all patient flow-related methods either analyse the patient flow system or a section of it, or attempt to improve the patient flow through a facility. It is therefore important for hospitals to first explore patient flow methods seeking to identify bottlenecks in the system and then introduce methods to adequately address these bottlenecks.

### 2.4.1 Assessing patient flow

According to the various literature explored, the following methods defined in Table 1 are considered the most valuable in assessing patient flow:

**Table1: Definitions of patient flow assessment methods**

| Method | Definition |
|---|---|
| Modelling patient flow | Provides insight for process improvements by carrying out various analyses to establish the most influential factors affecting the performance of a system (Bhattacharjee & Ray, 2014:301). |
| Queuing theory | Queuing theory is a mathematical model that is constructed to predict queue lengths and waiting times (De Silva, 2013:10). |
| Scatter plots | Doyle, Jones and Bell (2014:291) define scatter plots as "granular" data on the distribution of waiting times, which assess the potential added value to clients. |
| Admission process policy | The term admission process policy refers to a certain hospital protocol that determines the admission processes for patients (Kang, Nembhard, Rafferty & De Flitch, 2014:336). |
| Patient flow analysis (PFA) | PFA is a quality improvement tool that can be defined as the type of tool that identifies patient flow inefficiencies in a hospital (Dixon, Punguyire, Mahabee-Gittens, Ho & Lindsell, 2015:126). |
| Critical path analysis | The critical path analysis outlines the time each activity will take to complete, the dependencies between activities and the identification of logical end points (De Silva, 2013:10). |

In the context of this thesis, the patient flow precepts mentioned above can be identified in the literature and are mostly applied to the context of assessing patient flow. For instance, De Silva (2013:23) emphasises that the analysis of a patient flow system depends greatly on data collection techniques such as statistical process control, capacity planning, assessing service use, staff feedback, structured observation and ethnography. It is important to note that these data collection techniques may be used simultaneously in any of the above-mentioned methods and that they often form part of routine duties within hospitals. A brief explanation of each method is discussed below.

#### 2.4.1.1 Modelling patient flow

Healthcare managers may make decisions about operational duties and system processes based on subjective information, especially in the absence of hard data. Modelling patient flow in healthcare systems is considered vital in understanding patient flow and may therefore prove to be useful in understanding the system in order to improve its functionality (Marshall, Vasilakis & El-darzi, 2005:213). It is therefore critical for hospitals to develop models that can capture the complexity of patient flow systems in order to understand the system activities that may prove useful in improving the functionality of its healthcare system. An accurate and reliable model of patient flow would enable hospital managers to predict future activity that would be extremely useful in assessing future bed usage and predicting demand that will allow them to plan accordingly (Marshall, Vasilakis & El-darzi, 2005:214). Modelling can be seen as a mathematically founded technique that is well established in other domains and is more and more recognised as a valuable tool in planning organisational change in healthcare (Mishra et al., 2014:5). Most of the developed models attempt to clarify the inefficiencies of any given patient flow system in a hospital setting. Although many patient flow models exist (hundreds) in the field of patient flow, this section will only elaborate on some of the most researched and most common models.

#### 2.4.1.2 Simulation modelling

Simulation can be defined as the abstract computer representation of the operation of real-world processes or systems over time and is mostly used to analyse the behaviour of a system (Mishra et al., 2014:5). Simulation can be seen as a computerised method of modelling how things work in a hospital setting over time and can be used as an evidence-based approach to patient flow. When simulation techniques are applied in healthcare, they require sophisticated

tools and techniques that use existing data to generate useable results that support modellers and strategic planners to evaluate patient flow pathways (Mishra et al., 2014:5). For instance, Best et al. (2014:917) report that simulation can be used to estimate how changes within a patient flow system can either positively or negatively influence patient throughput. The purpose of this model should be to test common and system-stressing scenarios in order to identify strategies to enhance efficiency that will allow users to estimate the likely impact of operational changes before expending resources to implement those changes (Best et al., 2014:918). More specifically, Villa, Prenestini and Giusepi (2014:198) revealed that operation research studies in healthcare are using quantitative tools such as simulation modelling, particularly on scheduling and planning trends to maximise on service delivery.

For example, De Silva (2013:9) provides evidence of researchers in an American hospital that used a simulation model to test whether discharging an inpatient earlier in the day could alleviate overcrowding in the ED. The model suggested there was potential to reduce the number of people admitted through the ED and that overcrowding in the ED would drop significantly (De Silva, 2013:9).

#### 2.4.1.3 Types of simulation tools

Hospital managers use various simulation tools to logically plot data. Spread sheets are amongst the most commonly used tools to construct financial models although they do not display the model structure graphically (Mishra et al., 2014:6). Other simulation tools include, amongst others, discrete event simulators (DES), agent-based simulators, continuous simulators and hybrid simulators (Mishra et al, 2014:5):

- DES models have variables that are dependent and only change at distinct points in simulated time.
- Agent-based models are DES models that have both attributes and rules for interaction with other agents.
- Continuous simulators attempt to quantify the changes over longer time periods in response to the controls.
- Hybrid simulators use features of both DES and continuous simulators techniques.

In order for healthcare providers to select the most appropriate simulation software, the processes should be carefully thought through and planned (Mishra et al., 2014:7). Managers

should consider the merits and determinants of simulation products that include modelling flexibility, ease of use, modelling structure, code reusability, graphical user interface, hardware and software requirements, output reports, customer support and documentation (Mishra et al., 2014:7). Therefore, it is safe to assume that simulation models hold favourable characteristics as they provide an accurate picture of on-going processes in healthcare.

#### 2.4.1.3.1 Ethnographical model

According to Nugus et al. (2014:4), an ethnographically derived model can be defined as the prolonged engagement of a researcher in a patient flow setting to discern patterns of employee behaviour in the work setting. This model involves the real-time evaluation of the current situation and what is actually happening on a day-to-day basis (Nugus et al., 2014:4). This strategy allows the observer to compare what is actually happening against what employees perceived they do (Nugus et al., 2014:4). Therefore, the value of this model according to Nugus et al. (2014:8), clearly depends on the human agency in maintaining patient flow within hospitals, both for understanding patient flow and evaluating the impact employees have on a patient flow system.

#### 2.4.1.3.2 Markov model

Markov models, also known as "Markov decision processes" are used to represent stochastic processes in statistical theories (Gartner & Kolisch, 2014:689). According to Marshall, Vasilakis and El-darzi (2005:8), these processes are usually formalised by a set of states and probabilistic rules that govern movement between the states. Such a model assumes a probabilistic behaviour of patient patterns throughout the system and therefore provides a more accurate reflection of the entire system (Marshall, Vasilakis & El-darzi, 2005:8). Wang, Li and Howard (2013:349) elaborate further by stating that these analytical formulas provide healthcare managers with significant quantitative evidence to determine service delivery patterns that can be used to improve system efficiency. Furthermore, Antonelli, Bruno and Taurino (2014:89) support the above statement and add that the results of Markov models are essential for healthcare managers in developing policies to address potential patient flow bottlenecks.

#### 2.4.1.3.3 Theoretical model of ED census and daily surge

According to Asplin, Flottemesch and Gordon (2006:1110), in order to address ED census trends, there are two elements to consider predictable daily census patterns that are driven by historic patient-arrival times and unpredictable patterns. The unpredictable patterns are usually

derived from unpredictable deviations of historic patterns. The formal presentation of the ED census model begins with arrivals and is based on predictable patterns according to time of day, prior census and sudden unexpected surges in expected arrival patterns (Asplin, Flottemesch & Gordon, 2006:1110). It is therefore implied by Asplin, Flottemesch and Gordon (2006:1110) that in order for an ED to respond to unexpected surges, it depends on the predictive accuracy of the model, as well as trade-off between ED length of stay and quality of care, which may have important implications for patient outcomes.

#### 2.4.1.3.4 Regression modelling

Regression modelling is characterised as a statistical technique that may offer a more robust approach to identifying and describing variables that affect or forecast crowding, offering a more mathematically justified approach derived from statistical ways from a set of observations (Wiler, Griffey & Olsen, 2011:1373). This tool can either be used to evaluate or describe the effect of multiple variables to determine a collection of interdependent variables that predict an outcome based on a derived mathematical formula (Wiler, Griffey & Olsen, 2011:1373). Furthermore, this type of modelling is normally used in the hospital setting to anticipate overcrowding in the ED and what is most impressive about this model is its ability to include average waiting times and identify available beds (Wiler, Griffey & Olsen, 2011:1373). Common results demonstrated from regression models according to Wiler, Griffey and Olsen (2011:1373) are cyclical arrival times, seasonal prediction patterns and sudden unexpected surges that can have long-lasting results on census levels. Although, Wiler, Griffey and Olsen (2011:1373) identify that only a few regression-based models attempt to forecast ED overcrowding, they suggest that other non-mathematical models may provide better forecasting results. However, these models have proven to be less complicated than other models and are considered as beneficial in the assessment of patient flow systems (Wiler, Griffey & Olsen, 2011:1373).

#### 2.4.1.3.5 Queuing theory

Queuing theory, also known as queuing model, can be used by hospitals to improve their processes in areas such as waiting times, utilisation analysis, system design and appointment processes (Fomundam & Herrmann, 2007:2). In addition, Wiler et al. (2013:939) support the above use of a queuing model and add that this model can also predict the effect of patient arrivals, treatment time, and ED boarding. Queuing theory makes the basic assumption about a system to create mathematical equations that describe the system flow and thus assists in making predictions possible in an unpredictable arrival process (Wiler, Griffey & Olsen,

2011:1374). Fomundam and Herrmann (2007:4) believe that queuing models are simpler than other models, because they require less data and provide more generic results than other patient flow analysis approaches. Wiler et al. (2013:943) validate this statement further by indicating that queuing models allow for the application of simple equations to model patient flow. Wiler et al. (2013:943) therefore advocate that queuing models at their most basic level consist of four components: arrivals, servers, service principles and the flow of patients through a system.

According to Cochran and Roche (2009:1497), the ultimate purpose of a queuing model in an ED is to reduce the amount of patients leaving the ED before receiving treatment, increase ED access and to reduce prolonged waits for treatment in the ED. This methodology has been applied to a fleet of hospitals for validation in a study conducted by Cochran and Roche (2009:1497) and provides a guideline on how multiple determinants can be captured in a single common computational model. This allows health care managers to view queuing patterns in real-time by using waiting time and overflow probability as quality of service targets. In addition, Armony et al. (2015:17) argue that the application of a queuing model in the ED is greatly dependent on the design of the ED, capacity sizing and staffing and flow control. To further strengthen the theory of queuing, comprehensive data collection can be more cost effective for hospitals if mathematical equations can be integrated with their current information management system that enables healthcare providers to plan proactively (Armony et al., 2015:41). To conclude, although the theory of queuing models has been used for many years, Armony et al. (2015:41) believe that the process of data-based probability in hospitals is thus only the beginning.

#### 2.4.1.3.6 Scatter plots versus time-based measures

Scatter plots are an effective and commonly used method to show the relationship between two variables that can easily indicate trends and outliers within a data set (Matejka, Anderson & Fitzmaurice, 2015:2707). However, Matejka, Anderson and Fitzmaurice (2015:2707) warn us that when overplotting occurs as displayed by the narrow distribution in Figure 2 below, data points can be occluded, which makes it difficult or impossible to view individual data points, and this can lead to misinterpretation of data.

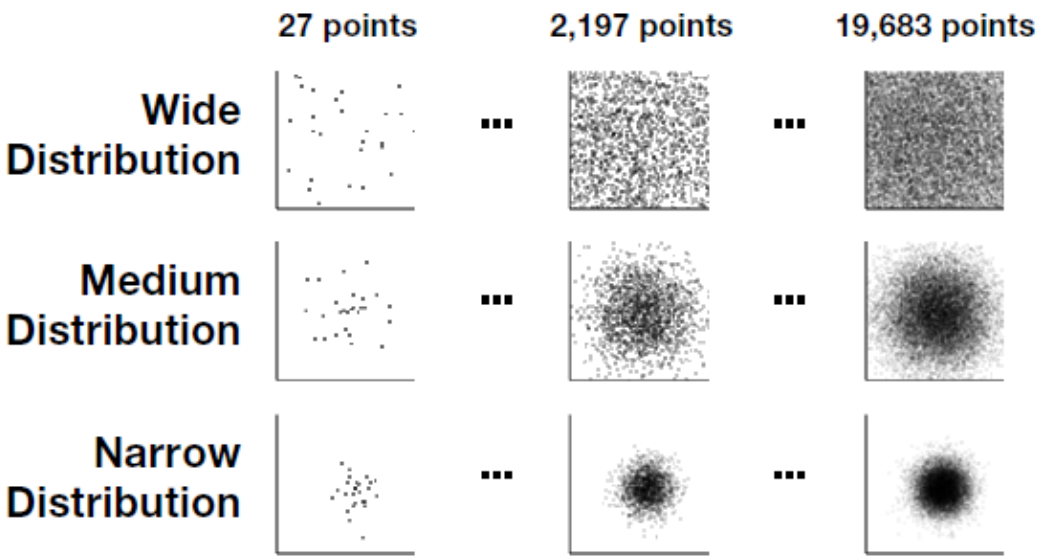


**Figure 2.2: Scatter plots distribution**

(Matejka, Anderson & Fitzmaurice, 2015:2707)

In a study by Doyle, Jones and Bell (2014:292) in four hospitals assessed the shape of curves in the scatter plots as the four-hour waiting time approach to search for potential signs of strain on delivering care in the ED against time constraints. This study proves that scatter plots add value by identifying issues of concern that were lost when single measures were used (Doyle, Jones & Bell, 2014:292). In particular, the use of scatter plots could help detect potential signs that would help healthcare providers to assess the distribution of patients who wait the longest when an ED struggles to deliver care against time constraints and provide a more accurate picture of performance (Doyle, Jones & Bell, 2014:294). Therefore, scatter plots proved to be useful in terms of identifying potential patient flow errors and could even be used as a real-time management tool that allows prompt analysis of common causes (Doyle, Jones & Bell, 2014:294).

#### 2.4.1.4 Admission process policy

In short again, many hospitals are constantly making efforts to address bed shortages, boarding patients and access block to improve the throughput of patients in hospitals. Although these back-door issues remain a challenge, little effort is being made to understand the process of admitting patients in the ED and its effect on patient flow (Kang et al., 2014:336). An admission process is the starting point of patient transition and it involves both the ED and admitting services (Kang et al., 2014:336). An inefficient admission process may affect patient flow, not only for admitted patients but also other ED patients (Kang et al., 2014:336).

In order to gather sufficient information effectively to improve an admission policy, a simulated approach to model the complex patient flow is required that includes patient attributes, staff attributes and many processes throughout the ED (Kang et al., 2014:340). Since the actual admission process in a real clinical setting may differ from a simulated setting, the simulation results still imply potential advantages are possible without using additional resources (Kang et al., 2014:340). Therefore, by modifying the admission process policy after assessing the effect it has on patient flow, potential benefits such as reduced waiting times, more efficient ED patient flow and less overcrowding would increase the overall performance of the entire hospital (Kang et al., 2014:340). To conclude, the analysis of the simulation results of this study contributed to demonstrating the potential value of leveraging admission process policies and developing a framework for pursuing these policies (Kang et al., 2014:340).

#### 2.4.1.5 Patient flow analysis (PFA)

Another useful improvement tool to indicate patient flow inefficiencies is PFA which involves two important methodological aspects: flow mapping and cycle time measurement. Flow mapping refers to the movement of objects from one location to another which provides a qualitative perspective on the process of care delivery. Cycle time measurement, in turn, can be defined as the total time from the beginning to the end of your process which provides quantitative data on time throughout the entire care-delivery process involving the patient (Dixon et al., 2015:126). Both aspects of PFA assist healthcare providers to determine key constraints affecting patient flow as well as potential gaps regarding staffing and resources (Dixon et al., 2015:126). For instance, Dixon et al. (2015:126) suggest that if arrival and throughput patterns are mapped to resource allocation and staffing, mismatches can be identified that require reallocation of resources or application of new resources. It is also implied by Dixon et al. (2015:126) that PFA should form part of a larger healthcare improvement initiative that involves identification, implementation and piloting various interventions towards improving healthcare delivery.

This study divides PFA into three phases (Dixon et al., 2015:127):

- Preparation – this is considered the most important phase as it entails processes such as establishing a team, understanding the system, defining the objectives and process measures, finalising the study plan, preparing the PFA documents, training staff and ensuring the availability of the necessary resources.

- Piloting – this phase is not mandatory, although it proves to be extremely helpful in revealing potential flaws in the study plan.
- Performing – this phase is straightforward if the planning was done correctly. The PFA leader must appoint champion staff to drive the PFA on an operational level to ensure that every role player performs as discussed.

The results from the PFA study demonstrated its significance in assessing the patient flow system as various inefficiencies such as long waiting times, long length of stay, high morbidity and poor healthcare were highlighted (Dixon et al., 2015:131). Consequently, hospitals can now address these inefficiencies and use the initial measurements as baseline measurements to quantify future improvement initiatives (Dixon et al., 2015:131).

#### 2.4.1.6 Critical path analysis (CPA)

In project management, the critical path method proved to be a useful tool in project time control. This technology shows that the keystone of project control is the critical path due to the activities that fall on the critical path and can induce project success or failure (Li & Jianjun, 2015:1409). Similarly, in healthcare, CPA is used to examine the relationships and interactions amongst system structures, processes and outcomes by visualising areas in the system that cause a delay in patient movement (De Silva, 2013:11). An example of CPA is the focus in unscheduled care on individual departments, rather than incorporating the entire hospital system (De Silva, 2013:11).

Many hospitals used CPA methodology to support process improvements and results show that after CPA is done, critical pathways that were identified improved the flow of patients through hospitals (De Silva, 2013:11). The most important requirement is to train staff to implement new pathways that proved effective for reducing waiting times as well as treatment times (De Silva, 2013:23).

### 2.4.2 Improving patient flow

In addition to looking at the analysis of a patient flow system, another approach involves exploring different methods to improve the actual patient flow system. A number of different models have been used to explore patient flow improvements. Although the various models used differ, they have in common a focus to eliminate bottlenecks, to reduce waiting times and to decrease the time patients spend moving through the entire system. According to the various

literature explored, the following methods defined in Table 2 are considered the most contemporary approaches to improve patient flow:

**Table 2: Definitions of patient flow improvement methods.**

| Method | Definition |
|---|---|
| Matching capacity and demand | To ensure that demand and capacity are in equilibrium on a daily basis. |
| Discharge Planning | Discharge planning can be defined as the development of a patient's discharge plan prior to leaving the hospital, i.e. the patient either returns to their own home or another care setting (Yemm, 2014:2). |
| Lean Management | Lean management is a philosophy that focuses on eliminating waste from a process or system so that clients receive greater value (Chan et al., 2014:24). |
| Electronic Boards | An electronic patient board is a communication tool that captures patient information in a computerised system (Clark, Moller & O'Brien, 2014:260). |
| Multidisciplinary teams (MDT) | An MDT consists of appropriate members representing the various departments in a hospital (Edwards et al., 2013:316). |
| Internal diversion plan | Diversions are when a patient is booked into another department due to a lack of capacity in the original department (Driscoll et al., 2015:E1) |

### 2.4.3 Capacity and demand

Critical to management, elective and emergency demand depends on the ability of hospitals or health systems to manage their capacity effectively in order to maintain patient safety, privacy and dignity (Pearson, 2008:13). Pearson (2008:13) continues by indicating that if hospitals use their capacity insufficiently, pressure on available hospital resources is likely to build, which can result in unintended consequences that can lead to poor patient flow (Ortiga et al., 2012:2). The theory of queuing is a popular strategy to align capacity with demand, especially when there is a mismatch between capacity and demand variation at specific times. This is mostly due to the right people or equipment not always being available to deal with the demand in a timely manner (Institute for Innovation and Improvement, 2005:15). In addition, the American

College of Emergency Physicians (ACEP) (2008:12) suggests that additional staff or rescheduling shifts are good strategies to ensure that demand is covered during times of increased patient volumes.

Interestingly, whenever demand exceeds capacity, it usually results in overcrowding. Therefore, the institute for Innovation and Improvement (2005:15) believes one area of concern is whenever capacity exceeds demand, the extra capacity is lost in the fixed session, or it is filled by boarding patients. However, it is suggested by Pearson (2008:15) that hospitals should manage their capacity in such a manner that they maintain some spare capacity to meet short-term surges in demand and thus eliminate the likelihood of overcrowding.

Other mechanisms to match demand for services as opposed to the capacity to provide them include scheduling and prioritisation, structural changes such as physical layout, and workforce planning as already mentioned above (De Silva, 2013:18). However, regardless of the mechanism put in place to match demand and capacity, it requires compiling of information about improving accessibility, finding ways to monitor varying demand and capacity, and improving patient processing by reducing variations (De Silva, 2013:18). In contrast to most hospitals, manufacturing organisations improve their production based on predicted demand, rather than waiting for orders to be placed by customers. For example, fast food outlets like McDonalds use tools like observation and rooftop cameras to study customer flow to ensure that adequate resources are on site to prepare for times when customer volume peaks (ACEP, 2011:9). Peck, Benneyan, Nightingale and Geahde (2012:1046) believe that patient flow in hospitals can be managed by adopting similar strategies from the manufacturing setting to predict daily demand and allocate appropriate resources that would address high patient demand.

### 2.4.4 Discharge planning

According to Waring et al. (2014:29), discharging patients cannot be seen as a single or isolated event, but rather as a complex series of linked incremental activities involving multidisciplinary teams spanning hospital boundaries. The entire inpatient journey through a hospital consists of three steps: decision for admission, an inpatient stay and a final step with the discharge process (Ortiga et al., 2012:2). The discharge process should ensure that patients are discharged from hospital at an appropriate time, with adequate notice and the provision that other services are organised (Shepperd et al., 2013:2). More specifically, proactive discharge planning should ensure that patients exit the ward before 12h00 in order to improve bed capacity and hospital

patient flow (De Silva, 2013:15). Ortiga et al. (2012:2) insist that the discharge process should start at the point of admission to ensure a planned and coordinated approach to discharge planning. This would allow the physicians and support staff to prepare the necessary documentation in advance and allow for better and quicker bed assignment that will promote smooth patient flow (Ortiga et al., 2012:2).

Although the emphasis of discharge planning varies between hospitals, Pearson (2008:54) recommends that all hospitals should have some kind of policy or procedure manual in place to coordinate discharges. This will make the discharge process seem less complex for patients, care providers as well as system-related factors such as medication and follow-up appointments (Bertsch, 2014:5). Standardising the discharge process with policies will also ensure that the vital pieces of the discharge process are completed to induce timely discharges. For instance, Bersch (2014:25) identified the vital pieces of the discharge process as the discharge decision made, patient education, discharge medication, follow-up instructions to the patient, support services therapy, availability of disposition location and transport.

Many hospitals make use of a transit lounge (discharge lounge) to achieve discharge efficiency and improved patient flow. For optimal use of the transit lounge, hospitals should ensure that all staff understand the purpose of the transit lounge. The transit lounge should be big enough and well located for pick-ups, it should be suitable for patients who fit the transit lounge criteria and it should operate under strict executive supervision (Hernandez, John & Mitchell, 2014:2). A transit lounge is described by Brassard (2013:37) as a safe environment for discharged patients waiting to be collected by transport. The sooner a patient moves to the transit lounge from the ward, the sooner an acutely ill patient from the ED can move into a ward bed.

According to Waring et al. (2014:79), a lot of the literature perceives that hospital discharges depend on a complex series of linked activities, where multidisciplinary groups and resources come together to exchange and use knowledge in the processes of discharge planning and care transitions. Therefore, it can be assumed that effective patient flow is dependent on well-coordinated discharge processes.

### 2.4.5 Lean management

Lean management originated from the Toyota production system and its core is the pursuit of waste, eliminating everything that does not add value to a product. In the healthcare sector,

lean management is increasingly being applied, both in private and public hospitals to create a platform from which more efficient production planning can be made (Olsson & Aronsson, 2015:115; Clancy & Graban, 2014:35). According to Drotz and Poksinska (2014:179), the primary reason for implementing lean management in healthcare is largely due to the rising demand for healthcare services and the need to provide services with high efficiency and quality. Many hospitals are more frequently starting to use lean management to address overcrowding, access block, long waiting times, and adverse incidents to achieve patient-centred outcomes that add more value to patients' needs (Chan et al., 2014:24). However, Lawal et al. (2014:1) found that although lean management is prevalent in healthcare, its implementation is considered pragmatic and fragmented, and research on its sustainability is still limited. Therefore, Lawal et al. (2014:1) argue that a more holistic application of lean management in healthcare such as the transformation of an overall business strategy will enable multiple healthcare facilities to collaborate in their efforts to improve the system.

For example, the Saskatchewan Department of Health in Canada is referred to in the media as the largest lean management transformation in the world and they committed to a multimillion dollar investment towards the implementation of lean methodology across the province's healthcare system. Kinsman et al. (2015:32) verify that such a lean transformation is an ambitious and resource-intensive undertaking that has the potential to fundamentally change the Saskatchewan health system and such a huge public investment should be rigorously evaluated to inform on-going policy development. However, Kinsman et al. (2015:30) acknowledge the fact that this transformation provides an unprecedented opportunity to generate substantial knowledge that would inform on-going decision-making regarding lean management implementation in healthcare.

According to De Silva (2013:14), lean methodologies can be used by hospitals to address variations to help organisations enhance process steps that are necessary, relevant and valuable for the end users. Therefore, any activity that does not add value in this way is thought to be 'wasteful' and thus a potential target for elimination in order to alter the way hospitals think about service delivery (De Silva, 2014:14). In a study by Mazzocato et al. (2010:380), they believe strongly that the success of lean initiatives in hospitals must be implemented in such a way that the lean goals are linked to the hospital's overarching goals and that management involvement is imperative. Hence, the assumption can be made that lean initiatives should not

be seen as an independent project in a hospital, they should rather be synthesised with official improvement initiatives.

Some of the most commonly used lean techniques endeavoured in healthcare can be described briefly as follows:

- Kaizen (Continuous Improvement): According to Wang (2015:3), this concept uses series of policies of continuously utilising incremental changes in a system in order to boost quality and efficiency that impact on both production and employee performance.
- A3: A3 is a problem-solving process that focuses on an ideal state where the process is defect-free, has no waste, emphasises one-by-one individual care, has immediate response to problems and demand healthcare services that provide patients with a satisfactory hospital experience (Parr, 2010:17). Parr (2010:17) further elaborates that the ideal state is an improvement of the current state, does not contain the wastes that are present in the current state and is a structured pattern of thought that begins with identifying and articulating a problem that limits the system and prevents well-intended workers from delivering ideal service.
- Plan Do Study Act (PDSA): PDSA cycle can be used to understand patient flow and the cause for delay by piloting rapid tests of change and eliminating unanticipated errors before the full implementation (Silvester et al., 2014:476).
- 5S: Young (2014:240) explains that 5S stands for five words translated from Japanese, sort, straighten, shine, standardise, and sustain and the purpose of this technique is a well-organised workplace to ensure a reduction of defects and costs, and to maintain a safe work environment.
- Root Cause Analysis: Root cause analysis is a structured investigation used for the detection of an error and identification of the cause, its relevance as well as the necessary actions to eliminate the problem (Morelli et al., 2015:91). According to Nanda et al. (2015:202), the 5 why approach is one of the easiest methods to identify the root cause of a problem, especially in healthcare.
- Value Stream Mapping (VSM): VSM is a system evaluation that is used to identify value-adding activities as well as wasteful activities regarding materials, flow of information and especially service delivery to people (Dal Forno, 2014:779).

Other lean management techniques not included in the literature can offer similar or even better results when implemented in the healthcare sector. Therefore, the techniques mentioned above can be seen as the most valuable in terms of improving patient flow in hospitals, as more evidence exists that these techniques are used to make noticeable improvements to patient flow systems.

### 2.4.6 Electronic boards

Knowing the status of a hospital is vital, as hospitals are continually confronted with patients arriving, moving around and leaving. Developed countries like Australia are introducing electronic patient journey boards to improve patient flow and facilitate patient movement through hospitals (Clark, Moller & O'Brien, 2014:259). In a study conducted by Devaraj, Ow and Kohli (2013:183) on healthcare information systems, it is indicated that the most basic method of introducing such an information system to the hospital environment is to integrate it with existing clinical and administrative data. Although this will aid patient flow managers to plan patient movement appropriately, electronic systems should incorporate real-time information on predicted discharges and planned admissions, which include both elective and emergency patients who are not usually included in traditional patient administration systems (Pearson, 2008:46).

Clark, Moller and O'Brien (2014:260) believe that the reason patient flow systems are so challenging is the amount of people involved in the delivery of care for patients. It is therefore difficult to map out the entire patient journey. However, with the use of electronic boards, paper based systems, manual white boards and scheduled information sharing meetings can be replaced. In addition, Lovett, Iiig and Sweeney (2014:1) claim that such improvements will typically reflect system mismatching of demand and supply and better escalation strategies can be introduced sooner, when patients' numbers are threatening full capacity. For the same reason, Lovett, Iiig and Sweeney (2014:3) argue that a single technology platform is required to identify task automation and real-time data reporting that will make the use of a patient flow dashboard that summarises demand, supply and throughput more practical for hospital use.

Patient flow dashboards are automatically fed by patient flow software that provides hospital staff with real-time information displayed on large LCD screens to promote transparency and includes information such as occupancy levels, number of pending transfers out, patients

requiring admission and number of confirmed discharges (Lovett, Iiig & Sweeney, 2014:4). Hospitals operating without electronic systems experience, amongst others, the following problems (Lovett, Iiig & Sweeney, 2014:4):

- Traditional whiteboards do not display all the necessary information for patient treatment.
- Patient progress notes must be tracked manually which can become very time-consuming.
- Once a referral has been made to a multidisciplinary team of clinicians, it is difficult to track progress.
- Discharge planning is not standard and cannot be tracked.
- When a patient gets transferred to another ward, their information does not follow them.
- Data collection is manual and is an additional responsibility for nursing staff.
- Duplication of information is common.

Pearson (2008:50) insists that it is possible to overcome the limitations of traditional paper-based and manual-based systems. Furthermore, hospital staff can be provided with real-time information by using an electronic patient flow system (Pearson, 2008:50). Therefore, it can be assumed that the lack of an effective electronic bed management system impedes hospital patient flow and despite the costs implications, the return on investment would eventually be worth it (Devaraj, Ow & Kohli, 2013:182).

### 2.4.7 Multidisciplinary teams (MDTs)

Numerous studies have shown the importance of creating multidisciplinary teams to plan quality improvement techniques as a strategy to improve patient flow effectiveness (McHugh, van Dyk, McClelland & Moss, 2012:7). Since a MDT consists of members from various departments, they all bring different perspectives and knowledge about problems, their underlying causes and potential solutions (McHugh et al., 2012:7). A MDT does not only improve patient safety by fostering a safer and accurate communication between staff members, it also enhances the overall internal patient flow efficiency and patient safety (Athlin,

von Thiele Schwarz & Farrohknia, 2013:8). However, the success of such a team relies on strong cross-disciplinary leadership and clear agreed goals as well as the shared understanding of risk (Leitch et al., 2013:316).

According to Leitch et al. (2013:317), MDTs play a pivotal role in planning and implementing various improvement strategies and the members involved can champion the effort in their respective departments. Therefore, for all the above-mentioned reasons, it is imperative to identify appropriate candidates to participate in a MDT initiative that would be central to the success of all patient flow improvement efforts (McHugh et al., 2012:7).

### 2.4.8 Internal diversion plan

The last improvement strategy that will be discussed in this section is the impact of a well-formulated internal diversion plan for a hospital. Before a hospital can develop an internal diversion plan, it should first acknowledge that patient flow difficulties are a system-wide problem and that it is the responsibility of each department to shift their boundaries beyond their respective departments (Murphy, Carlton & Cannon, 2014:606). Only after this has been acknowledged can hospitals develop system-wide plans to address patient flow. For example, during periods of high patient demands, a patient can be assigned to a unit that does not routinely care for that patient's clinical condition, if that unit has extra capacity (Driscoll et al., 2015:E2). However, Driscoll et al. (2015:E2) believe that diverted placements are undesirable and that they can have a significant negative impact on patient care outcomes. This is due to caregivers in alternate departments lacking the clinical competence and skill levels required to provide optimum care. Therefore, hospitals should first strive to minimise placement diversions by exploring methods related to communication and collaboration that can improve flow and optimise bed utilisation (Driscoll et al., 2015:E2).

According to Driscoll et al. (2015:E2), an internal diversion plan, also known as a hospital escalation plan should consist of various alert levels based on a number scale that reflects the level of risk to patient safety and the extent to which patient experience may be compromised. In addition, Murphy, Carlton and Cannon (2014:606) argue that the overarching goal of such a strategy requires a paradigm shift that creates a system in which patient admissions and discharges involve equal amounts of pulling and pushing, as opposed to purely a push from the ED.

Risks created by internal diversions are compounded when silos exist and it interferes with communication and collaboration between different departments (Driscoll et al., 2015:E2). Therefore, Driscoll et al. (2015:E7) suggest that the development of an internal diversion plan with designated primary and secondary placement options provide departments with the most appropriate diversion options for patients to receive high-quality care.

## 2.5 Measuring patient flow

Using empirical studies, several authors claim that patient flow is one of the most essential components to achieve hospital efficiency with the attention to enhance performance. In a study conducted by Villa, Presentini and Guisepi (2014:197), the researchers not only confirm all the patient flow-related challenges explained in chapter 1, but also reveal that scientific studies have not yet developed a thorough framework to measure overall hospital patient flow performance. This study also supports the notion that patient flow measurements are necessary in order to compare the performance of different hospitals and to identify the root causes of hospital patient flow problems (Villa, Presentini & Guisepi, 2014:197).

If for instance one looks at an overcrowded ED, in most cases it is perceived by the staff as being overcrowded but this is hard to determine quantitatively (Anneveld et al., 2013:3). However, Anneveld et al. (2013:3) proved that the NEDOCS (National Emergency Department Overcrowding Study) tool developed by Weiss et al. in 2004, is a reasonably good tool to quantify the subjective impressions of overcrowding. Therefore, performance measurements are simply a step in the feedback mechanism informing hospitals how they are performing and where improvements are needed most (McHugh et al., 2011:10). In addition, Villa, Presentini and Guisepi (2014:199) provided a comprehensive set of measurements that can be used on three different levels in a hospital.

According to Villa, Presentini and Guisepi (2014:197), a series of standard indicators can be used to measure the overall performance of a hospital. These measurements will contextualise the patient flow analysis in the general hospital setting and identify whether there are problems of shortage of capacity (Villa, Presentini & Guisepi, 2014:199). Villa, Presentini and Guisepi (2014:199) identify indicators such as bed occupancy rates, average length of stay, bed turnaround time and the percentage of emergency cases. Moreover, De Silva (2013:19), in turn, identified mortality rates, readmission rates and number of complaints as the most critical measurement of hospital performance. In addition, Viccelio et al. (2008:10) believe that the

amount of diversions, medical errors and medical negligence claims can also be used to measure hospital performance as it poses tremendous financial implications.

Other streamline measurements occur on the potential patient journeys such as emergency pipelines, surgical pipelines, medical pipelines and outpatient referrals (Villa, Presentini & Guisepi, 2014:199). Villa, Presentini and Guisepi (2014:199) identify these pipelines as mutually exclusive, though they can all be measured by number of admissions, length of stay and percentage of patients within a pipeline using the shared production (e.g. CT scanning). These measurements can be used to understand patient flow variability, to analyse transfers of patients through pipelines and especially to understand the interactions between elective and emergency cases (Villa, Presentini & Guisepi, 2014:199).

When it comes to departmental measurements, it should first be understood that all departments are heterogeneous and may benefit from different indicators to assess their performance (Villa, Presentini & Guisepi, 2014:200). Measurements such as admission and discharge ratios, occupancy levels, census, percentage of emergency cases and the ratio of patients being discharged by 12h00 are normally used to assess scheduling and capacity problems – and to identify bottlenecks that cause delays in patient movement (Villa, Presentini & Guisepi, 2014:199).

According to Villa, Presentini and Guisepi (2014:204), an important aspect for the above-mentioned measurements is to redesign information systems to support patient flow management strategies. Therefore, Villa, Presentini and Guisepi (2014:204) argue that hospitals need robust standards and guidelines regarding data collection procedures as well as the construction of indicators to set up an effective patient flow control system.

## 2.6 Conclusion

This chapter provided an overview for understanding the concept of patient flow management in hospitals. It was identified that patient flow depends on the inherent variations found in any healthcare delivery system. It is therefore a common but an incorrect assumption that poor patient flow is a result of what appears to be the randomness and complexity of disease presentation and the high demand for healthcare. However, achieving good patient flow usually refers to patients who move through the various parts of a hospital system without delay, providing benefits to patients and hospitals that include improved clinical outcomes.

The first part of the literature review concentrated on defining patient flow, followed by an explanation of how patient flow works. It is therefore imperative that hospitals understand and realise the importance of effective and efficient patient flow management. The literature review also revealed the important fact that patient flow approaches are heterogeneous and unique in every healthcare setting.

The second part of the literature review explored the most common and contemporary methods used by hospitals to assess and improve their patient flow systems. Improving patient flow is perceived as a relatively straightforward task. However, as hospitals attempt to improve their patient flow systems, they soon discover that there are existing methods to address patient flow problems. This section also explained which patient flow measurements can be used to monitor improvements as well as overall performance.

Finally, various patient flow methodologies found in the literature made it possible to achieve the goal of this chapter by providing a comprehensive description of what patient flow is, how it works and what the need for effective patient flow management is.

# Chapter 3: Patient flow in GSH: The current reality

## 3.1 Introduction

In the previous chapter, theoretical and conceptual patient flow methods were explored to describe what patient flow entails and how they contribute towards the overall patient journey in hospitals. A comprehensive literature review was conducted in order to answer three questions:

- What is patient flow?
- How does patient flow management work?

- Why do hospitals need an effective patient flow system?

The preceding chapter also identified what performance measures hospitals use globally to determine the effectiveness of patient flow. The explored literature provided a better understanding on the importance of patient flow towards overall hospital performance and how patient flow inefficiencies could be addressed.

In addition to exploring theoretical literature and the perspectives of GSH employees on patient flow, which is the empirical part of this study, it will be useful to define the current patient flow processes in GSH. Therefore, in this chapter, the goal is to explain the current reality of patient flow in GSH. In order to reach this goal the following objectives will be pursued:

- To explain context of patient flow in GSH.
- To explore the current patient flow policy.
- To explain patient flow performance measures in GSH.
- Identify and describe the main patient flow challenges in GSH.
- To discuss key lessons of the patient flow reality of GSH.
- To draw conclusions with regard to these topics.

The first section of this chapter will elaborate on the context of patient flow and how patient flow management fits into the bigger GSH system. This section will also explain the typical journey of an emergency patient and their movement through GSH and beyond.

Secondly, in order to successfully conceptualise the true nature of patient flow in GSH, a review of the patient flow policy implementation is necessary to elucidate the main factors that influence implementation. The patient flow manager (researcher) will clarify the implementation of this policy and its shortcomings.

This chapter will thirdly explore some of the patient flow performance measures explained in the preceding chapter and will use them to describe the patient flow performance of GSH. This performance data will be provided by the Information Management Unit (IMU), which is responsible for data management and report formulation for GSH. The performance measures that will be addressed in this chapter will be bed occupancy rate, mortality rate, average length of stay and Patient Daily Expenditure (PDE).

The fourth section of this chapter will identify and explain the main patient flow challenges that hamper the flow of patients through GSH and beyond. These are also the most common challenges that can result in patients not receiving the optimum care they require.

In fifth section of this chapter, a final discussion will be provided on key lessons of the current patient flow process of GSH. This will be done in terms of policy implementation, the connection between hospital bed occupancy rate and patient mortality, average length of stay, discharge planning, pulling and pushing mechanisms and the use of the transit lounge.

This chapter will conclude by explaining the links between policy implementation, the experiences of the patient flow manager as well as the measurements presented to provide an overview of the current reality of patient flow at GSH.

## 3.2 Context of patient flow in GSH

The main focus of this section is to provide a brief history of the development of patient flow in GSH and to map out the usual hospital journey of patients through the hospital.

### 3.2.1 Development of patient flow management

Before the concept of patient flow management was introduced to South African hospitals, the responsibility of patient movement was shared between clinicians and nursing staff. The nurses would accompany clinicians on their morning ward round in order to collectively discuss which patients could be discharged in order to establish the daily capacity. Thereafter, the clinician would indicate how many patients should be admitted and provide the nurses with a list of expected admissions. There would also be an indication of the order in which patients should be admitted. Following this, a calculation would be done to determine whether the ward would have enough capacity for the potential admissions. However, if the ward could not provide sufficient beds for all potential admissions, the doctors usually searched for open ward beds in other departments where patients would be booked as boarders. To search for beds in the hospital became a major challenge for clinicians and nurses, who reduced the time they spend with patients. Therefore, the idea of employing a patient flow manager to facilitate patient movement was explored by GSH in 2008.

It is assumed that employees perceived the appointment of patient flow managers as the answer to all bed capacity problems. However, when patient flow management became a reality in GSH, the doctors and nurses that previously searched for bed capacity became less involved in patient movement and the burden of patient flow became the responsibility of one person. However, although the doctors and nurses could spend more time with their patients, the bed management challenges did not disappear. GSH faced a whole set of different challenges that will be explained later in this chapter.

Another challenge that emerged was the fact that the patient flow manager was only on duty until 16h30 from Monday to Friday. Thereafter, doctors and nurses still had to search for ward capacity themselves. The demand for hospital beds was still a challenge as many beds would become available from after 16h00 and patients especially in the ED/trauma unit were still lying on trolleys without being allocated a ward bed. This motivated the supervisor of the patient flow manager to create an additional post that would cover GSH with regard to bed management until 23h00 at night.

This strategy made a big impact on patient movement and a patient flow audit conducted proved that after the employment of an after-hours patient flow manager, patients received beds sooner, which reduced the time they spent on a trolley. However, the two patient flow managers were accountable for all patient movement and the doctors and nurses involvement became even less. It reached a point that when no patient flow manager was on duty; no one really knew how patient movement worked and who was responsible for it. This allowed multiple patient flow perceptions to develop and each department was concerned with its own interests. Departments started to work in silos and there was no standard patient flow system in GSH, especially when no patient flow managers were on duty. Therefore, the development of patient flow management in GSH was perceived to improve patient movement. However, it created new challenges for GSH. The above-mentioned brings us to one of the motivating factors that initiated the need to conduct this study in GSH. In order to understand patient movement in GSH even better, the next part will describe how patients move through the hospital.

### 3.2.2 Journey of patients

The focus of this section is to describe the journey of patients through the ED to the ward until they are discharged.

Patients that usually enter GSH's ED either come with an ambulance, their relatives (or friends) or they are referrals from other surrounding hospitals. The first contact that patients have with GSH employees is at the entrance where they are triaged to determine how serious their condition is. The severity of their condition or triage score determines how long they will wait until they are attended to, as the more seriously ill patients will take priority. After the clinicians have formally reviewed the patients, one of three things happens.

Firstly, if patients' assessments reveal that they are fit to be discharged from the ED, they are sent home with the necessary medication. Secondly, various procedures and tests are requested for more seriously ill patients to determine if they need further hospital treatment. Thirdly, when a patient's condition requires further hospital treatment, the emergency doctor will refer the patient to the necessary speciality (for example medical or surgical) for further treatment.

If a patient is referred to another speciality, the doctor to whom they were referred should review the patient in the ED to establish whether the patient will be accepted by the department. After accepting the patient, the doctor should make the necessary arrangements in their ward to admit this patient within a reasonable time frame. The patient flow manager will be informed to facilitate patient movement after the ward has been informed. If no beds are available or no discharges have been identified, the patient flow manager will direct the doctor to the most appropriate ward where they can send a stable patient from the ward in order to admit the acute patient. In the ideal situation, this simple process involves doctors and nurses communicating with one another, nurses across departments communicating with one another, contacting porters to transfer patients who must be accompanied by a nurse for proper hand over, and the patient flow manager to ensure smooth patient movement. However, according to an observation by the patient flow manager, this process is delayed by various factors such as poor communication, doctors in theatre, nurses being unavailable, staff constraints, porters' delays, no escort nurse being available and phones not being answered. These factors delay the movement of the patients to ward beds.

When the patients from the ED eventually get transferred to the ward, their treatment plan should be made clear by the doctor. Doctors and nurses should continuously communicate with regard to patient treatment and they should involve proactive discharge planning, which will be explained in section 3.5. After patients are formally discharged, only then can the bed be occupied by another patient requiring admission. This statement reiterates the fact that the

whole patient flow system in a hospital depends greatly on the method of discharge used in order to create sufficient bed capacity for the daily demand. The policy that links all the above-mentioned together will be described briefly in the section that follows.

## 3.3 Patient flow policy

One of the most important management tools will be described in this section of the chapter and the main focus will be on how statements in the official bed policy of GSH can influence patient flow management. After this discussion, general patient flow policy comments will be discussed briefly and some theoretical views are explored to stress the importance of regularly updating policies.

According to Rankin et al. (2015:115), health policy implementation can be daunting and challenging for healthcare services, especially for the workforce and facilities where there is a lack of executive leadership. Harvey and Kitson (2015:123) verify this by stating that a gap between evidence and policy can influence implementation, particularly where factors such as contestable nature of evidence, multiple influences on decision-making and the effect of contextual variables exist at different levels in an organisation. The patient flow manager (researcher) of GSH supports the above-mentioned statement as the same factors hamper policy implementation at GSH. The current official bed policy of GSH was developed in 2009 and is considered outdated. However, the draft bed policy has been in draft form since 2014 and is still in development. The dynamics of patient flow management has changed tremendously over the last 6 years and the 2009 policy lacks information and this can influence patient flow negatively. Some of the content of the bed management policy hampering patient flow through the hospital will be highlighted and discussed briefly below.

### 3.3.1 Statement 1

"In principle, any vacant bed in the hospital may be used by any discipline when needed." This statement is very broad as the hospital consists of various wards such as ICU, paediatric, gynaecology, obstetric, maternity, isolation and adolescent wards that cannot be used for any patients who require ward admission. This also has an impact on surgical wards that reserve their beds for theatre patients the next day. However, since this rule is in the official policy, many employees still manipulate the system to get their patients admitted into a ward bed by enforcing this rule.

### 3.3.2 Statement 2

"Wherever possible, only stable patients should be transferred to a loan bed in the receiving ward in order to accommodate the new acute admissions to wards that are on emergency intake". This is not happening. According to the patient flow manager of GSH, this statement creates two problems. The first problem is that doctors do not identify which patients can be moved to other wards to create space for their acute patients. The second problem arises when acutely ill patients are directly admitted into other disciplines' ward beds by enforcing statement 1.

### 3.3.3 Statement 3

"When one department provides a bed for another department, that bed must be vacated by 09:30 the following day, so that it is available for emergency cases". Most of the medical and surgical teams are on morning ward rounds where they discuss patients and make collective decisions that usually include which patients are to be discharged. Therefore, no patient boarding in another ward is able to be transferred back by 9h30 the next morning if that ward did not yet process their daily discharges.

### 3.3.4 Statement 4

"If there are still no beds available, the Medical Superintendent should be asked to liaise through other channels." This statement is vague and incorrect. The Medical Superintendents (now called Medical Manager Services) are meant to be the highest managing bodies for hospital departments and should not get involved in operational duties unless action from the various departments have failed. Each department should escalate departmental pressures to their respective consultants to take action. Thereafter, the Medical Manager Services can be approached to intervene where required. This rule causes everyone to phone the Medical Manager Services directly for any patient flow-related issues.

### 3.3.5 Statement 5

"There is also (less detailed) information on Clinicom, using the 'Free Bed' look-up facility." The free bed inquiry function that is available on the Clinicom database is extremely inaccurate. The ward clerks are supposed to admit and discharge patients in real-time on this system. However, the ward clerks finish their duty at 15h30 and it is the responsibility of the ward sisters of 52 wards to contact the main reception area of the hospital to admit or discharge patients. According to an audit by one of the Medical Manager Services and the patient flow manager, the Clinicom system is only updated the following day when the clerks resume duty.

### 3.3.6 Statement 6

"Registrars (assisted by the Interns) must themselves negotiate for a bed by telephoning the wards directly." The registrars and intern doctors only negotiate for beds when no patient flow managers or nursing managers are on duty and in the case when a patient needs to board out to another department. Locating an open bed in GSH is considered to be too time-consuming for doctors. The reason for this is that doctors feel that attempting to locate ward beds will ultimately affect their contact time with patients, reducing the time they spend with patients in need of medical care.

### 3.3.7 General policy comments

It is clear that the current two-page bed management policy of 2009 is outdated and contradictory to current work flow processes. At the same time, the 19-page draft patient flow policy is considered to have either too much detail or not enough detail and will remain in draft form until a consensus is reached. The delay in updating the policy can create more complications at operational level, which is confirmed in a study conducted by Sandstrom et al. (2015:10) who state that the willingness to change and to successfully implement new guidelines depends on the relationship between employees and top management. In results from the same study, Sandstrom et al. (2015:10) claim that nurses and operational employees tend to rely more on knowledge from their colleagues and personal experience than on formal evidence-based sources, but it is also indicated that decision-makers appear to do the same. Therefore, it can be assumed that unless a common understanding exists amongst operational employees and management, patient flow will continue to function inconsistently (Kilic, Kalaca, Unal, Phillimore & Zaman, 2014:5). It has been determined in the above-mentioned discussion that updating policies is crucial to stay on par with the continuous development of healthcare. However, in order to establish changing trends and new developments, patient flow performance measurements are considered to be an ideal tool to address flow systems, which will be discussed in the section that follows.

## 3.4 Patient flow performance measures

The following section considers patient flow management through reference to various patient flow measurements identified in chapter two. The data that will be used in this section will be derived from a report, which is applicable to this study, requested by the patient flow manager from the Information Management (IM) unit. It could be anticipated that a larger range of data over a longer period will provide a more accurate description of the factors that define patient

flow. The report, consisting of data ranging from January 2015 until December 2015, provides the researcher with an entire annual cycle of captured data. In addition, other audit and project information with regard to patient flow will also be used to further describe patient flow in GSH.

### 3.4.1 Bed occupancy rate

It can be assumed that in order to supply enough ward capacity, it is important to determine what the Bed Occupancy Rate (BOR) of the hospital is. Bed occupancy can be defined as the percentage of available hospital beds occupied by patients at a specific point in time (Pearson, 2008:15). According to Villa, Presentini and Guisepi (2014:198), BOR is one of the most used standard indicators to determine whether there are situations of capacity shortage that create patient flow problems. This is confirmed by the Escalation Policy (2010) that clearly indicates at which occupancy levels the hospital should take action. For example, level 1 heralds a situation where the Emergency Unit is fast being outstripped and the ward bed status allows patients to be admitted to the wards up to 95% capacity. More than likely, at this level emergency patients requiring ward admission would be admitted into any usable bed, elective surgery should be temporarily paused and all senior clinicians should take action in their respective departments. Pearson (2008:15) argues that if hospitals exceed bed occupancy levels of 90%, there is an exponential increase in the number of times they experience access block. Therefore, it is important for hospitals to monitor their BOR at all times, especially at times when the ED unit operates above its capacity.

According to the statistics provided by the IM unit, GSH had an average midnight BOR of 85% for 2015. The month of August 2015 was the only time the BOR exceeded 90%. However, some of the ward beds could not be used for acutely ill, medical and surgical patients as explained earlier in this chapter. Therefore, it can be assumed that the BOR is an inaccurate reflection of the actual usable beds in the hospital. Although the BOR at midnight is a true reflection of the available beds, it would be more valuable to have a midday BOR when the emergency unit, trauma unit and all clinics are active and many more patients require ward admission. In addition, it would also be interesting to know at what occupancy levels the different departments function. For example, according to the IM unit report, the average BOR for medical and surgical for 2015 is 87% and 68% respectively. The medical ward exceeded 90% four times in 2015, where the surgical ward never crossed the 90% mark. Consequently, it is more likely for medical patients to board in surgical wards than it is for surgical patients to board in medical wards. Therefore, it is recommended by the patient flow manager of GSH

that an additional study be conducted on the utilisation of bed capacity as well as how and when BOR is captured to balance the load between departments.

### 3.4.2 Mortality rate

In a study conducted by Boden et al. (2015:3), the monthly mortality rate is defined as the number of deaths that occur in a hospital over a period of time compared to the number of patient admissions for care in that hospital over the same time. Boden et al. (2015:1) argue that if hospitals experience high bed occupancy periods, inpatient mortality proved to increase by 9%. This is usually caused by prolonged trolley times and poor departmental performance.

According to the statistics provided by the IM unit in Table 3.1 below, the average monthly mortality for GSH that totals 220 deaths for 2015. The medical department that consists of general medical and other sub-speciality wards had an average monthly mortality of 163, which is 74% of all the deaths that occur in the hospital. The surgical department, in turn, had an average monthly mortality of 55, which is only 25% of all the deaths that occur in the hospital.

**Table 3.1: 2015 Mortality Rate of GSH**

| Speciality2 | 2015/01/01 | 2015/02/01 | 2015/03/01 | 2015/04/01 | 2015/05/01 | 2015/06/01 | 2015/07/01 | 2015/08/01 | 2015/09/01 | 2015/10/01 | 2015/11/01 | 2015/12/01 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Anaesthetics | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Gynaecology | 0 | 3 | 2 | 2 | 3 | 2 | 2 | 0 | 2 | 2 | 5 | 2 |
| Obstetrics | 3 | 3 | 0 | 3 | 3 | 1 | 2 | 1 | 1 | 8 | 2 | 2 |
| Neonatal Medicine | 24 | 27 | 45 | 39 | 35 | 31 | 37 | 25 | 39 | 33 | 28 | 24 |
| Paediatrics | 0 | 0 | 0 | 0 | 1 | 0 | 2 | 0 | 1 | 1 | 0 | 0 |
| Medicine | 100 | 90 | 100 | 119 | 145 | 111 | 112 | 143 | 127 | 102 | 97 | 133 |
| General Psychiatry | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| Orthopaedics | 2 | 1 | 0 | 1 | 1 | 2 | 0 | 3 | 0 | 2 | 3 | 3 |
| Radiation Medicine | 10 | 10 | 15 | 17 | 13 | 12 | 24 | 12 | 18 | 17 | 22 | 17 |
| Surgery | 41 | 32 | 66 | 53 | 52 | 55 | 56 | 53 | 49 | 55 | 50 | 43 |
| **Grand Total** | **181** | **166** | **228** | **234** | **253** | **214** | **235** | **237** | **237** | **220** | **207** | **225** |

It would be interesting to study how specific improvement interventions with regard to patient flow and bed occupancy rates would affect the mortality levels of GSH. Therefore, a whole system transformation is required to create lower bed occupancy rates. However, this depends on departmental buy-in and enhanced system-level improvements, which may lead to decreased mortality rates and improved patient outcomes (Boden et al., 2015:5).

### 3.4.3 Average length of stay

In a hospital setting, the average length of stay (ALOS) can be defined as the total duration a patient spends in the hospital or ward as an inpatient divided by the number of patients (Armony et al., 2015:168). According to Armony et al. (2015:181), the ALOS, also known as the turnover rate per bed is increased when patients are waiting longer for ward admission. In essence, all hospitals should attempt to keep the ALOS of patients as low as possible by reducing the time patients wait for ward admission (Armony et al., 2015:181). Armony et al. (2015:181) believe that the first day of treatment is considered crucial, so tests, medical procedures and treatments can already start then, hence reducing the length of stay.

According to the statistics provided by the IM unit, the ALOS for GSH was 6.1 days in 2015. However, the ALOS will be different for the various departments in GSH. For example, according to the statistics provided by the IM unit, the department of medicine had an ALOS of 6.3 in 2015 and the surgical department an ALOS of 7.6. It can be assumed that these measures can be used to encourage patient flow improvements that would enhance throughput and continuity in these departments in an attempt to decrease the ALOS. This is supported by a study conducted by De Silva (2013:4) which claims that by reducing length of stay, the entire patient flow system would become more efficient, but, more importantly, it would enhance patient satisfaction and save costs.

### 3.4.4 Patient Daily Expenditure (PDE)

One aspect that many people do not take into consideration when it comes to delaying a patient's stay in a public hospital is the financial impact it has on a hospital. If a patient is admitted to a hospital unnecessarily, the hospital incurs wasteful cost, especially in a tertiary hospital such as GSH. Therefore, it can be assumed that it is to the benefit of a hospital to discharge healthy patients to create space for more acutely ill patients, which will decrease waiting times and ultimately reduce costs. According to the statistics provided by the IM unit for 2015, the average PDE for GSH is R5 060. This includes various expenditures such as lab costs, consumables, staffing and electricity. The formula by which the IM unit calculates the PDE is:

*Inpatient Days + (Day Pts/2) + (Total OPD Headcount/3) + (Emergency Headcount/3) ÷ Bas Expenditure*

This highlights the importance of processing patients through the hospital system as effectively as possible to warrant that patient movement is not delayed by system errors such as poor discharge planning, long waiting times, access block and communication difficulties. The formula also indicates that in order to reduce PDE, GSH should focus on their entire patient flow system, which includes all inpatients, outpatients as well as emergency patients who are being processed through the system. As stated in chapter 2, all healthcare facilities should define patient flow in terms of the balance between the capacity and demand, available services and internal strategic goals (Backer, 2002: 45). However, several studies indicate that in order for hospitals to improve their systems or reduce their costs, all stakeholders in a hospital should first agree on common goals and cooperatively develop strategies to accomplish system-level improvements (Viccellio et al., 2008:5). Some of the major challenges that have a direct influence on patient flow performance measurements will be identified and explained in the section that follows.

## 3.5 The main patient flow challenges in GSH

This part of the chapter will focus on the most important challenges that affect patient flow in GSH. Each of the identified challenges explained in this chapter has a significant impact on patient flow, which hampers the efficient movement of patients through GSH. For the purpose of this study, the challenges were obtained from the observation and experience from the patient flow manager as well as regular frustration expressed by operational staff who is involved with patient movement. The sources used to identify these challenges include various waiting time surveys, current communication tools used, current discharge planning practices and the opinion of the patient flow manager.

### 3.5.1 Outdated patient flow policy

Policies are supposed to link a hospital's vision and its daily operations that enable employees strategically to understand their roles and responsibilities within predefined limits clearly. A well-developed policy would allow management to guide operations without constant management intervention. Instead of promoting smooth patient flow in GSH, it has been established that the content of the current bed policy of GSH is outdated, which causes more challenges. Therefore, it can be perceived that the policy objectives of GSH changed from when it was first developed in 2009. The policy discussion in section 3.3, confirmed that the current policy does not provide employees with adequate information that allows them to

perform their duties and make decisions within appropriately defined boundaries. The consequence of this weak policy content created contradictory patient flow practices in GSH, which caused employees to develop their own perception with regard to patient flow. In order to address this issue, strong leadership and management support would be necessary to change the mindset of the current workforce of GSH and to pursue patient flow solutions at the same time. Although the problem is hospital wide, the biggest area of concern is usually the performance of the ED, which will be discussed below.

### 3.5.2 Emergency department boarding

One of the biggest contributors that cause ED overcrowding is the practice of keeping admitted patients on stretchers in the ED for long periods of time, which could be detrimental to the treatment of patients. It is known that boarding in the ED increases patient morbidity, ALOS, mortality and ED resource demand. Therefore, ED boarding hampers the ability to deliver high-quality hospital care. The main challenge of boarding patients is when the ED is overwhelmed and runs out of capacity to respond to the demand for emergency services. This affects not only the patients but also the employees working in the ED. Another risk of ED boarding is the exposure of patients to hospital-acquired infections. Therefore, it can be agreed that ED boarding is not good for patient care and staff satisfaction. However, attempts to solve ED boarding should be driven by strong hospital leadership that is dedicated to balance out the pressure, which is usually only experienced in the ED.

### 3.5.3 Communication impediments

Good communication structures are usually the key to an effective hospital system. Even the best communication system would be dependent on people understanding and utilising it appropriately. In hospitals the two most important concepts with regard to patient flow are adequate push-and-pull mechanisms. The concept of pushing and pulling is perceived as vital when it comes to effectively placing patients in appropriate ward beds. Pushing, on the one hand, usually occurs from the ED and could be viewed as moving a patient away from oneself or the origin of force, which in this case is the ED. Pulling, on the other hand, typically occurs from the ward and could be viewed as drawing patients towards itself or to the desired location.

Pulling and pushing practices were decently implemented before the appointment of a patient flow manager at GSH, where the responsibility of patient movement was a shared responsibility between doctors and nurses. The appointment of the patient flow manager caused

the doctors and nurses to withdraw their efforts to assist in patient flow in the hospital. This created endless challenges with regard to patient movement, especially when the patient flow manager is not on duty. Pushing in GSH usually becomes a priority when the ED runs out of capacity to accommodate new patients. Even when this happens, the ED relies on available ward capacity and their ability to actively pull patients into open ward beds. The weak communication structures have a direct influence on the long waiting times experienced by patients in the ED, which will be further explained below.

### 3.5.4 Long waiting times for ward beds

Hospitals can be viewed as one of the most important determinants of our quality of life and requires various resources to operate efficiently. If resources are not managed appropriately, it can cause frustration, which is exacerbated by delays. The most common delay experienced by patients in many hospitals is the inability for a hospital system to transfer patients into a ward bed within an acceptable time frame. It is clear that lengthy waiting times are a persistent challenge experienced by hospitals and it has been linked to a variety of undesirable outcomes that affect both the patients and the employees. The lack of urgency to transfer ED patients into ward beds at GSH remains the key contributing factor that creates the challenge of patients waiting long hours for ward beds. It is not only the ED patients that are affected by long waiting times, but also elective patients sitting outside surgical wards waiting for beds to become available.

It has been established that waiting times could be reduced if hospital put systems in place to address the challenges that causes access block. However, access block and discharge planning is perceived to be the answer to provide appropriate ward capacity for patients waiting for wards beds. However, even these systems are experiencing their own difficulties, which are explained in the next part of this section.

### 3.5.5 Discharge Planning

According to the Emergency Case Load Management Policy (ECLMP) (2012), discharge planning can be defined as a medical and nursing process or plan that forms part of the continuum of patient care by developing a discharge plan that forms part of a patient's clinical records. This process should commence from admission and includes an expected date of discharge for each patient, but predicted discharge should be reviewed regularly throughout a patient's stay (ECLMP, 2012). It is clearly stated in the ECLMP (2012) that 90% of all discharges should vacate their ward beds by 10h00 on the day of discharge.

According to an observation of the patient flow manager of GSH as well as evidence from various system audits, approximately 80% of discharged patients vacate their ward beds after 12h00 daily. Apart from patients' clinical notes, no discharge plan exists in patient folders, which means the discharge process will only commence on the day the discharge decision is made (Folder Audits, 2015). The transit lounge statistics revealed that only certain wards send their discharged patients to the transit lounge area and the nurse manning the transit lounge stated that the transit lounge is tremendously underutilised. Therefore, the assumption can be made that discharged patients wait in their ward beds until their transport collects them, which results in many beds being blocked for acutely ill patients requiring ward admission at GSH.

The results from a project that is currently running in the acute surgical ward with regard to discharge planning proved that communication between doctors, nurses, clerks and the bed manager can improve the total process time of all discharges. The baseline measurement of this project was captured in June 2015 and had an average process time of 6 hours and 30 minutes. Furthermore, the process time captured in February 2016 was under 5 hours. This project demonstrates that with strong leadership and a standardised process, improvement is possible, but it relies greatly on the ability of multi-disciplinary teams to work cooperatively.

### 3.5.6 Access block

In chapter 2, access block is clearly defined and it is seen as one of the leading causes of overcrowding, especially in the ED where patients wait long to access ward beds. In order to alleviate access block, hospitals should measure and reduce waiting times of patients waiting in the ED for admission and should improve on discharge planning to create vacant beds sooner (Pines et al., 2011:1359).

According to the waiting surveys done at GSH by Dr Jacob and the patient flow manager, the current average waiting time for a medical patient after referral from the emergency unit consultant to an internal medical registrar is 8 hours and 20 minutes. This time gets measured from the time the patient is referred to the internal medical registrar until the patient is being transferred to the ward. This time does not include the time the patient spent in the ED as an emergency patient. According to the hospital's annual performance plan, in order to achieve one of the hospital's improvement goals, the ideal waiting time for such patients should be below 8 hours.

Waiting time surveys for surgical patients is much more difficult as surgical referred patients are not grouped into one space. In addition, the administration registers for each area are also not being completed, which makes it difficult to track patient movement by only using registers. Therefore, all waiting surveys must be done manually by people who understand the movement of patients through the hospital.

According to the porter's book, 80% of patients waiting for ward admission in the ED only start moving to the wards from 15h00, which is a reflection of the poor discharge planning practised at ward level. The patient flow manager also completed a study on the bed-dead-time, which is the time a discharged patient leaves the bed until the next patient occupies that bed. The results indicated that after a patient vacates the ward bed, it will remain vacant for approximately 3 hours until the next patient occupies that bed. An investigation on these results revealed that there were poor push-and-pull mechanisms in place to expedite patient movement, which is a reflection of poor communication between the ED and the wards.

All of the above-mentioned difficulties and other additional factors contribute to access block experienced at GSH and various interventions are required to improve on these conditions. However, to address access block adequately, hospitals need strong leadership, good governance and updated policies that are properly developed and enforced at all levels in the hospital (Geelhoed & de Klerk, 2012:124). The section that follows will elaborate on the key issues identified in the description of patient flow in GSH above.

## 3.6 Key lessons on the patient flow reality in GSH

The current patient flow processes of GSH will be reflected on briefly in this section with the purpose of concluding the discussion on the reality of patient flow in GSH. Only the most significant factors with regard to patient flow explained in the preceding sections will be identified and discussed below to finalise the description of patient flow processes in GSH.

### 3.6.1 Significance of policies

It can be argued that healthcare has developed into one of modern society's most dynamic policy arenas with regard to alleviating the challenges it faces and supplying the necessary healthcare services. Although health policy is seen as formal written documents, rules and guidelines that present managers' decisions about legitimate and necessary actions to improve

a healthcare system and the health of the community being served, Kuhlmann, Blank, Bourgeault, and Wendt (2015:3) suggest that a multilevel governance approach to a wide range of factors that influence policy implementation is required to address equity in healthcare policy adequately. One of the biggest challenges regarding policy development and implementation at GSH is the visible gap between policy developers and operational staff. More importantly, executive or senior managers have different perspectives on how patient flow should work at GSH, thus causing delays when waiting to finalise and sign off policies. Therefore, in attempting to address the difficulties of patient flow policy development in GSH, various departmental boundaries and jurisdiction should be explored to develop an advocating body that can attempt to regulate patient flow in GSH.

### 3.6.2 Bed occupancy rate (BOR), mortality rate and average length of stay (ALOS)

It is clear that there is a direct connection between a hospital's BOR and its mortality rate, as explained earlier in this chapter. According to many patient flow theories, high bed occupancy levels create a demanding environment that put employees and resources under pressure to provide patients with optimum care. This directly influences the mortality rate of a hospital. It can be assumed that low in-hospital occupancy levels would decrease access block, which would decongest the ED and patients would then receive emergency care more promptly, which in turn could significantly reduce inpatient mortality rates.

Another factor that affects hospital BOR is the ALOS. A number of studies suggest that methods to reduce ALOS are associated with the time they spend in the ED, which includes occupying a trolley waiting for ward admission. However, according to the statistics provided by the IM unit, although the medical department has an ALOS of 6.3 days and surgical department 7.6 days, the BOR of medical was much higher than surgical at 87% to 68% respectively. The surgical BOR and ALOS are also affected by the medical boarders they regularly accommodate. This has a negative impact on their departmental expenditure (PDE) and can also influence their consumable costs and budget allocations. Most of the patient flow indicators have a strong connection, affect one another and should be addressed collectively across the entire hospital.

### 3.6.3 Importance of discharge planning

It is evident that discharge planning in GSH needs some attention to improve the supply of ward capacity earlier in the day. According to De Silva (2013:20), hospitals should implement proactive discharge planning strategies, which involves how patients move on from hospital

services safely, appropriately and as early as possible. Discharge planning at GSH is not standardised and each department processes their discharges differently despite the clear discharge planning guidelines in the ECLMP. Adequate discharge planning will reduce access block and the movement of patients into vacant ward beds can start earlier. This will allow waiting times for ward beds to reduce, which will according to many references in the literature also reduce the hospital stay of patients. If there is a reduction in the hospital stay of inpatients, it will be possible to visualise the improvement on the ALOS report from IMU. Therefore, discharge planning could be viewed as one of the most important factors that could improve current patient flow in GSH. However, another related factor with regard to discharge planning is the bed-dead-time, which significantly depends on well-developed push-and-pull mechanisms.

### 3.6.4 Utilisation of the transit lounge

The transit lounge of GSH is currently underutilised and over-resourced. It is important to note that if wards make use of the transit lounge, ward beds would be vacant even earlier and the flow of patients in and out of wards more efficient. It can therefore be assumed that by addressing the above-mentioned, patient flow in GSH would improve and enhance quality care by making the best use of resources and staff time that would ultimately reduce PDE. It is also known that patient flow systems are unique to each hospital and improvements may seem relatively straightforward. However, departments often work in isolation, while a collective approach would offer greater improvement opportunities. This chapter will continue with a conclusion in the next section, which will provide a final summary on the reality of patient flow in GSH that was addressed.

## 3.7 Conclusion

In this section, comments will be made with regard to each section discussed in this chapter, which will draw final conclusions relating to each objective that was explored.

This chapter investigated the current patient flow processes of GSH. Various policy documents, supporting literature, hospital reports and observations were used to describe the current patient flow system of GSH. Although it is evident that the patient flow system of GSH needs improvement, baseline work such as updating policies, accurately capturing data as well as agreeing on common goals should be addressed before improvement strategies can be implemented, as all patient flow factors connect and affect one another.

The first section of this chapter briefly explains how patient flow management fits into the larger hospital system of GSH. This was done by mapping out the generic journey a patient follows through the ED to the ward until the patient is formally discharged.

The second section of this chapter focused on a few controversial statements of the current bed policy of GSH in order to highlight how the policy hampers the current patient flow system. This section also addressed the difficulties and dissimilar interests amongst various departments to update the bed policy. The patient flow manager also expressed his view and experience in terms of policy implementation to substantiate the current patient flow inconsistencies.

The third section of this chapter focused on some of the most common patient flow measures as explained in the preceding chapter, which were used to describe and compare the patient flow performance of GSH.

The main focus of the fourth section of this chapter was to identify and clarify the major patient flow challenges experienced in GSH. These challenges contribute to poor patient outcomes and are usually responsible for the extended hours waiting for ward admission.

The fifth section describes the current patient flow process of GSH in terms of policy implementation, BOR and patient mortality, ALOS, discharge planning, push-and-pull mechanisms and the use of the transit lounge. This section used most of the information of the preceding sections to formalise final discussions with regard to the current patient flow processes of GSH.

This chapter closes by making concluding comments on each of the sections explored in this chapter in order to create a better understanding of how patient flow management connects with the broader GSH system. Therefore, the final conclusion reached is that this chapter achieved its goal successfully, which is to provide an overview of the current reality of patient flow at GSH.

The chapter that follows will contain the empirical component of this study, which is exploring the opinions of the employees of GSH on the current patient flow system.

# Chapter 4: Patient flow in GSH: The perspective of doctors and nurses

## 4.1 Introduction

The previous chapter highlighted and described the most important aspects of patient flow practices at GSH. The material used to describe the patient flow system at GSH consisted of various policy documents, data reports from the IM unit, results of surveys, results of improvement projects as well as observations from the patient flow manager of GSH. The outcomes of this chapter revealed that the patient flow system of GSH is not functioning optimally and that there are many controversial practices with regard to patient movement. Therefore, it would be beneficial to understand how the doctors and nurses of the different departments perceive patient flow practices in GSH.

It is believed that central hospitals (academic hospitals) are generally major providers of acute and sub-acute healthcare, which can be perceived by many employees as an emergency or trauma department's responsibility. Typically, one of the biggest challenges remains the movement of patients in and out of acute inpatient settings without undue delay, while maintaining optimal standards that are reliant on ward capacity to alleviate the demand for inpatient admission. Traditionally, a balance between emergency departments and inpatient care is crucial to achieve both high-quality patient care and efficient throughput.

It is not uncommon that different opinions amongst employees exist with regard to the movement of patients throughout the various departments within a hospital. A difference in opinion can delay the movement of patients even further, especially in larger hospitals where departments are usually managed in silos. Therefore, it can be assumed that it is much more difficult to reach a consensus on patient flow practices, specifically in settings where departments affect each other's functionality.

The goal of this chapter is to explore the opinions of GSH doctors and nurses with regard to patient movement throughout the hospital. In order to achieve this goal, the following objectives will be pursued:

- To describe the research design used for the purpose of this study.
- To explain the research methodology used in this study to obtain employee opinions regarding patient flow at GSH.
- To convey the results obtained from the patient flow survey.

- To conclude by highlighting the most important aspect revealed by the survey results, which will be used as a guide for the discussion of the succeeding chapter.

The first section of this chapter will describe the design of this study. This will clarify why the research approach selected was the most appropriate to pursue the goal of this study.

This chapter will then explain what research methodology techniques were used to obtain the empirical component of this study. The data collection methods (survey and interviews) will also be described in this second section of the study, which will specify what research process was followed to adhere to the purpose of this study.

The third section of this chapter will focus on the results obtained from the survey conducted. The results will be simplified through the use of graphs and tables that will enable the researcher to demonstrate the analysed data appropriately.

The final section of this chapter will draw conclusions from the major themes identified in the results, which will be used as a guideline for the succeeding chapter.

## 4.2 Research design

This section will elaborate on the design of this study used to obtain the opinions of GSH employees with regard to patient flow management. The study will be conducted in a non-experimental manner and an evaluative design with a quantitative approach will be used to pursue the objectives of this study. Therefore, the research approach allows the researcher to explore the aim of this study by obtaining quantitative data by using structured questionnaires and expert interviews as the data collection tools that will enable the researcher to accomplish the goal of this study.

### 4.2.1 Study setting

The study will be conducted in the medical, surgical and emergency departments of GSH, a central hospital in the Cape Metropole region. The medical wards are located on the G-floor ($5^{th}$ floor), the surgical wards on the F-floor (4th floor) and the emergency and trauma departments on the C-floor ($1^{st}$ floor). The five medical wards selected for this study are the wards that engage with emergency patients daily and are seen as the pulling end of the patient's journey. The six surgical wards selected are mostly involved with the movement of patients

from the emergency units. These wards often experience blockages in their patient flow systems, which results in patients not being admitted into ward beds timeously.

### 4.2.2 Population and sampling

For the purpose of this study, the target population for the survey will consist of qualified doctors and nurses working in the medical, surgical, emergency and trauma departments that were selected for this study. The main reason for the selection of the above-mentioned population was that these departments are mostly involved with the rapid movement of patients from the emergency and trauma departments to ward admission and beyond. In order to create awareness about this study, the researcher informed potential participants about the study and where to receive the questionnaires.

In order to obtain a large enough sample of the target population, questionnaires were given to all permanent employees and the response determined the sample size. The researcher anticipated a better response if all employees who qualify to participate in this study were provided with the option to complete a questionnaire. The sample size for each department is displayed in Table 4.1.

One potential executive manager (member of the clinical directorate team of GSH) of each of the three departments was invited to participate in interviews. A non-probability purposive sampling method was used to select interviewees for this study. The interviewees have a wealth of experience with improvement methodology such as lean or patient flow, which makes them experts in hospital improvements. Their feedback/answers were protected by means of a lockable desk and computer that is protected by a password. All participants signed the consent form before providing any information. This study has a minimum to no risk towards participants.

### 4.2.3 Inclusion criteria

The participants who are included in this study consisted of permanently employed doctors and nurses of GSH who worked in the selected departments at the time the survey was conducted.

### 4.2.4 Exclusion criteria

The employees who were not included in this study are agency staff, volunteers, students and foreign exchange employees who were working in the selected departments at the time the survey commenced. These employees usually spend short periods of time in a ward and do not

always have the knowledge on all hospital systems. The following section will explain what research process would be followed to obtain the opinions of GSH employees with regard to patient flow management.

## 4.3 Methodology

The research methodology used to define the research process will be described in this section of the chapter. It will elaborate on the data-gathering instruments, the data collection methods, research limitations, potential risks and discomforts, and ethical considerations.

### 4.3.1 Data-gathering instruments

The data was collected by using a semi-structured questionnaire, carefully designed by the researcher to test opinions of GSH employees on patient flow management. The questionnaires were completed anonymously, as the participants did not capture their names on the questionnaires.

The secondary data collection instrument was a semi-structured interview that used the main themes of the questionnaires as guidance. The main themes included:

- Patient flow management in general and in GSH.
- The importance of patient flow policy.
- Discharge planning and transit lounge use in GSH.
- The impact of emergency department overcrowding.
- Patient flow improvements and data collection.
- How patient flow is measured and evaluated at GSH.

### 4.3.2 Data collection

The data collection process was a precise systematic gathering of information applicable to the research objectives or to test the aim of the study. The researcher delivered and collected the semi-structured questionnaires manually to the various departments. The supervisors or shift leaders with the assistance of the researcher were responsible to distribute the questionnaires and ensure that each participant sign the consent form before completing the questionnaire. The participants completed the questionnaires in private to eliminate any form of bias or intimidation. The completed questionnaires were delivered to the supervisors' respective

offices or dedicated areas where the respondents placed their completed questionnaires in a sealed box for collection. Envelopes were provided in the dedicated areas where respondents requested it. Therefore, even the researcher does not know who completed which questionnaire. In addition, the collected questionnaires were kept by the shift leaders until the researcher collected them for analysis. The completed questionnaires were kept by the researcher in a lockable desk in a lockable office.

The interviews were conducted in the comfort of the interviewees' own offices after consent was given and an appointment was confirmed. A work pad as well as a voice recorder was used to capture notes. The interviewees also participated anonymously to encourage them to express themselves freely. However, although the researcher did face to face interviews, it was agreed that the interviewee's identities were excluded in the content of this study, which ensures their anonymity.

### 4.3.3 Research process limitations

Potential limitations of the research process included a lack of interest from employees to participate in this study and supervisors not keen to assist the researcher. Therefore, the supervisor support in the selected departments was important to create the appropriate awareness to motivate employees to participate in this study, which was essential to receive a good response. The research process used could have been problematic if a large enough sample was not obtained, which will influence the outcome of this study significantly.

The disadvantages of using semi-structured questionnaires are that the respondents may have had difficulty understanding some questions as well as the language being used. This made it difficult for the researcher to clarify questions if respondents are unclear about how to approach them. The researcher also found certain answers difficult to understand, which made the analysis process potentially difficult.

### 4.3.4 Potential risks and discomforts

There were no reasonable foreseeable risks or harm to any participant or their work environment.

### 4.3.5 Ethical considerations

This research commences after ethical clearance was obtained from the GSH ethics committee and the Human Research Council approval from Stellenbosch University. The researcher obtained permission from each department's head before any questionnaires were distributed to participants. After permission was granted, the researcher explained the content and importance of the study to all supervisors or shift leaders that assisted with distributing and collecting questionnaires.

The research process described in this section allowed the researcher to attain valuable information on how patient flow is perceived by GSH employees, which will be explained in the section that follows.

## 4.4 Results

This part of the chapter will focus on the results obtained from the completed questionnaires. In order to display the gathered data in meaningful terms, the data was analysed by using the IBM SPSS statistics program in order to transform the data into useable information.

This section will first illustrate the sample size, which will determine the significance of the response rate. The second part of this section will focus on the results analysed from the questionnaires obtained. The response from the open-ended sections will consist of small narratives, which will be used to capture the respondents' opinions into a meaningful summary.

### 4.4.1 Study response

The response rate of the survey and interviews conducted will be considered in this part, thereby determining the sample size of the identified population.

#### 4.4.1.1 Response to survey

The table below illustrates the response rate for the distributed questionnaires for each department. The response for this survey was 157 completed questionnaires, which is a 72% representation of the total population. The response is considered to be satisfactory in order to reach the goal of the study.

**Table 4.1: Number of responses received for survey questionnaires**

| Department and participants | Number in department (Population – N) | Number of responses (Sample – n) | Percentage |
|---|---|---|---|
| **Emergency and Trauma** | | | |
| Doctors | 32 | 24 | 75% |
| Nurses | 37 | 25 | 68% |
| Department total | 69 | 49 | 71% |
| **Medical** | | | |
| Doctors | 24 | 19 | 79% |
| Nurses | 45 | 37 | 82% |
| Department total | 69 | 56 | 81% |
| **Surgical** | | | |
| Doctors | 35 | 22 | 63% |
| Nurses | 46 | 30 | 65% |
| Department total | 81 | 52 | 64% |
| **Study Response** | | | |
| Study total | 219 | 157 | 72% |

### 4.4.1.2 Response to interview

The table below indicates that the response rate of the interviewees were 100%. All three executive managers, each representing the highest management level of the selected departments, agreed to participate in this study. Therefore, their input is considered satisfactory towards reaching the goal of this study.

**Table 4.2: Number of responses received for interviews**

| Department | Number of participants | Response |
|---|---|---|
| Emergency/Trauma | 1 | 1 |
| Medical | 1 | 1 |
| Surgical | 1 | 1 |
| Total | 3 | 3 |

The data-gathering tools used proved to be sufficient for analysis and further discussion. The next part of this section will consist of a discussion on the results obtained from the survey. The interview results will be used for discussion in the succeeding chapter.

### 4.4.2 Data analysis and interpretation

For the purpose of this study, the respondents had to complete three sections in the questionnaires, which will be explained in this section. Each section of the questionnaire will be defined and the results will be analysed.

#### 4.4.2.1 Section A: Biography of respondents

The intention of Section A of the questionnaire is to provide descriptive information of the study population for purposes of data analysis. This included the gender and age of respondents, their position in the hospital, how long they have been working in a hospital setting, in what department there are currently working, how often they engage with patients, their familiarity on the concept of patient flow and their knowledge of the current patient flow policy. The following responses were obtained:

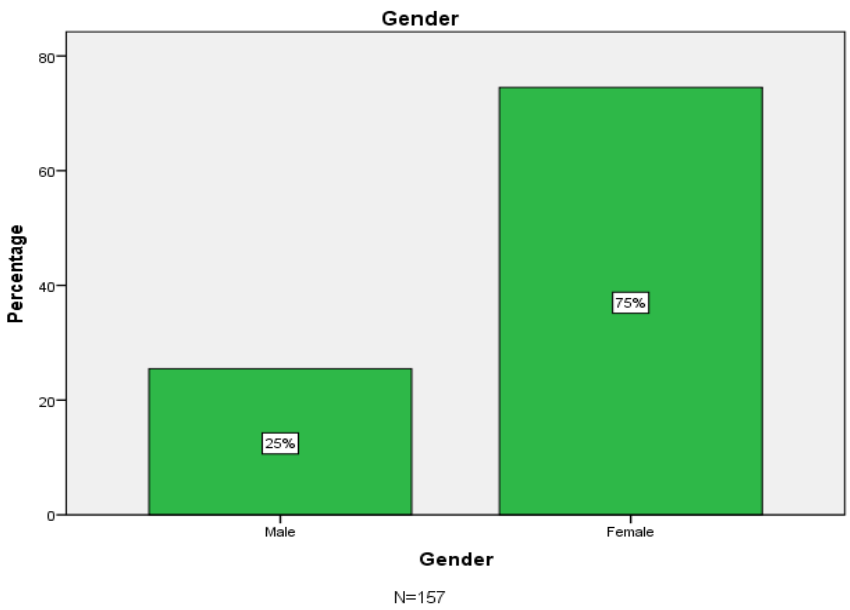


**Figure 4.1: Response to question 1**

Amongst the 157 individuals that participated in the study, the majority were female (75%).

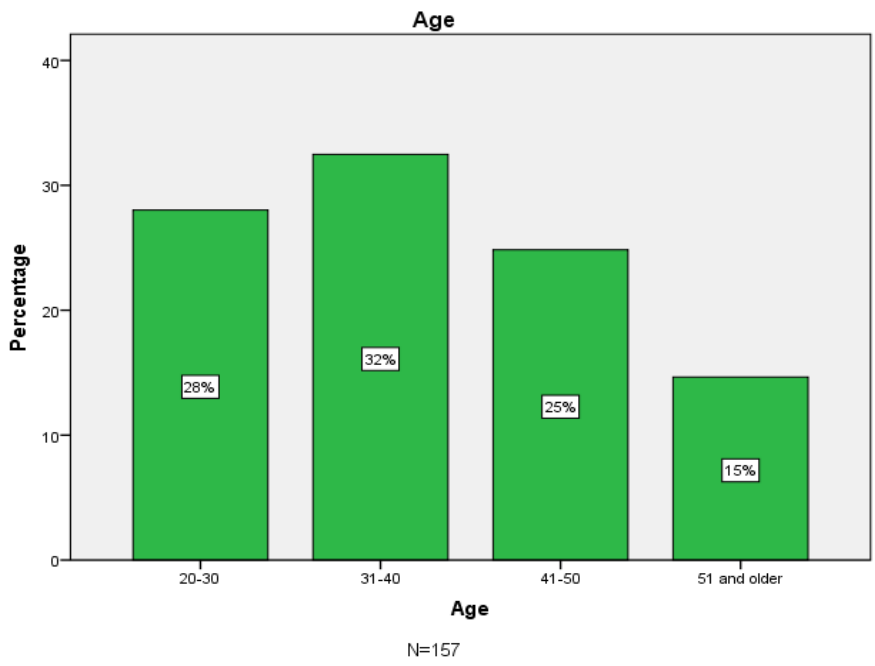


**Figure 4.2: Response to question 2**

The age distribution is fairly close between ages 20–30, 31–40 and 41–50. Only 15% (n=23) of the sample was over the age of 51.

**Table 4.3: Response to question 3**

| **Position in Hospital** | | |
|---|---|---|
| **Respondents** | **Number of participants** | **Percentage** |
| Consultant | 6 | 4% |
| Registrar | 38 | 24% |
| Intern | 22 | 14% |
| Operational manager Nurse | 9 | 6% |
| Registered nurse | 38 | 24% |
| Enrolled nurse | 44 | 28% |
| Total | 157 | 100% |

The majority of the respondents were nurses, which represents 58% (n=91) of the sample population.

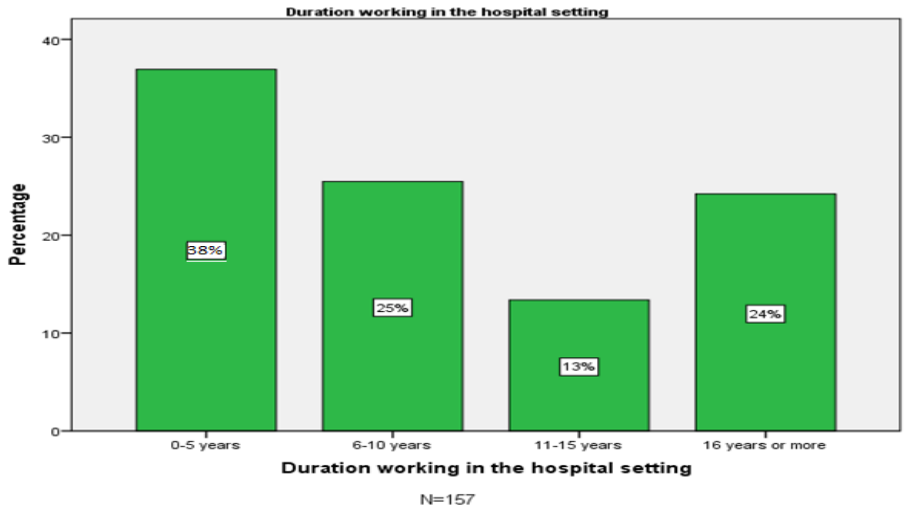


**Figure 4.3: Response to question 4**

Figure 4.3 indicates that the majority of the respondents had 0–5 years working experience in a hospital setting. However, if one adds the number of respondents that have less than ten years' experience, it totals 62%, which means that 38% of the respondents have been working in a hospital setting for more than ten years.

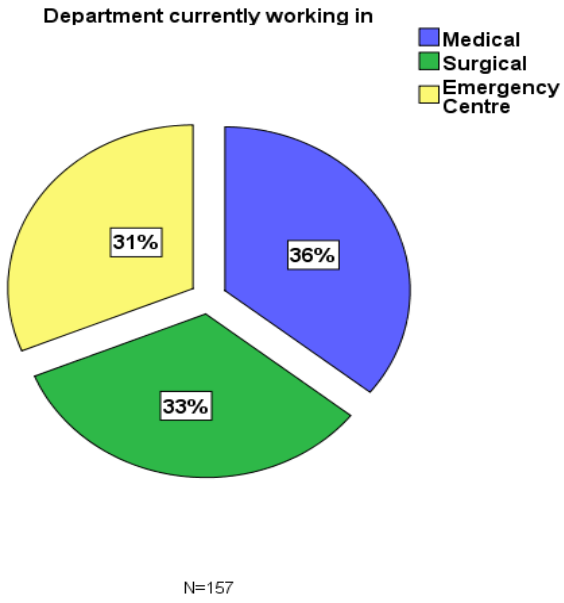


**Figure 4.4: Response to question 5**

The distribution of respondents amongst the three departments is very similar, implying that each department's representation is satisfactory for this study. This means that the opinions of nurses and doctors are equally represented from each department.

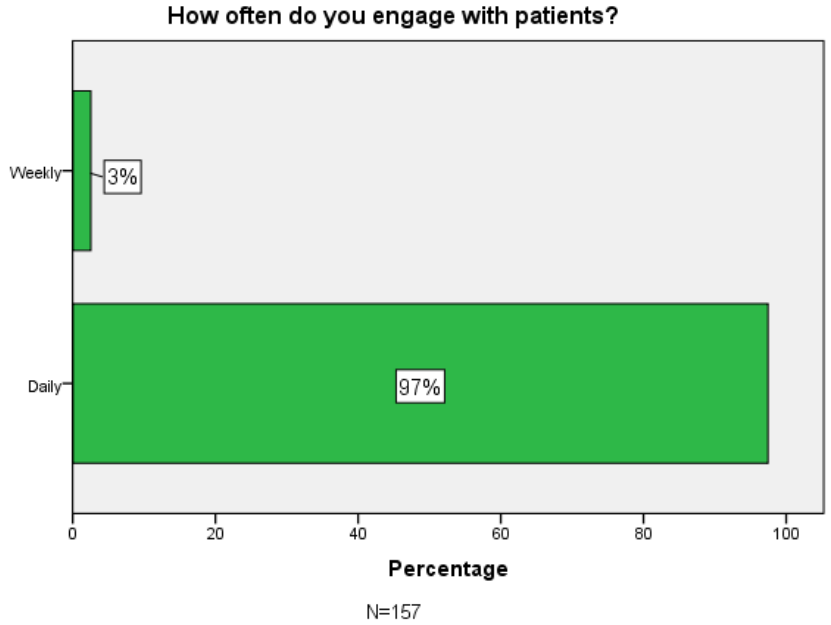


**Figure 4.5: Response to question 6**

The majority of the respondents indicated that they engage with patients on a daily basis.

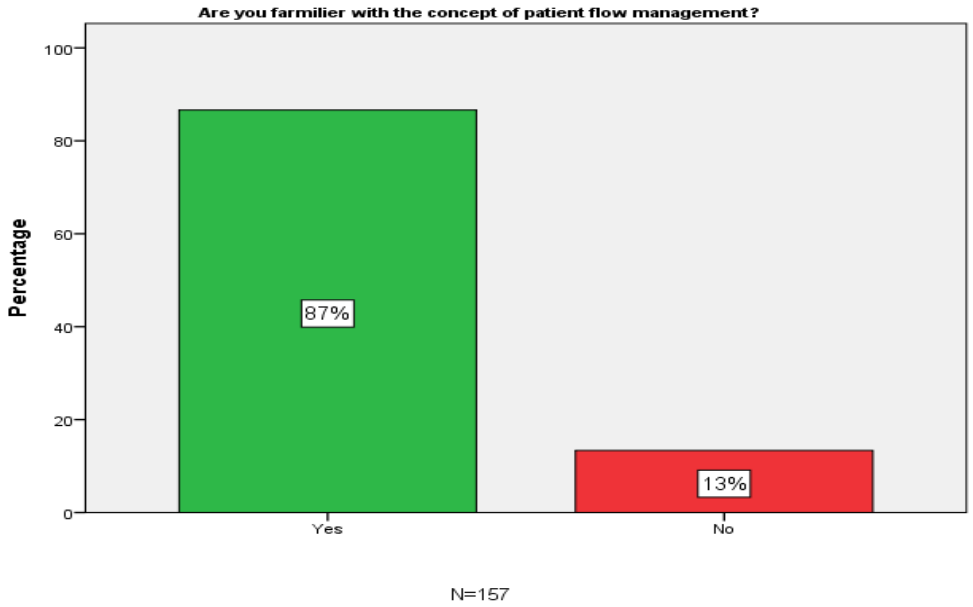


**Figure 4.6: Response to question 7**

The majority of the respondents were familiar with the concept of patient flow management, which supports the purpose of this study. Only 21 (13%) respondents indicated that they were not familiar with the concept of patient flow management.

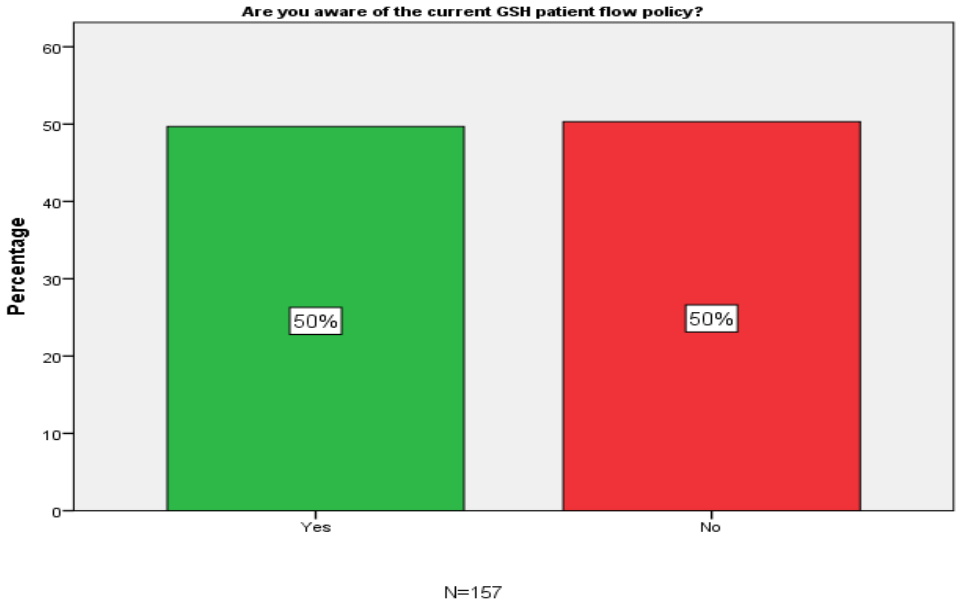


**Figure 4.7: Response to question 8**

Interestingly, half the respondents were aware of the official patient flow policy of GSH and the other half not.

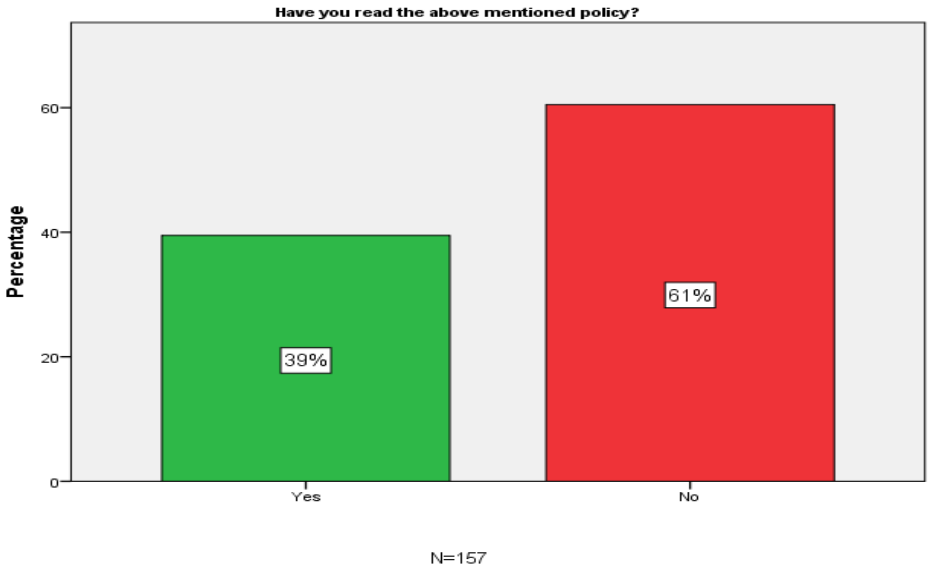


**Figure 4.8: Response to question 9**

The response to question 9 revealed that only 39% of the respondents actually read the patient flow policy of GSH. The respondents who indicated that they read the policy was asked an additional question and the result is displayed in Figure 4.9 below.

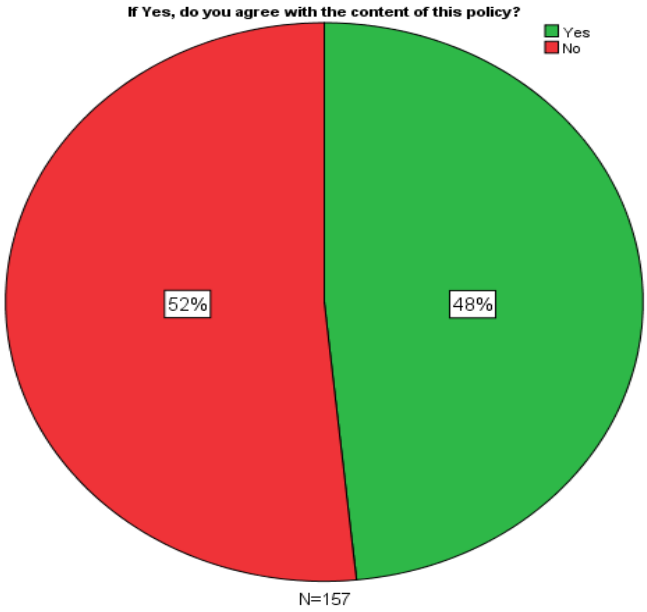


**Figure 4.9: Response to question 10**

Only 62 respondents were allowed to answer question 10 and 48% of them agreed with the content of the current patient flow policy of GSH, while 52% did not. The aim of this section was to obtain general biographical and profile information with the succeeding sections in mind.

### 4.4.2.2 Section B: Closed-ended questions

Section B consisted of closed-ended questions that contained various statements to which the respondents had to indicate to what degree they agree or disagree with the statements. This section is divided into five subsections and only the most significant statements will be included for the purpose of this study. These themes are general patient flow management, patient flow and policy at GSH, discharge planning and transit lounge usage, emergency centre overcrowding and ward environment, and patient flow improvements and data capturing. The following responses were obtained:

#### 4.4.2.2.1 General patient flow management

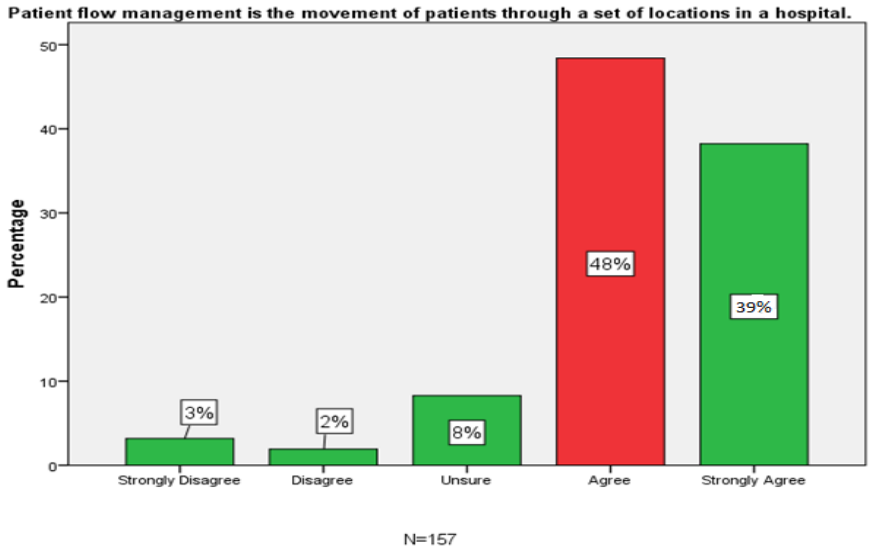


**Figure 4.10: Patient flow management is the movement of patients through a set of locations in a hospital.**

The majority of the respondents agreed that patient flow is the movement of patients through a set of locations in a hospital. It is, however, noteworthy that if one adds the number of respondents who agreed and strongly agreed, it totals 136 respondents, which means the vast majority were in favour of this statement.

Table 4.4 below displays that 92% (n-144) of the respondents also indicated they support the statement that a delay in the flow of patients would increase patient waiting times.

**Table 4.4: A delay in the flow of patients will increase patient waiting times**

| **A delay in the flow of patients will increase patient waiting times.** | | |
|---|---|---|
| **Response** | **Number of participants** | **Percentage** |
| Strongly agree | 100 | 62% |
| Agree | 44 | 28% |
| Unsure | 6 | 4% |
| Disagree | 1 | 2% |
| Strongly disagree | 6 | 4% |
| Total | 157 | 100% |

This response can be interpreted as respondents understanding that bottlenecks in the patient flow system can delay patient movement and increase waiting times.

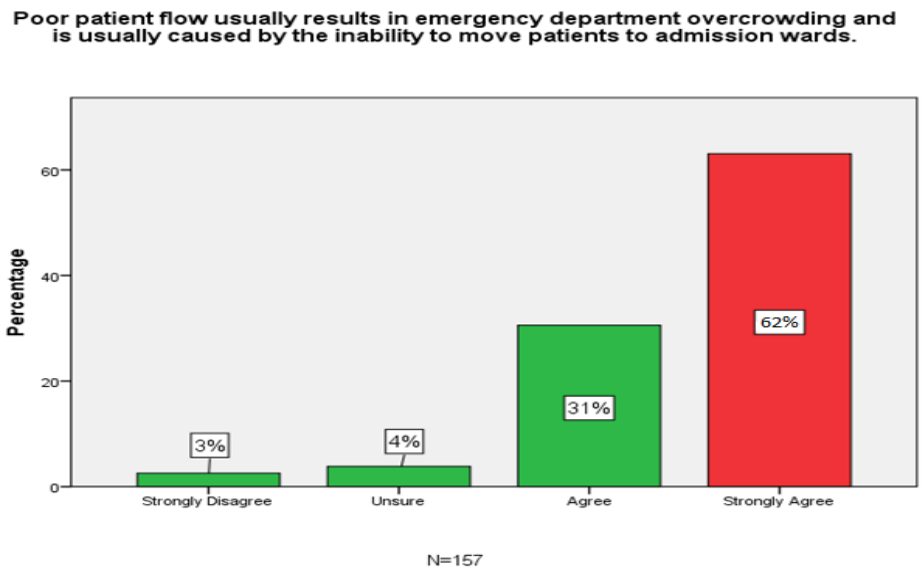


**Figure 4.11:** Poor patient flow usually results in emergency department overcrowding and is usually caused by the inability to move patients to admission wards.

The majority of the respondents (62%) strongly agreed that the inability to move patients from the emergency department to admission wards results in overcrowding of the emergency department and 31% (n-48) agreed, which means that 94% (n-147) agreed with this statement.

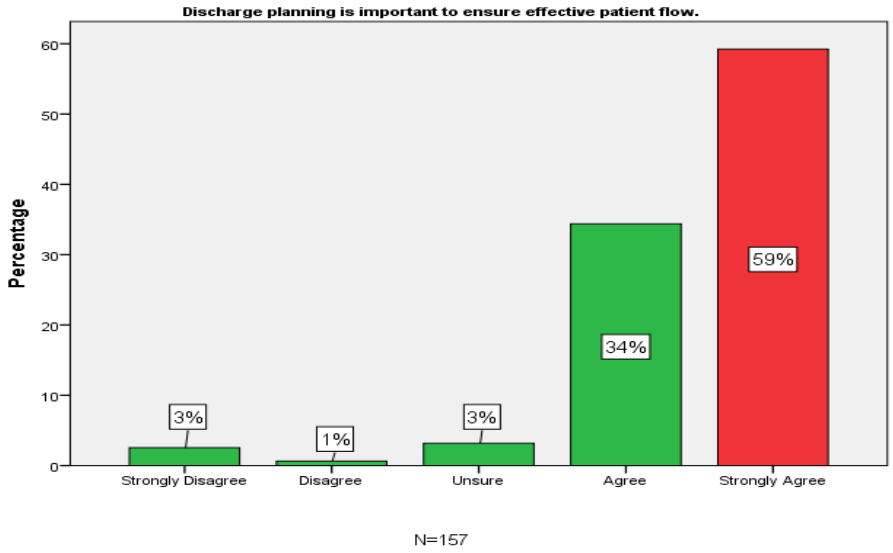


**Figure 4.12: Discharge planning is important to ensure effective patient flow.**

Feedback from the last question in terms of general patient flow showed that 59% (n-93) of respondents strongly agreed that discharge planning is important to ensure effective patient flow, which can be interpreted as discharging patients which will provide capacity for those patients that are waiting for ward admission. The following part will focus more on the respondents' perceptions of the patient flow system of GSH.

#### 4.4.2.2.2 Patient flow and policy at GSH

The main focus of this part and the parts that follow will be on how the doctors and nurses of the three selected departments perceive the patient flow system of GSH.

**Table 4.5: GSH patient flow statements**

| Statement | Strongly disagree | Disagree | Unsure | Agree | Strongly agree |
|---|---|---|---|---|---|
| GSH has a good patient flow system. | 6% | 20% | 34% | 26% | 14% |
| Patients move through GSH without any delays. | 16% | 43% | 26% | 10% | 5% |
| GSH patients waiting for ward admission are transferred to a ward bed within a reasonable timeframe. | 14% | 32% | 26% | 22% | 6% |
| GSH patients usually wait less than 8 hours for ward admission. | 24% | 30% | 33% | 10% | 3% |
| The patient flow policy of GSH is an important policy. | 3% | 3% | 18% | 43% | 33% |

Table 4.5 above displays a set of statements on the patient flow system of GSH. All the respondents completed this section and the following results were obtained. Thirty-four percent (34%) of the respondents indicated that they were unsure whether GSH has a good patient flow system. However, if one combines agree and strongly agree for this statement, they total 40%, which were the majority of the respondents. It is clear from the table above that 59% of the respondents felt that there are indeed delays in patient pathways at GSH. Only 15% felt there are no delays in patient movement. If one combines strongly disagree (14%) and disagree (32%), forty-six percent (46%) of the respondents acknowledged that GSH patients are not transferred into ward beds within a reasonable time frame, twenty-six percent (26%) were unsure and 28% felt patients are transferred into ward beds within a reasonable time frame.

Only 13% agreed that patients wait less than eight hours for ward admission, a third (33%) were unsure, 30% disagreed and 24% strongly disagreed, which one can interpret as 54% did not agree that patients are transferred into a ward beds in less than eight hours. Although only 50% of the respondents are aware of the policy and 39% of them actually read the policy, as indicated by Section A, 76% of all the respondents acknowledged that the patient flow policy of GSH is indeed an important policy and only 6% did not agree with this statement. The next part considering Section B will concentrate more on the discharge practices and the use of the transit lounge at GSH.

#### 4.4.2.2.3 Discharge planning and transit lounge usage

The importance of adequate discharge planning was identified in chapter 2 and verified in chapter 3. The respondents were asked whether GSH has effective discharge mechanisms in place and Figure 4.13 demonstrates that 44% (n-70) agreed and strongly agreed with the statement, 24% (n-37) were unsure and 32% (n-50) disagreed and strongly disagreed with the statement.

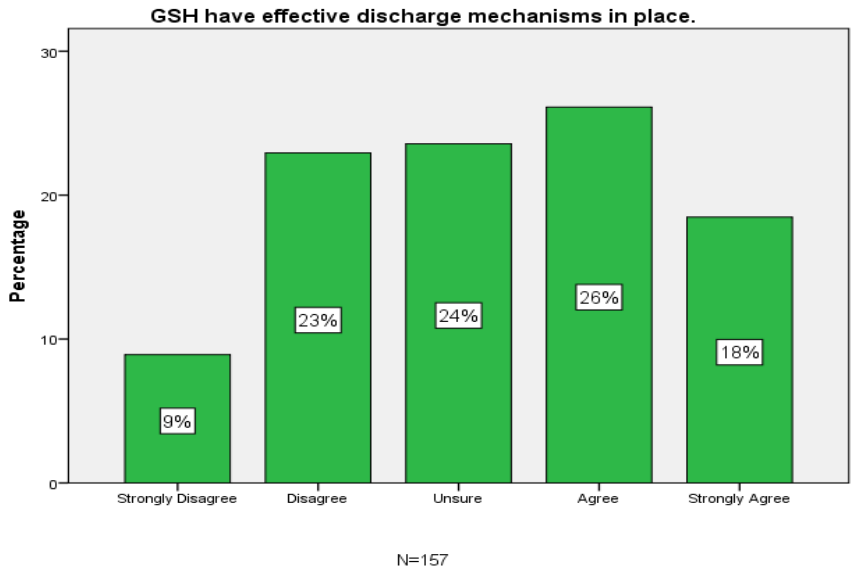


**Figure 4.13: GSH has effective discharge mechanisms in place.**

The intention of the following two statements presented in Tables 4.6 and 4.7 is to determine at what stage of a patient's journey the discharge process begins. The majority of the respondents (54%) did not support the statement that the discharge process starts from the time of admission. Interestingly, almost the same amount of respondents (55%) indicated that the discharge process starts on the day a patient is fit to be discharged.

**Table 4.6: Discharges are planned from the time of admission.**

| **Discharges are planned from the time of admission.** | | |
|---|---|---|
| **Department** | **Number of participants** | **Percentage** |
| Strongly agree | 10 | 6% |
| Agree | 29 | 19% |
| Unsure | 33 | 21% |
| Disagree | 65 | 41% |
| Strongly disagree | 20 | 13% |
| Total | 157 | 100% |

**Table 4.7: The discharge process starts on the day the patients are fit for discharge.**

| **The discharge process starts on the day the patients are fit for discharge.** | | |
|---|---|---|
| **Department** | **Number of participants** | **Percentage** |
| Strongly agree | 24 | 15% |
| Agree | 62 | 40% |
| Unsure | 29 | 18% |
| Disagree | 33 | 21% |
| Strongly disagree | 9 | 6% |
| Total | 157 | 100% |

However, it is known that a discharge process has various components before patients can actually vacate the ward and if not planned pro-actively, it could become a lengthy process. Therefore, the respondents were asked if 80% of all identified discharges leave the ward before 12h00 every day. Figure 4.14 below clearly demonstrates that 70% of respondents did not agree that discharged patients leave the wards before 12h00 daily and 13% felt they do.

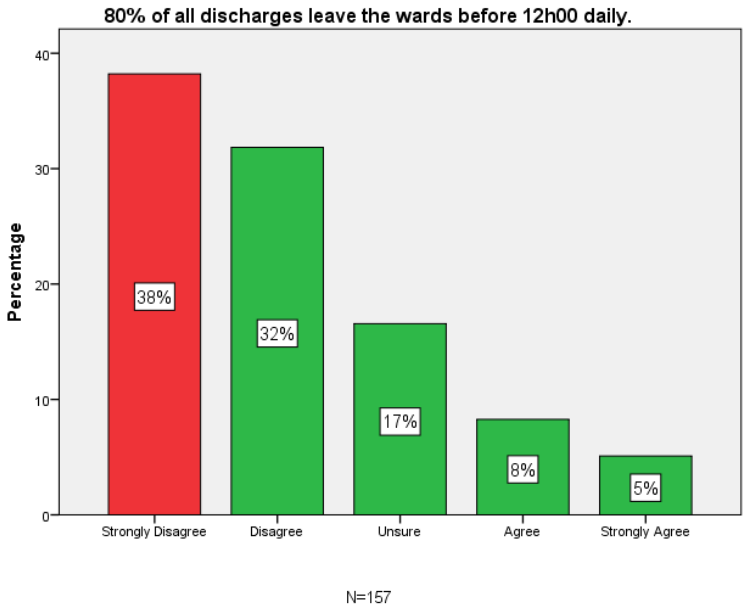


**Figure 4.14: 80% of all discharges leave the wards before 12h00 daily**.

The aim of the next two questions was to test whether respondents were aware of the transit lounge at GSH and its functionality.

**Table 4.8: Transit lounge usage**

| Statement | Strongly disagree | Disagree | Unsure | Agree | Strongly agree |
|---|---|---|---|---|---|
| GSH has a functional transit lounge. | 4% | 13% | 27% | 34% | 22% |
| Discharged patients must wait in the transit lounge for their transport in order to create ward capacity for more acutely ill patients. | 5% | 10% | 6% | 41% | 38% |

When the respondents were asked whether GSH has a functional transit lounge, the majority (56%) either agreed or strongly agreed that a functional transit lounge exists. However, 27% were unsure and 17% claimed that GSH has no transit lounge. The vast majority (79%) either agreed or strongly agreed that patients that are up for discharge and are only waiting on transport must wait in the transit lounge, while 16% did not agree. Therefore, to elaborate further on this statement, one can assume that if patients are transferred to the transit lounge, it will create ward capacity that can be used for more acutely ill patients. The following part of the current section endeavoured to determine how respondents perceive the emergency and ward environments.

#### 4.4.2.2.4 Emergency centre overcrowding and ward environment

One of the leading problems hospitals usually face is overcrowding of emergency centres and it is known that this is the equilibrium state for many health systems Boyle et al. (2012:1). Therefore, in this part, the respondents were asked to comment on a few statements to obtain their perception of the emergency and ward environments.

**Table 4.9: GSH emergency department and ward environment**

| Statement | Strongly disagree | Disagree | Unsure | Agree | Strongly agree |
|---|---|---|---|---|---|
| GSH regularly experiences overcrowding in its emergency unit. | 3% | 1% | 4% | 41% | 51% |
| The wards often experience overcrowding. | 7% | 17% | 19% | 32% | 25% |
| Overcrowding is mainly caused by a high demand for emergency services and patients waiting for ward admission. | 1% | 8% | 7% | 43% | 41% |

Feedback from the statements in Table 4.9 revealed that 92% of the respondents either agreed or strongly agreed that the emergency centre of GSH regularly experiences overcrowding. It is interesting to note that the majority (57%) of the respondents also indicated that the wards often experience overcrowding, which means the wards have to exceed their physical bed capacity

to experience overcrowding. However, the overwhelming majority (84%) of the respondents supported the statement that overcrowding is generally caused by a high demand for emergency services as well as patients that are waiting for ward admission.

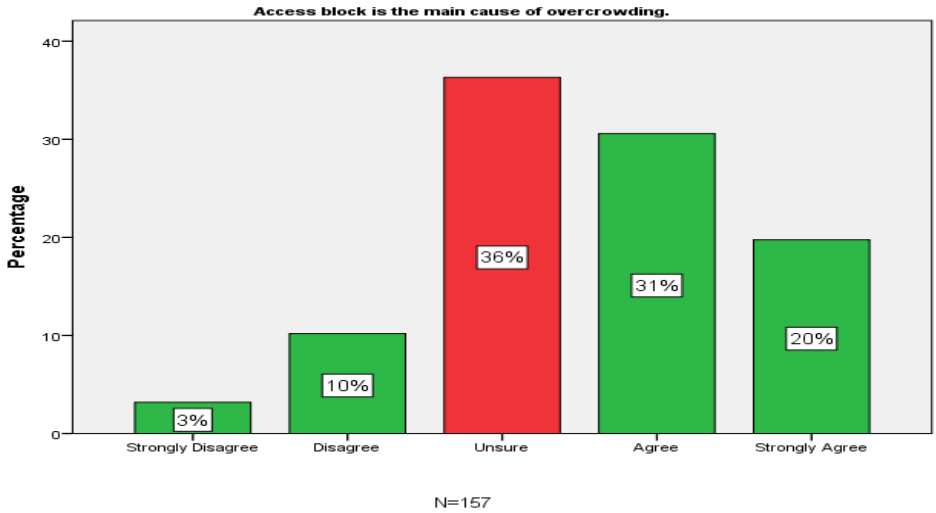


**Figure 4.15: Access block is the main cause of overcrowding.**

The majority (36%) of the respondents were unsure whether access block was the main cause of overcrowding. However, if one combines the respondents who strongly agreed and agreed with this statement, they total 51%, which is more than half of the respondents.

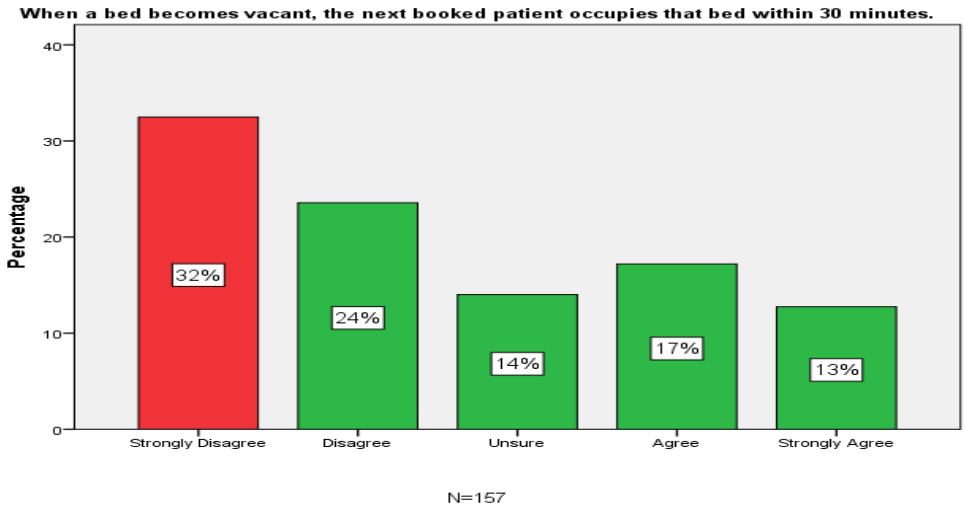


**Figure 4.16: When a bed becomes vacant, the next booked patient occupies that bed within 30 minutes.**

The highest portion of the respondents (56%) either strongly disagreed or disagreed with the statement that when beds become vacant, another patient occupies the bed within 30 minutes. Fourteen percent (14%) of the respondents were unsure, while 31% agreed that vacant beds are filled within 30 minutes. The above part of this section clearly identifies that GSH experiences

regular overcrowding, which confirms the statement when 88% of the respondents acknowledged that there are indeed an imbalance between the supply of ward beds and the rising demand for hospital services. Therefore, the following part of this section will aim to test the respondents' opinions of patient flow improvement strategies and the capturing of data.

#### 4.4.2.2.5 Patient flow improvements and data capturing

The purpose of this part is to determine whether the respondents are aware of any strategies to improve the patient flow system of GSH, whether they are included in such initiatives and how the collection of data influenced their daily work performance.

**Table 4.10: Patient flow improvements and data capturing**

| Statement | Strongly disagree | Disagree | Unsure | Agree | Strongly agree |
|---|---|---|---|---|---|
| GSH have many patient flow improvement initiatives. | 3% | 8% | 54% | 29% | 6% |
| Operational staff are included in new patient flow projects. | 6% | 8% | 34% | 39% | 13% |
| The collection of data and capturing of patient movement times hamper operational duties of ward staff. | 6% | 17% | 34% | 33% | 10% |
| Data collection is a waste and time-consuming. | 31% | 34% | 18% | 10% | 7% |
| The capturing of data is important to measure progress of projects. | 2% | 3% | 13% | 52% | 30% |
| The capturing of data is important to measure patient flow performance. | 1% | 4% | 9% | 42% | 44% |

The table above reveals the opinions of all respondents in terms of patient flow improvements in GSH and data capturing. When the respondents were asked whether GSH has any improvement initiatives, 54% were unsure, 35% either agreed or strongly agreed and 11% either disagreed or strongly disagreed.

All respondents are considered to be part of the operational workforce. Therefore, when they were asked if operational employees are included in new patient flow projects, the majority (52%) indicated that they are included, 34% were unsure and 14% indicated they are not included in such projects.

When the respondents were asked how they feel about capturing data for the purposes of project performance and improvement initiatives, the following results were obtained. Most of the respondents (43%) either strongly agreed or agreed that the collection of data and capturing of

patient movement times hampers operational duties of ward staff and 34% were unsure. When they were asked if data collection is a waste and time-consuming, the majority (65%) either strongly disagreed or disagreed and only 17% strongly agreed and agreed. Therefore, although the majority felt data collection hampers their operational duties, they also consider the collection of data as important. This confirms the response to the next statement, where 82% of the respondents supported the fact that data capturing is important to measure project progress and 86% indicated that it is also important to measure patient flow performance. One could argue that data collection is considered important. However, it is perceived to be time-consuming, which affects the operational duties of GSH employees.

### 4.4.2.3 Section C: Open-ended questions

The following part consists of results on a few open-ended questions, which allowed the respondents to comment on their answers. Small narratives will be drawn up for each question to summarise the most frequent or relevant comments. The first question and probably the most pertinent one referred to the functionality of the entire patient flow system of GSH.

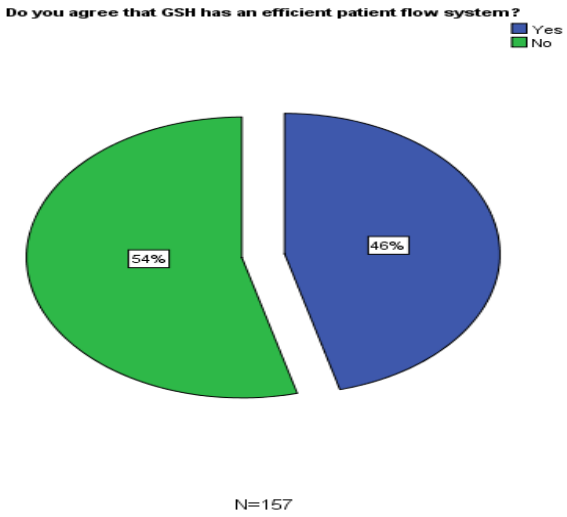


**Figure 4.17: Do you agree that GSH has an efficient patient flow system?**

The majority (54%) of the respondents revealed that GSH does not have an efficient patient flow system and 46% indicated that it does. The most common and relevant feedback obtained from the 85 (54%) respondents who felt that the patient flow system of GSH is inefficient is briefly summarised below.

The constant friction between departments with regard to bed availability often results in patients waiting long hours for ward admission, which is mostly due to a huge demand for

hospital beds and a lack of supply of ward beds. Related frustrations are that GSH has no patient flow standards, experiences regular overcrowding in its emergency centre, has doctors running in the ward looking for open beds, which is done in parallel with the patient flow managers looking for open beds, and experiences a general lack of communication between departments. Many respondents also indicated that there are no clear guidelines on how to practise efficient patient flow, which results in parallel practices that could be contradicting to one another. However, many also feel strongly that patients that board in their ward are not taken back timeously by their own discipline causing their own patients to wait long for admission and sometimes being declined.

Furthermore, discharge planning was identified as one of the biggest bottlenecks, which consequently creates access block, perceived as the leading cause of overcrowding and increased waiting times. However, the lengthy discharge process can be reduced if more patients are sent to the transit lounge, as discharged patients wait all day for their transport. When beds eventually become available, employees are faced with another dilemma. Many respondents complained that there is conflict between emergency and elective admissions, as the emergency centre and surgical doctors push equally hard for their patients to be admitted first.

Other respondents specified that although there are guidelines and systems in place to regulate patient movement, many employees are not aware of them, which creates an inefficient patient flow system. What aggravates the inefficiencies even further is that new employees are not exposed to the necessary policies or guidelines, which creates more uncertainties in the patient flow system of GSH.

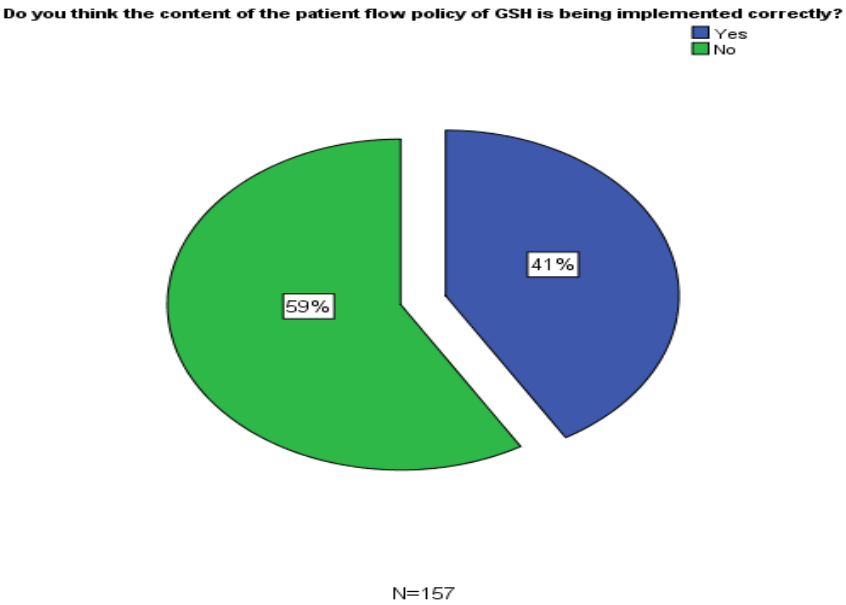


**Figure 4.18: Do you think the content of the patient flow policy of GSH is being implemented correctly.**

Nonetheless, 59% (n-92) of all respondents felt that the patient flow policy of GSH is not being implemented correctly and 41% said it is. This is despite the fact that only 50% of the respondents were aware of this policy and 39% actually read it. General comments of the 59% that indicated that the policy is not implemented correctly are discussed below.

The vast majority stated that they have not seen this policy and were unaware of its content. Others felt that the policy content was contradicting current patient flow practices and that a lack of communication between departments hampers policy implementation. Quite a few of the respondents believed that non-medical wards are reluctant to admit medical patients, which creates overcrowding in the emergency centre when medical wards are saturated. Nevertheless, if medical patients are admitted into other disciplines (e.g. surgery), other respondents claim that it takes long for medical patients to be moved back to the medical departments, which creates bed capacity problems for their own admissions. Even more important, regardless of the policy not being implemented correctly, some of the respondents insist that bed capacity and a shortage of manpower are the biggest obstacles.

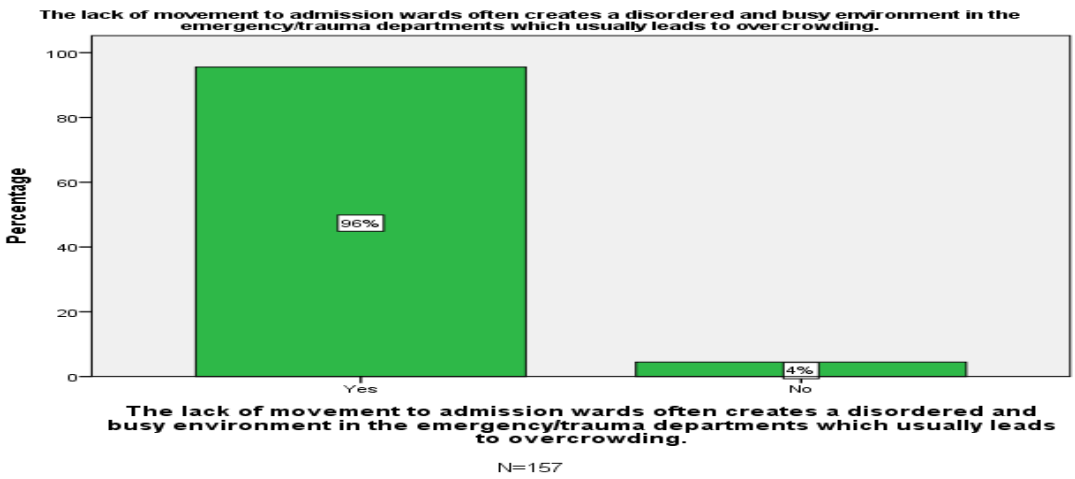


**Figure 4.19: The lack of movement to admission wards often creates a disordered and busy environment in the emergency centre which usually leads to overcrowding**

The vast majority (96%) of all the respondents acknowledged that the lack of patient movement to the wards creates an environment in the emergency centre that could be perceived as disorderly due to the unit being overcrowded with patients waiting for ward admission. The few that did not agree understood that the effects of late discharge rounds are the main reasons for access block and others blamed the poor portering services. They also specified that the patients flooding GSH are from other drainage areas. Other patients making use of GSH include patients who require primary healthcare but do not make use of day hospitals and clinics. Additional comments referred to staff shortages and the lack of urgency to admit patients from the emergency department into ward beds, which respondents feel could be a lack of proper guidelines (policies).

**Table 4.11: Discharge planning and transit lounge utilisation**

| Questions | Yes | No |
|---|---|---|
| The inability to transfer patients from the emergency centre timeously is mostly due to patients vacating the wards late and is mostly caused by poor discharge planning. | 77% | 33% |
| All patients have a discharge plan in their hospital folder from the time they are admitted. | 31% | 69% |
| Approximately 80% of all patients being discharged every day physically leave the wards before 12h00. | 13% | 87% |
| All discharge patients that fit the transit lounge criteria should be moved to the transit lounge. | 96% | 4% |
| In your opinion, do you think the transit lounge is being utilised optimally? | 36% | 64% |

Feedback from the next set of open-ended questions displayed in Table 4.11 revealed the respondents' understanding of the discharge practices as well as the utilisation of the transit lounge. When the respondents were asked if the delay in patient movement is usually caused by poor discharge planning, 77% agreed and 33% did not agree. Those who did not agree believed other factors such as waiting for medication from pharmacy, transport delays, delays in radiology investigations, delays to transfer patients to stepdown facilities and poor portering services influenced the time patients actually vacate their ward beds. Patients who have social issues with no fixed abode also block hospital beds as the stepdown facilities do not accept patients who are homeless. Other challenges include poor communication between doctors and nurses, late discharge letters and late discharge prescription sheets, which are vital components to finalise discharges. However, many other respondents claimed that the workload is just too much for the workforce.

Furthermore, 69% stated that there are no discharge plan developed from the time patients are admitted and 31% felt there were. Most of the respondents who indicated that such a discharge plan does not exist suggested that, at the time of admission, a patients' clinical condition is often still unpredictable to determine their discharge date. Therefore, the majority felt that the patient's condition changes tremendously on admission and complication might influence their potential discharge date. In contrast, others claimed that they have never seen a discharge plan apart from the one on the day of discharge and that the discharge plan only starts on the day the patient is fit to go home.

To determine why discharged patients vacate their ward beds so late, the respondents were asked whether 80% of all discharges physically leave the ward before 12h00 each day to which 87% indicated no and 13% indicated yes. The vast majority's response was that discharged patients wait long for their discharge medication, transport to collect them and discharge letters from doctors. Apart from these challenges, a few respondents stated that the discharge decision is made too late, which makes it difficult to process discharges timeously. They also felt that the relatives of discharged patients are notified too late, which impedes their availability to collect patients the same day. It is also known that the transit lounge is not being utilised optimally by wards and some respondents claimed that patients wait long for examination that are important to confirm discharge decisions.

Nonetheless, 96% of all respondents agreed that all discharged patients that fit the transit lounge criteria should move to the transit lounge, which is supported by 64% who believe that

the transit lounge is not being utilised optimally. However, those respondents that did not support the above-mentioned statements claimed that transport delays could create additional bed problems as patients are not always collected on the day of discharge. Other comments included that the transit lounge staff only accept certain patients, that patients were too sick and that discharges are only ready to go to the transit lounge before it closes at 18h30. Although GSH has a functional transit lounge, many respondents questioned its functionality and the safety of the patients.

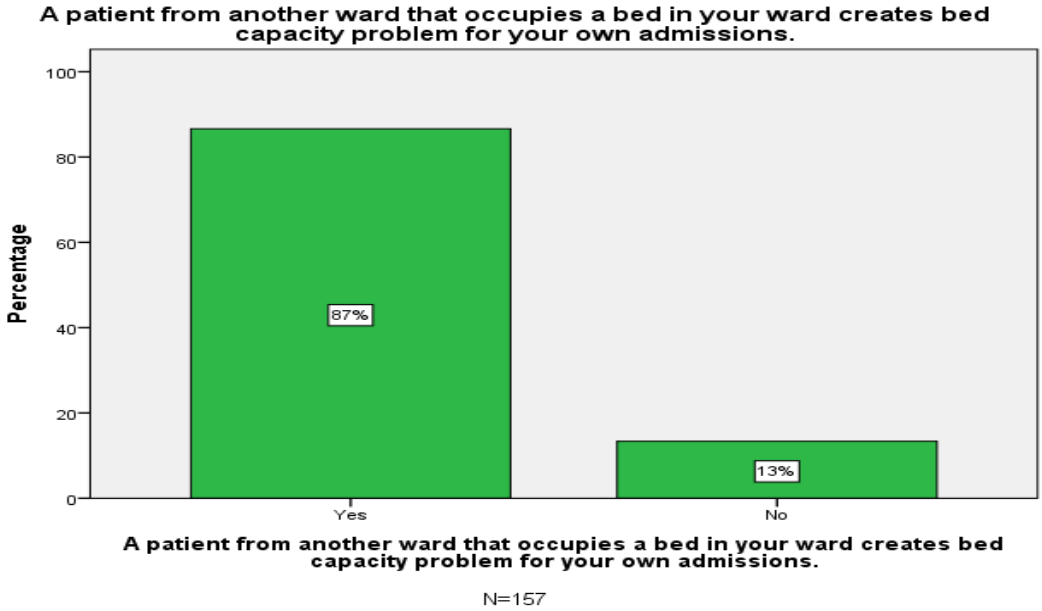


**Figure 4.20: A patient from another ward that occupies a bed in your ward creates bed capacity problems for your own admission.**

One area of concern that was identified in the previous chapter was the impact boarding patients from other departments have on a ward's capacity. It is clear from the graph above that the overwhelming majority (87%) agreed that when patients from other departments board in their wards, it creates capacity problems for them. The most important feedback according to the respondents is that boarding patients are often less on the treating team's radar and the urgency to move them back is low. This results in departments either cancelling their elective admissions or they end up boarding patients in other departments, which creates a ripple effect. Therefore, respondents claimed that the treatment of patients boarding in other departments is usually poorer as they are last to be seen and often even forgotten. It also creates confusion when transport arrives to collect patients and patients have been moved somewhere else, which is an indication that poor communication between departments occurred. It was determined

that wards refuse to take back the boarding patients; instead, they admit their own patients booked on the day, which contradicts the guidelines of the patient flow policy.

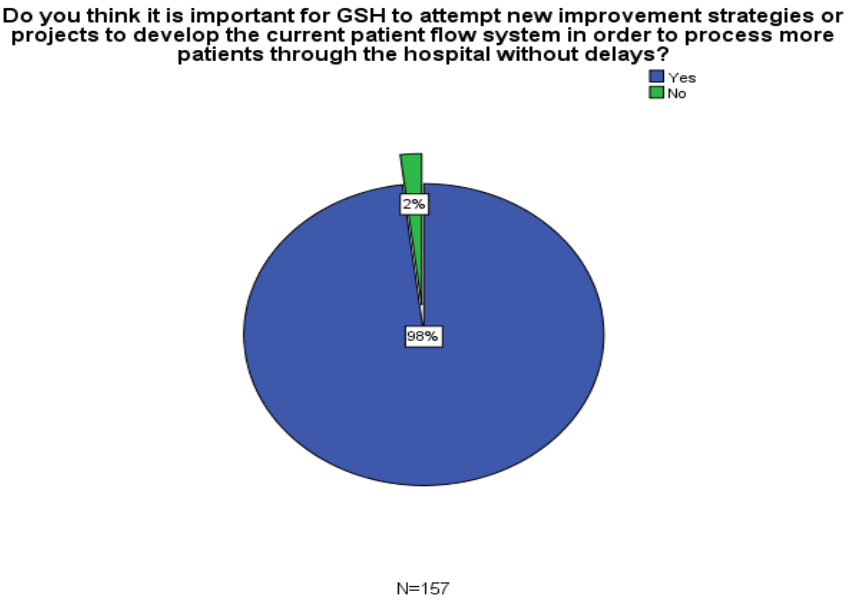


**Figure 4.21: Do you think it is important for GSH to attempt new improvement strategies or projects to develop the current patient flow system in order to process more patients through the hospital without delays?**

The aim of this particular question was to test whether respondents supported new improvement strategies in order to develop the patient flow system of GSH. As illustrated by Figure 4.21 above, 98% (n-154) of the respondents support the notion that new improvements will allow GSH to process more patients with fewer delays. The other 2% argued that improvements will only be beneficial if it addresses the right problems and others deliberated that more staff and more ward capacity are required to alleviate patient flow challenges. It was also mentioned that administration of projects will add to the workload of staff, which could cause them to neglect their initial duties.

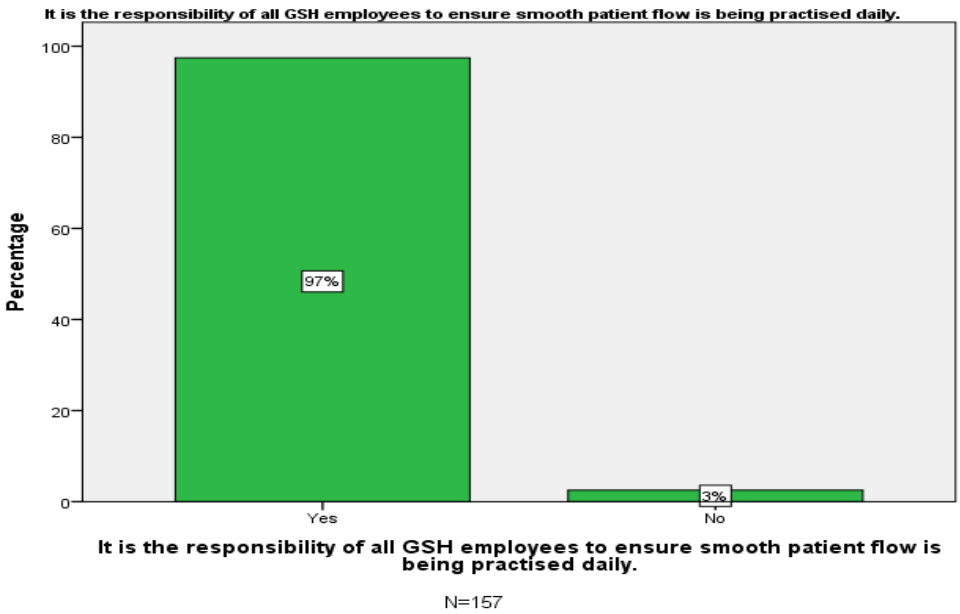


**Figure 4.22: It is the responsibility of all GSH employees to ensure smooth patient flow is being practised daily.**

It is interesting to note that 97% (n-153) of all respondents agreed that it is the responsibility of all GSH employees to ensure that patient flow is practised daily. The 3% that did not agree believed that patient flow is the responsibility of the two patient flow managers employed and others indicated that only certain employees like nurses and doctors are involved in patient movement. However, one employee claimed that if more staff were employed, less people would be involved in patient movement, which would result in better patient care.

The last and final part of the survey gave every respondent the opportunity to provide additional comments with regard to patient flow in GSH. Only 22% (n-34) of the respondents provided additional feedback. Quite a number of them argued that one of the biggest contributors for the influx in patient numbers are inappropriate referrals, which include walk-ins. Many general practitioners (GPs) often refer patients to the wrong geographical facility, wrong level of care or wrong department. This also signifies the ignorance of many patients with regard to how the primary healthcare system works. Other respondents support this statement and even go further by stating that GSH should be empowered to redirect patients back to the appropriate drainage area or correct level of care. The staff also claimed that less sick patients are admitted into tertiary level care beds that add to the bed pressures of GSH.

Other respondents suggested that infectious patients are inappropriately cared for where there are often not enough side cubicles to accommodate all infectious patients such as active

tuberculosis patients. The patients often lay in general wards that put other patients and staff at risk. In addition, a number of comments by respondents suggested that there should be more strict criteria for boarding patients in other wards and that doctors should attempt to plan their patients within their allocated bed capacity. The policy should also be updated, disseminated and enforced by all GSH employees.

Although it has been established that the patient flow system of GSH needs attention, many respondents indicated that GSH should employ more permanent employees. The main reason for this is that agency staff is in need of constant training on ward duties, which impacts on the already skeleton staff's ability to perform their daily tasks.

The last additional comments referred to poor communication structures and departmental silos. The various departments still isolate their functionality to their discipline, which makes it difficult to board patients in certain areas, because the staff claims the patients are too sick for their area. Respondents believed that if departmental silos could be eliminated and the workload shared evenly, it would be a step in the right direction, i.e. a step towards the improvement of patient flow in GSH.

## 4 .5 Conclusion

This section will conclude by summarising this chapter and to elaborate on the findings that will be used as a guideline for discussion in the succeeding chapter. Therefore, the following sections were explored to successfully obtain the opinions of GSH doctors and nurses on the patient flow system of GSH:

This chapter first described the design of the study that ensured the research approach was suitable to achieve the goal of this study. This allowed the researcher to elaborate on the study setting, the population and sampling method as well as which candidates qualified to participate in this study.

The second section of this chapter explains the research methodology techniques used to obtain the empirical data of this study. The purpose of this section was to explain the data-gathering instruments and how data was to be collected. This section also highlights the potential limitations of this study, continues by identifying any potential risks or discomforts to respondents of this study, and concludes by defining the ethical considerations of this study.

The latter part of this chapter consisted of the results section. In this section, the data was successfully analysed and interpreted, which were simplified and explained by various graphs and tables. This section firstly described the biographical information of the 157 respondents who participated in the survey. Secondly, the results of set closed-ended questions were interpreted and presented. Thirdly, the comments of a few open-ended questions were presented, which allowed the researcher to summarise the respondents' opinions. Both the closed-ended and open-ended questions focused on five main themes in order to investigate the opinions of GSH doctors and nurses regarding patient flow in GSH sufficiently. The themes below will be used as a guideline for discussion in the succeeding chapter.

- General patient flow management with the focus on the patient flow system of GSH.
- The importance of policies, especially the patient flow policy of GSH.
- Access block, which will focus on discharge planning and the utilisation of the transit lounge of GSH.
- Emergency centre overcrowding, its causes and the ward environment of GSH.
- The importance of patient flow improvements, data capturing and the effects it has on patient flow performance.

The final conclusion reached is that the goal of this chapter is successfully achieved, which is gathering the opinions of GSH doctors and nurses with regard to patient movement throughout the hospital. Therefore, the results analysed in this chapter are considered valid and can be used in the succeeding chapter for further discussion.

# Chapter 5: Final discussion on patient flow practices at GSH

## 5.1 Introduction

The previous chapter successfully described the design and research methodology techniques that were used to obtain the empirical data of this study. The limitations, risks and discomforts caused by the study, as well as the ethical considerations were also identified and described. More importantly, the previous chapter focused on the data analyses and interpretation of the survey conducted, which obtained the opinions of doctors and nurses of the medical, surgical and emergency departments. The outcomes of the analyses and interpretation clearly revealed that differences in opinions do exist and that different employees view patient flow differently. Therefore, the previous chapter allowed the researcher to identify five important themes, which will be used as guidelines for discussion in this chapter.

It was demonstrated in the literature and gathered from the results of the previous chapter that increasing a hospital's bed capacity or workforce is not the solution to poor patient flow. This is usually the most commonly proposed solution, which should be considered as the most inappropriate attempt to improve patient flow. However, as mentioned in the literature review of this study, in order for hospitals to make significant improvements, they first need to understand their current patient flow processes well enough before introducing any form of improvements.

Bearing the above in mind, it could be argued that methods to analyse or improve patient flow have some merit to really address patient flow challenges. It may be beneficial if hospital staff understand the general concepts of patient flow and why policies are developed. Such a hospital-wide commitment will enable hospitals to address patient flow challenges effectively, which should manifest when transparent data reporting systems are put in place.

This brings us to the goal of this chapter, which is to formulate a discussion around patient flow management at GSH. This discussion will be developed through links between the literature review, the patient flow system of GSH, results from the survey, as well as the results from the interviews conducted. In order to achieve the goal of this chapter, the following objectives will be pursued:

- To describe general patient flow management practices of GSH.
- To explain the importance of policies, especially the patient flow policy of GSH.

- To explain the effects and challenges caused by access block at GSH.
- To describe emergency centre overcrowding, its causes and the ward environment of GSH.
- To describe the importance of patient flow improvements, data capturing and the effects it has on patient flow performance.

The first section of this chapter will describe the general patient flow management system of GSH. The main focus of this section will be to determine whether GSH doctors and nurses understand the concept of patient flow.

In the second section, the importance of policies, especially the official patient flow policy of GSH will be explained to highlight the values of well-developed policies.
The third section of this chapter will explain the challenges caused by access block in GSH. This section will identify how certain steps in the patient flow system are dependent on other steps to guarantee smooth patient movement.

The fourth section will compare the ward environment to that of the emergency centre. The focus here will revolve around the causes of periodic overcrowding usually experienced by the emergency centre of GSH. The fifth section of this chapter will elaborate on why hospitals need improvements to develop their patient flow systems according to healthcare demand. The importance of capturing data will also be explained in this section.
Lastly, this chapter will draw final conclusions in terms of each of the themes described above.

## 5.2 Discussion

The ultimate goal of this research was to examine the current patient flow system of GSH. One of the main objectives was to determine how nurses and doctors working at GSH perceive this patient flow system.
Findings from the research showed that the distribution of staff amongst the medical, surgical and emergency departments are virtually similar and that 75% of the participants were female. This can arguably be due to the fact that 58% of respondents were nurses, which predominantly consist of females. This result is supported by the SANC (South African Nursing Council) geographical distribution data, which indicated that the Western Cape had a total of 20 907 female nurses and 1 855 male nurses in 2013 (SANC Geographical Distribution, 2013).

The parts of this section to follow will continue with a discussion on more specific aspects of patient flow in GSH, as identified in the proceeding chapter, which will be compared to related literature, content of the third chapter and especially with results from the patient flow interviews.

### 5.2.1 General patient flow management system of GSH

Although it is believed that patient flow in hospitals is heterogeneous, 86% of the participants involved in this study agreed with the operational definition of patient flow management developed by Cote (2000:8), which is the movement of patients through a set of locations in a hospital. It can therefore be argued that efficient patient flow management refers to the movement of patients through a facility without undue delay that will consequently reduce waiting times (Pearson, 2008:16), which is supported by 92% of the respondents.

There is extensive existing literature on patient flow management practices worldwide. However, as mentioned by Backer (2002:45), each healthcare facility should define patient flow according to their function and the services they provide. The main focus of this study was on the patient flow system of GSH. Therefore, findings of this study, as well as the interviews conducted, demonstrated that most of the respondents feel that GSH does not have an efficient patient flow system. It is claimed by many participants that it is difficult to function without clearly defined guidelines, which consequently allow different patient flow practices to develop. This is in keeping with the interview results that indicated GSH should define their current patient flow system in order to close the gap between theory and practice. Results of the interviews conducted revealed that the main factors influencing patient flow in GSH include poor communication, access block, late discharge planning, lack of resource utilisation, and non-standardised patient flow guidelines. These factors are supported by 58% of the survey respondents.

Interestingly, the patient flow analysis identified that patients are not transferred into ward beds within a reasonable time frame. Nevertheless, the interview results suggest that there is an imbalance in the weekly workload, to such an extent that Monday to Thursday GSH experiences extreme capacity problems, in contrast with Friday to Sunday where there are virtually no capacity problems. Given the established link between waiting times and undesirable patient outcomes, the lack of urgency to transfer patients into ward beds remains

one of the biggest challenges for GSH. Therefore, the significance of reduced waiting times is emphasised by Forero et al. (2010:120) who argue that a delay in patient movement has a very strong connection with increased mortality rates, especially when hospitals are experiencing capacity problems.

Although two patient flow managers are employed at GSH, 97% of all respondents claimed patient flow is a shared responsibility for all GSH employees to ensure efficient patient flow. However, most of the respondents insisted that more staff and increased capacity would be the answer to GSH's patient flow challenges. In addition, it is confirmed by the literature that adding capacity would not solve patient flow problems, but would potentially create further difficulties (Litvak et al., 2007:40). Therefore, Mishra et al. (2014:5) urge hospitals to assess and understand their patient flow systems first and then focus on eradicating bottlenecks that affect the optimal usage of available resources.

At the same time, the interviewees acknowledged that the patient flow system of GSH is under tremendous pressure, which is mainly caused by the absence of clearly defined guidelines employees can use to facilitate patient movement. The fact that the patient flow system of GSH is under pressure is confirmed by observations of the patient flow manager, who considers the current patient flow policy of GSH to be outdated. The next part of this section will continue the discussion on the impact that the current policy has on patient movement.

### 5.2.2 Adhering to policy guidelines

This research study demonstrated that the current patient flow policy of GSH urgently needs attention. Although only 50% of the respondents are aware of the policy, 59% stated that they have not seen this policy to date and were unaware of its content. It has been recognised by researchers such as Rankin et al. (2015:115) that policy implementation, especially in healthcare can be extremely challenging. According to observations from the patient flow manager, results from the survey and interviews, and current patient flow practices, the official patient flow policy of 2009 can be considered as outdated.

Section 3.3 in chapter 3 describes how the above-mentioned policy contradicts the current patient flow practices in GSH, which also confirms the fact that this policy is only two pages long and lacks some valuable guidelines. However, the patient flow manager of GSH submitted a 19-page draft document in 2014, which in his opinion, addresses most patient flow discrepancies not covered by the current policy. This document is still under review, which allows more unofficial patient flow practices to develop in GSH. This is confirmed by

Sandstrom et al. (2015:10), who remind us that a delay in updating a policy can create more complications at operational level.

This study also identified that the majority of the respondents acknowledge that the patient flow policy of GSH is not being implemented correctly, despite the fact that they are unaware of the policy content. One could argue that the lack of policy enforcement from senior management could contribute to the poor implementation. However, Parr (2010:42) clearly specifies that top management usually becomes uninvolved after introducing a policy and does not provide the necessary support to operational employees after the commencement of policy implementation, which could influence the sustainability of policy application. In contrast, the interview results revealed that GSH needs a firm plan to update the current patient flow policy, which should involve both managerial and operational stakeholders. Sandström et al. (2015:10) claimed that operational employees tend to rely more on knowledge from their colleagues and personal experience than ill-defined policies. Unfortunately, decision-makers appear to do the same, hence confirming the separation between them and operational employees. Furthermore, findings from the interviews revealed the gap between managers and operational employees and that policy adjustment is sure to improve patient flow in GSH.

In addition, this study also provided evidence that new employees are not orientated with the necessary policies or guidelines, which could create more uncertainties in the patient flow system of GSH. It can be argued that the more staff GSH employs, the fewer employees will be aware of the current patient flow policy, which would result in even bigger patient flow inconsistencies. However, results from the interviews confirm that a paradigm shift in terms of patient flow is required to improve patient movement. This is largely due to the fact that the demand for hospital services has changed.

### 5.2.3 Access block at GSH

Findings of this study revealed that one of the leading causes of long waiting times is access block. According to the literature, access block usually occurs when there is a delay in the discharge process (Pines et al., 2011:1359). The importance of adequate discharge planning has been stated throughout this study, which is verified by the empirical data analysed.

The majority of the respondents of the survey, as well as all the interviewees, agreed that the discharge processes at GSH are disconcerting. It has been argued in the literature that the key

to alleviate access block starts with strengthening the discharge processes of a hospital, which in turn are essential in reducing waiting times (Forero, McCarthy & Hillman, 2011:4). Although there are many projects or innovations to improve discharge planning in GSH, these projects are still being conducted in silos and the lessons learnt are not timeously shared with other departments. Such improvement initiatives are developed despite the fact that clear guidelines are provided in provincial policies such as the ECLMP. For example, results from the survey stated that the vast majority denied that 80% of all discharges actually leave the ward before 12h00 daily. This contradicts the guidelines of the ECLMP (2012), which clearly indicates that 90% of all discharges should vacate their ward beds by 10h00 on the day of discharge. However, comments from the interview results revealed that discharged patients do not vacate their beds before 12h00, but also showed that there are lots of other determinants that affect the discharge process if discharge decisions are made late.

Even more importantly, it is clearly stated in the ECLMP (2012) that discharge planning should commence from the time patients are admitted and has a clear treatment plan. Results from the study showed that majority of the respondents claim that discharge planning does not start from admission, but rather on the day the patient is fit to be discharged. However, it is also known that the discharge process can become a lengthy process if it is not planned proactively. The main reasons identified by the survey respondents and the interviewees include waiting for medication from the pharmacy, transport delays, delays in radiology investigations, delays to transfer patients to stepdown facilities and poor portering services influenced the time patients actually vacate their ward beds. It was also suggested that the patients' conditions are tremendously volatile at the time of admission to determine the expected date of discharge. One could ask the question, is there ever a time the patients conditions does not change? It is therefore evident that early discharge decisions will allow nurses and supporting staff to address the abovementioned issues appropriately to ensure that patients are ready to leave within an appropriate time.

This study also reveals that communication challenges between the doctors and nurses in GSH aggravate access block in terms of how discharges are identified. Driscoll et al. (2015:E2) remind us how hospitals should strive to reinforce good communication methods, which will allow the flow of patients to improve as well as optimise bed utilisation. It can be argued that this will not only improve the pulling and pushing mechanisms, which is essential to ensure smooth patient flow, but it will also improve the quality of care patients' receive.

In this study, we also found that the transit lounge is extremely underutilised. According to a transit lounge report, it was established that not all wards make use of this function. Results from the interviews revealed that the function of the transit lounge is not clear and the area is not conducive to care for all patients. Therefore, ward employees are very reluctant to send patients to the transit lounge. However, although Brassard (2013:37) describes the transit lounge as a safe environment for discharge patients to wait for transport, Hernandez, John and Mitchell (2014:2) suggest that the transit lounge should be large enough and appropriately located to accommodate patients and should have a fixed criterion that ensures patients will be cared for correctly until their transport collects them. It is also known that the transit lounge at GSH closes at 18h30, which was identified by many survey respondents as a problem, as patients often vacate the wards after 18h30. If the transit lounge is used correctly by GSH employees, it would drastically reduce access block. However, in order for this to happen, one can assume that the function of the transit lounge should be assessed and its criteria for accepting patients' needs to be disseminated properly.

Apart from the above-mentioned factors that hamper ward access, it has been discovered in this study that there are other factors, beyond the control of GSH, that affect access block. Patients with social issues or with no fixed abode could stay in hospital beds for days before vacating the wards. It was also revealed that the process to get such patients out of the hospital takes a while and if this problem is identified earlier, the process time could potentially be shortened. This relates to the discussion of good communication and appropriate guidelines that are essential to enhance patient flow performance.

Results of this study demonstrated that access block is one of the biggest contributors of overcrowding of the emergency units, which will be considered in the next part of this section.

### 5.2.4 GSH experiencing overcrowding

Emergency department overcrowding is a known challenge in the hospital setting that is often perceived by staff, but is hard to determine quantitatively. The circumstances that influence the level of overcrowding are diverse, therefore this study provided opinions from nurses, doctors and a few managers on overcrowding at GSH. Based on the results of this study, it was identified that the biggest contributor that causes ED overcrowding is the practice of keeping admitted patients on stretchers in the ED for long periods of time. This was confirmed by results from a study by Nugus et al. (2014:3) which indicate that the inability to grant ward beds to

patients waiting for ward beds is the leading cause of overcrowding. It was established that the two factors that the ED of GSH struggle with the most are patients waiting for ward beds and the high demand for emergency services. In a study by Pines et al. (2011:1359), it was revealed that a third of the patients in an ED usually wait for ward admission, which leads to the occupation of floor space that could have been used for acute patients in need of emergency services. The interview results also supported this finding and revealed that there are many patient flow inefficiencies that require improvement.

Other factors of ED overcrowding include, amongst others, an increased demand for ED resources, staff burnout and the ability of ED staff to deliver high-quality hospital care. This directly affects the care patients receive and the work environment of employees. Results from the interviews further revealed the fact that communication amongst departments remains one of the biggest challenges of GSH. In addition, these results showed that the push-and-pull mechanisms currently in place do not support the patient flow system of GSH.
In addition to these findings, it was noted in chapter 3 that the deterioration of the communication structures started when the patient flow manager was appointed. A culture amongst employees developed to the point where they started to withdraw their efforts to assist with patient movement, because they claim that it is not their responsibility to ensure efficient patient movement. However, it was suggested by Boyle et al. (2012:6) that hospitals will only function optimally if they have full capacity protocols or guidelines that highlight the responsibility of all staff members. This brings us back to the point that GSH's official patient flow policy is completely outdated.

In this study, we also found that nurses and doctors argue that overcrowding also occurs at ward level. Eighty-seven percent (87%) of the survey respondents felt that boarding patients from other wards creates problems for their own admissions if these patients are not transferred back to their admitting ward. This type of boarding is perceived by nurses and doctors as overcrowding at ward level. The main reason provided for this was that they cannot accommodate their own patients that are usually waiting outside the wards for beds to become available. It was also verified that patients who board in other wards are usually not top priority for treating teams and the urgency to move them back is low. The effects of this type of overcrowding often leads to elective patients being cancelled or ending up as boarding patients in other departments, which shifts the problem from one area to another. In contrast, the interview results revealed that wards cannot experience overcrowding, as it is not acceptable

for wards to admit over their allocated capacity. It can therefore be assumed that the managers often do not share the same frustrations as operational staff. One of the biggest challenges identified was that even though wards are obliged to take back their boarding patients, they rather admit new elective patients to their available beds, which contradicts the guidelines of the official patient flow policy.

It is obvious from the discussion above that the reality of overcrowding experienced at GSH influences the implementation of effective patient flow practices, which affect the ability of all staff to optimally care for patients. Although it is not a priority to measure overcrowding, the next part of this discussion will elaborate on the importance of data capturing and patient flow improvement strategies.

### 5.2.5 The significance of patient flow improvements

It is evident from the literature that patient flow is considered as one of the most essential components to ensure efficient hospital performance. Although Villa, Prenestini and Giusepi (2014:197) indicate that it is difficult to measure overall hospital performance, the results of this study clearly identified that the collection and measuring of data is considered important. However, most of the respondents agreed that the collection of data hampers operational duties. In contrast, the interview results revealed that data collection is a top priority for most managers and that it is not an ingrained culture for operational staff. However, Villa, Prenestini and Giusepi (2014:198), amongst others, refer to BOR, mortality rates, ALOS, readmission rates and number of complaints as indicators to measure patient flow performance. Furthermore, it is also known that all hospitals are heterogeneous and that each hospital should develop their own performance measures to track their performance.

Interestingly, the patient flow analysis revealed that data collection is considered a waste of time, despite the fact that most of the respondents as well as the interviewees deemed data capturing an important function. These results also revealed that in order to improve patient flow in GSH, the correct challenges should be addressed and improvement projects should not be delegated to operational staff. This observation is supported by the interview results and supplements the argument that improvements are usually driven by top management, which could be perceived by operational staff as adding to their current workload. However, the interviewees also assume that it would be difficult for operational staff to initiate and manage projects without the correct understanding and knowledge. Therefore, although the

interviewees all agreed that in order to close the gap between managers and operational staff, GSH usually appoints external professionals to drive hospital improvement projects. This would allow managers and operational staff to collaborate their efforts to process more patients through GSH with fewer delays.

In addition, the interview results disclosed a fascinating point with regard to patient flow improvements at GSH. These results indicated that sustaining improvement projects is a challenge in itself. The reason for this is that operational staff believe that their involvement in projects are instructions from managers and then start to push back when improvement projects become an additional duty for them. This makes the sustainability of projects extremely difficult, especially when projects have a positive impact on patient flow. Therefore, it can be assumed that if operational staff are empowered with the appropriate skills to manage projects and take ownership of projects, sustaining projects will become more feasible. This would allow GSH to sustain its patient flow system to an extent where a new improvement culture is developed by both managers and operational staff.

## 5.3 Conclusion

This section makes final concluding comments with regard to the discussion of this chapter, especially relating to each objective explored in this chapter. The discussion offers useful insights into how managers and operational staff perceive the patient flow system of GSH. The empirical component of this study reveals that differences in opinion exist between top management and operational staff. The discussion above delineates that managers have a more evidence based approach of doing things, where the operational staff feels that data capturing and administration duties are time consuming and a waste of time. The study also offers interesting considerations to reshape future improvement strategies in GSH, especially by breaking departmental boundaries that would allow GSH to adopt a system-wide approach in its efforts to improve patient movement. This chapter identified the most important aspects of patient flow in GSH that were used to guide the discussion of this chapter.

The first section of this chapter briefly explained the opinions of doctors and nurses with regard to the general patient flow management system in GSH. It was revealed that most of the study participants consider the patient flow system of GSH inefficient.

The second section of this chapter focused on the importance of policies, especially the official patient flow policy of GSH. It was discovered that all parties involved in this study believed that the current patient flow policy of GSH is outdated. It was also argued that despite the fact that this policy needs revision, strong guiding principles are necessary with implementation.

The third section of this chapter explained the effects access block has on patient flow in GSH. The discussion recognised that proactive discharge planning and optimal utilisation of the transit lounge are key areas that could reduce access block in GSH. Other results revealed that access block and patient flow could be immensely alleviated if communication mechanisms were strengthened.

The fourth section demonstrated that the reality of overcrowding is actually a result of ineffective patient flow practices. It was discovered that overcrowding also occurs at ward level and is mostly affected by boarders from other departments, which leads to wards being overbooked. The negative influence overcrowding has on staff and patients was revealed, especially how long waiting times impact on the patients' journey.

The fifth section of this chapter elaborated on the importance of system improvements and data capturing. Results revealed that even though improvement projects and data collection are considered essential in establishing patient flow, operational staff indicated that these increase their workload. The interview results indicated that although improvement projects have positive results, the sustainability is a considerable difficulty.

This chapter concludes that the patient flow manager, doctors, nurses and senior management representatives all agreed that there are known patient flow challenges in GSH and that the current culture is not conducive to practice efficient patient flow strategies. Therefore, this chapter succeeded in its goal to establish a discussion that would clarify patient flow management at GSH.

# Chapter 6: Summary and final discussion

## 6.1 Introduction

It was identified in the literature review that patient flow management is one of the most important aspects to ensure efficient patient throughput in hospitals. However, it also became evident that all healthcare facilities are heterogeneous, which clarifies why it is possible that employees usually perceive patient flow management according to their own work background. Therefore, the goal of this study was to explore the patient flow system of GSH holistically, as well as to establish which measures could be used to determine patient flow performance. The analysis provided a better understanding of how nurses, doctors and executive managers perceive patient flow in GSH.

The goal of this closing chapter is to provide a summary of the preceding chapters, describe the main findings of the research, make suitable recommendations based on the results, and formulate a final conclusion.

## 6.2 Summary of chapters

Chapter one was an introduction to the entire study, its context and rationale were explained, and the pressures experienced by healthcare facilities were outlined. The background and problem statement laid a solid foundation that justified the need for the study. This chapter also identified the ultimate goal of the study and introduced related objectives in order to achieve this goal. The research design and methodology were described briefly, which explained how the non-empirical and empirical data would be obtained. This chapter concluded by describing the layout of this study by providing a brief description of each chapter.

Chapter two focused primarily on literature from existing patient flow studies that were conducted globally. This chapter explored patient flow management definitions as well as new patient flow concepts that are implemented by hospitals to improve their patients' journey. The literature review largely focused on methods to assess and improve patient flow, which are seen as the key towards eliminating patient flow inconsistencies. This chapter also revealed which patient flow measurements could be used by hospitals to assess their patient flow performance.

Chapter three presents an in-depth description of the current patient flow system employed by GSH. This chapter used hospital reports, policies, project results, audit results, personal

experience and observations from the patient flow manager of GSH to explain the current patient flow system.

Chapter four provided details of the design and methodology employed to obtain the empirical component of this research. It explained the data collection methods, the research instruments used as well as the processing and interpretation of the data. The latter part of this chapter presented the results obtained from the survey conducted to attain the opinions of doctors and nurses on patient flow practices in GSH.

Chapter five delivered the final discussion of this research. This discussion concentrated on links between the results obtained from the survey, related literature, content of chapter three and results from the interviews.

The purpose of chapter six is to conclude with the findings of this study and to make suitable recommendations that could potentially be used by GSH and other hospitals to improve their patient flow practices.

## 6.3 Main findings of research

One of the main findings of the research was that efficient patient flow management allowed patients to move through a hospital without delay, eliminating waiting times while reducing time, effort and costs. Many participants indicated that it is difficult to ensure efficient patient flow without clearly defined guidelines. Interview results revealed that poor communication, access block, late discharge planning, lack of resources utilisation and non-standardised patient flow guidelines are some of the most frequently identified reasons that influence patient movement in GSH. It is therefore evident that the current patient flow policy of GSH requires an update in order to address the current patient flow demands appropriately. It was also argued in this study that after policies have been developed and implemented, the relationship between managers and operational staff begins to wane, which impacts on the sustainability and effectiveness of policies.

This study revealed that the main reason patients experience increased waiting times is access block. The majority of the respondents of the survey, as well as all the interviewees, are concerned about the current discharge practices in GSH. It was also discovered in this study that the majority of discharged patients only vacate their beds after 12h00, despite clear guidelines provided by provincial policies, which indicate that 90% of all discharges should

vacate their ward beds by 10h00 on the day of discharge. The main reasons for delay in discharges are that GSH has no discharge standard and that the transit lounge is grossly underutilised. It was found that the functionality, capacity and operating times of the transit lounge were not clear to ward staff, which triggered the uncertainty with regard to using this function.

Interestingly, the patient flow analysis revealed that the effects of poor patient flow usually results in overcrowding of the ED. However, respondents indicated that overcrowding is also experienced at ward level, which usually occurs when patients from other departments block beds for elective admissions. It was highlighted in this study that overcrowding affects staff performance, which may influence the level of patient care. It was evident from the interview results that the current push-and-pull mechanisms do not support the patient flow system of GSH, which again conveys the fact that communication between departments remains one of the biggest challenges. Therefore, it can be argued that overcrowding in GSH directly affects the ability of all staff to optimally care for patients.

Although the new buzzwords for GSH managers are innovation and improvement, most of the respondents agreed that the collection of data and project administration hamper operational duties. It was recognised that managers and operational staff do not always share the same vision, which can result in conflict when new improvement projects are proposed. Therefore, in order to close the gap between managers and operational staff, GSH usually appoints external professionals to drive hospital improvement projects, which allows managers and operational staff to pursue common goals, especially when projects have a positive impact on patient flow.

This study provided useful insights into how managers and operational staff perceive the patient flow system of GSH. Although it is clear from the results of this study that GSH have many patient flow inconsistencies, the current patient flow system should be mapped out properly and analysed before significant improvements are possible. Based on the results and discussion of this study, it is possible for the researcher to propose a set of recommendations that can be used by GSH to alleviate its patient flow inconsistencies.

## 6.4 Recommendations relating to research findings

The research has shown that there is a definite gap between patient flow management policy and practice in GSH. In response to the challenges identified and findings from this study, the researcher concludes this study with suitable recommendations, which could be used to improve the patient flow management system of GSH. Therefore, the following recommendations discussed below could be pursued by GSH.

It is recommended that the executive management team of GSH take a leading role towards reviewing and updating the patient flow policy of 2009, with the purpose of addressing the current patient flow needs of GSH. The 2009 policy does not cover all aspects of patient flow management at GSH, which will also be part of a change management strategy that is necessary to address the attitude of operational personnel. In addition, the knowledge and evidence gained from the content of this study provides a solid foundation to develop a new policy framework that supports the strategy for policy upgrade. The development of a new patient flow policy should involve relative stakeholders who already participate in patient movement. When the new policy is approved, it should be disseminated and signed by all departments to ensure everyone is aware of the new policy. This policy should form part of the orientation programme for new employees. This endeavour would ensure that patient flow is standardised throughout the hospital and would eliminate the possibility of contradicting patient flow practices to develop.

With the above in mind, it is also recommended that GSH develop an escalation plan that clearly defines dangerous occupancy levels with appropriate action plans assigned to each level. This would allow the hospital to have a systems-wide approach when it responds to major incident situations. The purpose of such an escalation plan would be to describe the processes to be undertaken and to address basic principles to improve bed utilisation and patient flow through GSH, which would alleviate the increased pressure for acute hospital services within an appropriate time frame. Therefore, it can be argued that an escalation plan would allow GSH to address its challenges in a more structured manner.

Another focus area for GSH is to reduce waiting times and improve capacity utilisation to confront challenges that cause access block. It is therefore recommended that GSH adopt the guidelines set out by provincial policies to develop its own discharge plan. Clearly defined discharge guidelines would allow discharge planning to occur in a more structured manner if

it is implemented and enforced properly. Another recommendation that could alleviate access block is better utilisation of the transit lounge. The researcher recommends that the function, capacity and location of the transit lounge be reviewed and improved according to the needs of the wards, once the ward staff feel content with the new function and operating hours. This should increase the utilisation of the transit lounge, which would stimulate efficient patient movement.

One of the most important challenges to address would be how the bed status of the wards is communicated. It is known that bed status is currently determined by phoning each ward, which is time-consuming and labour intensive, especially because the status changes continually. The researcher proposes that the wards in GSH use the Nursing Information Management System (NIMS) to update their bed status every four hours. This system can be designed and changed to suit the users' needs and all ward sisters are already familiar with this system. A generic password would be used by anyone who wishes to view the bed status according to the last update. The system is also designed to track what wards do not capture their bed status. Such a system would not affect the internal networks of GSH, but would eliminate hours of doctors, nurses, patient flow managers and others phoning around for available beds.

It is quite evident from the results that patient flow performance is not being measured in GSH, despite the hospital having the necessary infrastructure to generate useable information. In this regard, the researcher recommends that specific information is captured to reflect on the patient flow performance at GSH. The most important measurements identified by various related studies include, amongst others, occupancy levels, mortality rates, ALOS, number of daily admissions and number of daily discharges. All of this information is readily available from the IM unit of GSH. After gathering this information, mechanisms could be developed to capture waiting times and number of boarders. If the data acquired by means of these measurements are compiled in a monthly report, GSH executives could reflect on the patient flow performance on a monthly basis and use it to identify potential improvements. This information could be used over time to predict trends, which GSH can use to forecast and plan according to the predicted demand. The managers of GSH would also be able to discern whether improvement interventions make an impact on the above-mentioned measurements and use it as motivation to sustain improvement projects on operational level.

One of the concerns raised by respondents during the survey was the lengthy process to transfer patients to stepdown facilities. It was revealed that patients wait up to a few days to be

transferred to stepdown facilities, which is usually due to capacity or transport challenges from these facilities. As a result, the expense to temporarily board such patients in GSH is approximately R5 000 per day according to the statistics provided by the IM unit. Therefore, the researcher recommends that GSH should invest in a stepdown ward or alternatively house these patients in comfort off site while waiting for a bed in other facilities. This will free up additional beds on a daily basis and the patients would still receive the appropriate care before being transferred to a stepdown facility.

The discussion also exposed that one of the biggest contributors for patient numbers at GSH is the number of inappropriate referrals that GSH receive. It is therefore, recommended that GSH as a central hospital should ensure that all healthcare facilities in its drainage area knows how the referral system works and when it is appropriate to seek tertiary care at GSH. The community should also be empowered with the necessary knowledge that will enable them to understand how the primary healthcare system works, which starts with information provided to them at the primary healthcare facilities.

In addition to the above, the researcher believes that in order to adequately apply the proposed recommendations, a culture change towards patient flow is required in GSH, which should be initiated and driven by the executives of GSH, but should at the same time recognise the inputs of the operational staff. Therefore, the researcher argues that patient flow management is the responsibility of all staff working at GSH.

## 6.5 Recommendations for further research

Further research involving other tertiary and secondary hospitals is recommended. It is evident that patient flow management within the context of the Western Cape is not thoroughly explored yet. Therefore, it is recommended that the Western Cape Department of Health should develop a patient flow guideline on provincial level with clearly defined performance measures to monitor patient flow efficiencies. Moreover, in order to formalise this recommendation, the researcher proposes that the Western Cape Department of Health should initiate a formal patient flow forum to which all hospital patient flow managers or related representatives should report. This forum would empower patient flow managers to address their patient flow challenges appropriately and provide them with the necessary support to make system improvements at their hospitals. Patient flow managers would also use this setting to share

experiences, compare statistics and more importantly develop a patient flow audit tool that is conducive to their hospitals. Such a formalised reporting structure would enable the Western Cape Department of Health to monitor and evaluate patient flow performance against each hospital's Annual Operations Plan, as well as the objectives that the National Government intends to achieve.

## 6.6 Final conclusion

This section seeks to conclude the chapter and study by seeking the most relevant and important conclusions. It is understood, from the literature explored in this study, that hospitals should have the appropriate infrastructure, policies, processes and human resources to optimise patient movement through a hospital in a safe, timely and cost-effective manner. However, the common culture is usually the failure to recognise the importance of patient flow, unless a hospital is faced with major capacity problems. It is therefore argued that proactive planning and improving patient flow is important with or without capacity problems.

The findings of this study revealed that the patient flow system of GSH has many inconsistencies and that the perception of patient flow changes with people's ignorance and different work environments. The empirical evidence suggests that there is a definite need for GSH managers and operational staff to join their efforts towards strengthening policies and improving communication. This study also identified how useful data would be to compare and benchmark patient flow practices at both departmental level and on a hospital-wide basis, which could provide valuable insights into establishing improvement strategies. The findings also provided a better understanding of how nurses, doctors and executive managers perceive patient flow in GSH. As a result, the findings were used to make suitable recommendations that GSH should consider as a start to their journey towards improving patient flow.

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# Addendums

## Appendix A: Structured Questionnaire

UNIVERSITEIT·STELLENBOSCH·UNIVERSITY
jou kennisvennoot • your knowledge partner

**STELLENBOSCH UNIVERSITY**

**CONSENT TO PARTICIPATE IN RESEARCH**

**Patient Flow Management in a South African Academic Hospital:**

**The GSH Case**

**You are asked to participate in a research study conducted by Mr Garth Hankey, Masters in Public Administration student, from the School of Public Leadership at Stellenbosch University. The results of this study will contribute towards the completion of a thesis. You were selected as a possible participant in this study because you are a front line worker that experiences the everyday pressures and frustrations of patient movement through the hospital system. Your knowledge will be valuable in terms of understanding the notion of patient flow in the hospital setting as well as how it impacts on your operational duties.**

1. **PURPOSE OF THE STUDY**

**The purpose of this research is to investigate the patient flow system of a large South African academic hospital, Groote Schuur Hospital (GSH) in Cape Town.**

2. **PROCEDURES**

**If you volunteer to participate in this study, we would ask you to do the following things:**

**Complete a questionnaire regarding patient flow management to the best of your ability. There will be sections that you can give reasons for your answers as well as state your own opinions. The following Methodology will be used for this study:**

**Study setting**

**The study will be conducted in the medical, surgical and emergency departments' of GSH, a central hospital in the Cape metro-pole region.**

**The medical wards are located on the G-floor (5th floor), the surgical wards on the F-floor (4rth floor) and the emergency department on the c-floor (1st floor).**

**Research design**

**An explorative research approach will be used to obtain the opinions of GSH employees regarding patient flow management. This study will be conducted in a non-experimental manner and an evaluative design with a quantitative approach will be used to pursue the objectives of this study. This research approach allows the researcher to explore the aim on this study to obtain quantitative data by using a structured questionnaire as the data collection tool.**

**Population and sampling**

**For the purpose of this study, the target population will consist of GSH employees who consist of managers, doctors, nurses and selected departmental specialists. No particular sampling method will be used to obtain a large enough sample from the population. The researcher will distribute questionnaires to all the departments and hope for a large enough response to validate the patient flow opinions of GSH employees. This means that the sample size will be dependent on the participant response rate and the researcher anticipates a better sample size by using this approach.**

**Data collection tool**

**The data will be collected by using a structured questionnaire, carefully designed by the researcher to test opinions of GSH employees on patient flow management. The questionnaires will be completed anonymously, as the participants will not be required to capture their names on the questionnaires.**

**Process**

**The questionnaires will be provided to the supervisors or shift leaders of the departments involved in this study. All questionnaires will be in an open envelope that the participants can seal after completion. When the participants submit the completed questionnaires to the supervisors or shift leaders, they will throw it through an opening in a sealed box that the researcher will collect.**

**The supervisors or shift leaders will be responsible to distribute the questionnaires. The researcher will assist the supervisors and shift leaders to create awareness of this study to motivate potential participants to complete questionnaires. After the questionnaires are completed and placed in the box provided, the supervisors or shift leaders must store the sealed box in their lockable office for collection by the researcher at the end of their shift. The participant will receive the questionnaires at the beginning of their shift (07h00) and must complete and deliver the questionnaires before the end of their shift leaders shift (16h00).**

**The researcher will collect the sealed boxes filled with completed questionnaires (in sealed envelopes) and store it in a lockable cupboard in the researcher's office for analysis. Therefore, the anonymity of each participant is guaranteed and the researcher will be the only one that has access to the completed questionnaires.**

## 3. POTENTIAL RISKS AND DISCOMFORTS

**There are no reasonable foreseeable risks or harm to you or your work environment involved in this study. The only discomfort will be the short time used to complete the questionnaire.**

## 4. POTENTIAL BENEFITS TO SUBJECTS AND/OR TO SOCIETY

**You will not directly benefit from this research. However, the results of this research can be used to make valuable improvements to the current patient flow processes in GSH.**

**This research will also provide science regarding patient flow management with knowledge on how the frontline workers within hospitals perceive patient flow.**

## 5. PAYMENT FOR PARTICIPATION

**You will receive no financial or any other reward for participating in this study.**

## 6. CONFIDENTIALITY

**Any information that is obtained in connection with this study and that can be identified with you will remain confidential and will be disclosed only with your permission or as required by law. Confidentiality will be maintained by means of anonymous completion of the questionnaires. The completed data will be kept in a lockable desk drawer and only the researcher will have access to this drawer.**

**The information obtained will be used for academic purposes, unless hospital management request to obtain access to the research results in order to make patient flow improvements. If the researcher plans to publish the results of the study, confidentiality will be maintained by ensuring you stay anonymous.**

## 7. PARTICIPATION AND WITHDRAWAL

**You can choose to participate in this study or not. If you volunteer to be in this study, you may withdraw at any time without consequences of any kind. You may also refuse to answer any questions you don't want to answer and still remain in the study. The investigator may withdraw you from this research if circumstances arise which warrant doing so.**

## 8. IDENTIFICATION OF INVESTIGATORS

**If you have any questions or concerns about the research, please feel free to contact Mr Garth Hankey on 072 592 1792 at time.**

## 9. RIGHTS OF RESEARCH SUBJECTS

**You may withdraw your consent at any time and discontinue participation without penalty. You are not waiving any legal claims, rights or remedies because of your participation in this research study. If you have questions regarding your rights as a**

**research subject, contact Ms Maléne Fouché [mfouche@sun.ac.za; 021 808 4622] at the Division for Research Development.**

| **SIGNATURE OF RESEARCH SUBJECT OR LEGAL REPRESENTATIVE** |
|---|

**The information above was described to me by Mr Garth Hankey in English and I am in command of this language or it was satisfactorily translated to me. I was given the opportunity to ask questions and these questions were answered to my satisfaction.**

**Please tick appropriate Box**

| | |
|---|---|
| **I have read and understood the information provided above and voluntarily consent to participate in the research under the stipulated conditions.** | |
| | |
| **I have read and understood the information provided above but voluntarily decline to participate in the research under the stipulated conditions.** | |

**Date: _____**

**Research Questionnaire**

**Patient Flow Management in a South African Academic Hospital:**

**The GSH Case**

**SECTION A. BIOGRAPHY**

**Please make a cross in the applicable box/s**

1. **What is your Gender?**

| | |
|---|---|
| **Male** | |
| **Female** | |

2. **What is your age?**

| | |
|---|---|
| **20 – 30** | |
| **31 – 40** | |
| **41 – 50** | |
| **51 and older** | |

3. **What is your position in the Hospital?**

| | |
|---|---|
| **Consultant – doctor** | |
| **Registrar – doctor** | |
| **Intern – doctor** | |
| **Operational manager - Sister** | |
| **Registered nurse** | |
| **Enrolled nurse/assistant** | |

4. **How long have you been working as a professional in a hospital setting?**

| | |
|---|---|
| **0 - 5 years** | |
| **6 – 10 years** | |
| **11 – 15 years** | |
| **16 – more years** | |

5. **In what department are you currently working in?**

| | |
|---|---|
| **Medical** | |
| **Surgical** | |
| **Emergency and Trauma** | |

6. **How often do you engage with patients?**

| | |
|---|---|
| **Daily** | |
| **Weekly** | |
| **Monthly** | |
| **Never** | |

7. **Are you familiar with the concept of patient flow management?**

| | |
|---|---|
| **Yes** | |
| **No** | |

8. **Are you aware of the current GSH Patient flow management policy?**

| | |
|---|---|
| **Yes** | |
| **No** | |

9. **Have you read the above mentioned policy?**

| | |
|---|---|
| **Yes** | |
| **No** | |

10. **If YES, do you agree with the content of this policy?**

| | |
|---|---|
| **Yes** | |
| **No** | |

**SECTION B1: Patient flow management**

**Please rank the importance by crossing the appropriate box labelled as follows:**

**1 = Strongly disagree 2 = Disagree 3 = Unsure 4 = Agree 5 = Strongly agree**

| | **Patient flow management** | | | | | |
|---|---|---|---|---|---|---|
| **1** | **Patient flow management is the movement of patients through a set of locations in a Hospital.** | **1** | **2** | **3** | **4** | **5** |
| **2** | **Patient flow represents the progression of a patient's health status.** | **1** | **2** | **3** | **4** | **5** |
| **3** | **Good patient flow allows patients to move through the various parts of the hospital system without delay.** | **1** | **2** | **3** | **4** | **5** |
| **4** | **A delay in the flow of patients will increase patient waiting times.** | **1** | **2** | **3** | **4** | **5** |
| **5** | **Patient flow is important to ensure effective hospital performance.** | **1** | **2** | **3** | **4** | **5** |
| **6** | **An imbalance between hospital demand and capacity can affect patient flow.** | **1** | **2** | **3** | **4** | **5** |
| **7** | **Poor patient flow usually results in emergency department overcrowding and is usually caused by the inability to move patient to admission wards.** | **1** | **2** | **3** | **4** | **5** |
| **8** | **Bottlenecks that exist in a patient flow system can delay patient movement and will increase waiting times.** | **1** | **2** | **3** | **4** | **5** |
| **9** | **By eliminating unforeseen bottlenecks, the system will become more efficient, and it will decrease wasteful utilization of resources.** | **1** | **2** | **3** | **4** | **5** |

| | | | | | | |
|---|---|---|---|---|---|---|
| **10** | **Discharge planning is important to ensure effective patient flow.** | **1** | **2** | **3** | **4** | **5** |
| **11** | **The transit lounge was established to create ward space for patients waiting for ward admission.** | **1** | **2** | **3** | **4** | **5** |
| | | | | | | |
| | **GSH** | | | | | |
| | **General patient flow and policy** | | | | | |
| **12** | **GSH has a good patient flow system.** | **1** | **2** | **3** | **4** | **5** |
| **13** | **Patients move through GSH without any delays.** | **1** | **2** | **3** | **4** | **5** |
| **14** | **GSH patients waiting for ward admission are transferred to a ward bed within a reasonable timeframe.** | **1** | **2** | **3** | **4** | **5** |
| **15** | **GSH always supply enough ward beds for the demand (patients waiting for admission)** | **1** | **2** | **3** | **4** | **5** |
| **16** | **No bottlenecks exist in the patient flow management system of GSH.** | **1** | **2** | **3** | **4** | **5** |
| **17** | **GSH patients usually wait less than 8 hours for ward admission.** | **1** | **2** | **3** | **4** | **5** |
| **18** | **The patient flow policy of GSH is an important policy.** | **1** | **2** | **3** | **4** | **5** |
| **19** | **All patient flow producers are clearly highlighted in this policy.** | **1** | **2** | **3** | **4** | **5** |
| **20** | **It is important that all staff adhere to the guidelines of this policy to ensure effective patient flow practices.** | **1** | **2** | **3** | **4** | **5** |
| **21** | **The policy is contradicting to current patient flow processes.** | **1** | **2** | **3** | **4** | **5** |
| | | | | | | |
| | **Discharge planning and transit lounge use** | | | | | |
| **22** | **GSH have effective discharge mechanisms in place.** | **1** | **2** | **3** | **4** | **5** |
| **23** | **Discharges are planned from the time of admission.** | **1** | **2** | **3** | **4** | **5** |
| **24** | **80% of all discharges leave the wards before 12h00 daily.** | **1** | **2** | **3** | **4** | **5** |

| | | | | | | |
|---|---|---|---|---|---|---|
| **25** | **80% of all discharges leave the wards before 16h00 daily.** | **1** | **2** | **3** | **4** | **5** |
| **26** | **The discharge process starts on the day the patients are fit for discharge.** | **1** | **2** | **3** | **4** | **5** |
| **27** | **Patients that are medically discharged should vacate their beds as soon as possible.** | **1** | **2** | **3** | **4** | **5** |
| **28** | **Discharged patients must wait in the transit lounge for their transport in order to create ward capacity for more acutely ill patients.** | **1** | **2** | **3** | **4** | **5** |
| **29** | **GSH have a functional transit lounge.** | **1** | **2** | **3** | **4** | **5** |
| **30** | **It is important that all wards make use of the transit lounge.** | **1** | **2** | **3** | **4** | **5** |
| | | | | | | |
| | **Emergency/trauma department overcrowding and ward environment** | | | | | |
| **31** | **GSH regularly experience overcrowding in their emergency unit.** | **1** | **2** | **3** | **4** | **5** |
| **32** | **GSH regularly experience overcrowding in their trauma unit.** | **1** | **2** | **3** | **4** | **5** |
| **33** | **Overcrowding is mainly caused by a high demand for emergency services and patients waiting for ward admission.** | **1** | **2** | **3** | **4** | **5** |
| **34** | **Access block are the main cause of overcrowding.** | **1** | **2** | **3** | **4** | **5** |
| **35** | **Patients wait long hours before being transferred to the wards.** | **1** | **2** | **3** | **4** | **5** |
| **36** | **Patients in the emergency/trauma unit that wait for ward admission adds to the work load of the staff, which causes staff burnout and frustration.** | **1** | **2** | **3** | **4** | **5** |
| **37** | **GSH have affective pushing mechanisms from the emergency/trauma units to the wards.** | **1** | **2** | **3** | **4** | **5** |
| **38** | **The wards actively pull patients into vacant beds.** | **1** | **2** | **3** | **4** | **5** |
| **39** | **When a bed becomes vacant, the next booked patient occupies that bed within 30 minutes.** | **1** | **2** | **3** | **4** | **5** |
| **40** | **Poor discharge planning cause access block.** | **1** | **2** | **3** | **4** | **5** |

| | | | | | | |
|---|---|---|---|---|---|---|
| **41** | **The wards often experience overcrowding.** | **1** | **2** | **3** | **4** | **5** |
| **42** | **The wards never experience overcrowding.** | **1** | **2** | **3** | **4** | **5** |
| | | | | | | |
| | **Patient flow improvement and data capturing** | | | | | |
| **43** | **GSH have many patient flow improvement initiatives.** | **1** | **2** | **3** | **4** | **5** |
| **44** | **Patient flow improvement strategies are important to reduce overcrowding.** | **1** | **2** | **3** | **4** | **5** |
| **45** | **Patient flow improvement strategies increase overall hospital performance.** | **1** | **2** | **3** | **4** | **5** |
| **46** | **Operational staff is included in new patient flow projects.** | **1** | **2** | **3** | **4** | **5** |
| **47** | **New patient flow improvement strategies should be initiated and owned by operational staff.** | | | | | |
| **48** | **GSH have adequate patient flow practices and need no improvement.** | **1** | **2** | **3** | **4** | **5** |
| **49** | **The capturing of data is important to measure progress of projects.** | | | | | |
| **50** | **Patients' details are accurately captured in all registers daily.** | **1** | **2** | **3** | **4** | **5** |
| **51** | **The times patients move to and from departments are captured accurately for all patients.** | **1** | **2** | **3** | **4** | **5** |
| **52** | **The collection of data and capturing of patient movement times hampers operational duties of ward staff.** | **1** | **2** | **3** | **4** | **5** |
| **53** | **Data collection is a waste and time consuming.** | **1** | **2** | **3** | **4** | **5** |
| **54** | **The results of patient flow data/project can be used to improve the current patient flow system.** | **1** | **2** | **3** | **4** | **5** |
| **55** | **The capturing of data is important to measure patient flow performance.** | **1** | **2** | **3** | **4** | **5** |

**Section C: Open ended questions**

**Please make a cross in the applicable box/s and comment where necessary.**

**1. Do you agree that GSH has an efficient patient flow system?**

| | |
|---|---|
| **Yes** | |
| **No** | |

**If NO, state reasons for your answer?**

……

……

……

**2. Do you think the content of the patient flow policy of GSH is being implemented correctly?**

| | |
|---|---|
| **Yes** | |
| **No** | |

**If NO, state reasons for your answer?**

……

……

**3. Do you agree that bottlenecks in the patient flow system will delay patient movement?**

| | |
|---|---|
| **Yes** | |
| **No** | |

**If YES, what do you consider the biggest bottlenecks in GSH's patient flow system?**

……

……

**4. The lack of movement to admission wards often creates a disordered and busy environment in the emergency/trauma departments which usually lead to overcrowding?**

| | |
|---|---|
| **Yes** | |
| **No** | |

**If No, what do you think is the main causes of emergency/trauma overcrowding.**

……

……

**5. The inability to transfer patients from the emergency/trauma departments timeously are mostly due to patients vacating the wards late and is mostly caused by poor discharge planning?**

| | |
|---|---|
| **Yes** | |
| **No** | |

**If NO, state reasons for your answer?**

……

……

**6. A patient from another ward that occupies a bed in your ward creates bed capacity problem for your own admissions.**

| | |
|---|---|
| **Yes** | |
| **No** | |

**If YES, how does it affect bed capacity in your ward?**

……

……

**7. All patients have a discharge plan in their hospital folder from the time they are admitted?**

| | |
|---|---|
| **Yes** | |
| **No** | |

**If No, state reasons why not?**

……

……

**8. All discharged patients that fit the transit lounge criteria should be moved to the transit lounge?**

| | |
|---|---|
| **Yes** | |
| **No** | |

**If No, please state why not.**

……

……

**9. Approximately 80% of all patients being discharge every day physically leave the wards before 12h00?**

| | |
|---|---|
| **Yes** | |
| **No** | |

**If No, provide reasons why discharged patients are not leaving the wards before 12h00 daily?**

……

……

**10. In your opinion, do you think the transit lounge is being utilized optimally?**

| | |
|---|---|
| **Yes** | |
| **No** | |

**If No, why do you think the wards are not sending the discharged patients to the transit lounge?**

……

……

**11. With the increase of the burden of disease and demand for hospital services, do you feel that GSH adequately supply sufficient ward capacity for the rising demand?**

| | |
|---|---|
| **Yes** | |
| **No** | |

**If No, please state why not.**

……

……

**12. Do you think it is important for GSH to attempt new improvement strategies or projects to develop the current patient flow system in order to process more patients through the hospital without delays?**

| | |
|---|---|
| **Yes** | |
| **No** | |

**If No, please state reasons for your answer.**

……

……

**13. If the patient flow system of GSH is improved through new innovations, it will increase the overall hospital performance?**

| | |
|---|---|
| **Yes** | |
| **No** | |

**If No, please state why not.**

……

……

**14. In order for GSH to measure their patient flow improvements, all employees must ensure that the correct data are accurately captured?**

| | |
|---|---|
| **Yes** | |
| **No** | |

**If No, please state why not.**

……

……

**15. It is the responsibility of all GSH employees to ensure smooth patient flow is being practiced daily.**

| | |
|---|---|
| **Yes** | |
| **No** | |

**If No, please state why not.**

……

……

**If you have any related comments regarding patient flow in GSH, please indicate here.**

……

……

## Appendix B: Expert interviews

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**STELLENBOSCH UNIVERSITY**

# CONSENT TO PARTICIPATE IN RESEARCH

**Patient Flow Management in a South African Academic Hospital:**

**The GSH Case**

**You are asked to participate in a research study conducted by Mr Garth Hankey, Masters in Public Administration student, from the School of Public Leadership at Stellenbosch University. The results of this study will contribute towards the completion of a thesis. You were selected as a candidate to participant in this study because you are a department manager that experiences the everyday pressures and frustrations of patient movement through the hospital system. Your knowledge will be valuable in terms of understanding the notion of patient flow in the hospital setting as well as how it impacts on the functionality of your department.**

## 10. PURPOSE OF THE STUDY

**The purpose of this research is to investigate the patient flow system of a large South African academic hospital, Groote Schuur Hospital (GSH) in Cape Town.**

## 11. PROCEDURES

**If you volunteer to participate in this study, we would ask you to do the following things:**

**Answer a few questions regarding patient flow management to the best of your ability. Some reasons will be asked based on the answer you provided on some of the questions.**

**Study setting**

**The study will be conducted in the medical, surgical and emergency departments' of GSH, a central hospital in the Cape metro-pole region.**

**The medical wards are located on the G-floor (5th floor), the surgical wards on the F-floor (4rth floor) and the emergency department on the c-floor (1st floor).**

**Research design**

**An explorative research approach will be used to obtain the opinions of GSH employees regarding patient flow management. This study will be conducted in a non-experimental**

**manner and an evaluative design with a quantitative approach will be used to pursue the objectives of this study. This research approach allows the researcher to explore the aim on this study to obtain quantitative data by using a structured questionnaire and expert interviews as the data collection tools.**

**Population and sampling**

**For the purpose of this study, the target population will consist of GSH employees who consist of managers, doctors, nurses and selected departmental specialists. No particular sampling method will be used to obtain a large enough sample from the population. The researcher will distribute questionnaires to all the departments and hope for a large enough response to validate the patient flow opinions of GSH employees. This means that the sample size will be dependent on the participant response rate and the researcher anticipates a better sample size by using this approach.**

**Three senior managers that are in charge of the three focus areas will be asked to participate in the interviews in order to obtain their view on patient flow of their departments.**

**Data collection tool**

**The data will be collected by using a structured questionnaire, carefully designed by the researcher to test opinions of GSH employees on patient flow management. The questionnaires will be completed anonymously, as the participants will not be required to capture their names on the questionnaires.**

**The interviews will use the same main themes as the questionnaires as a guideline to cover the most important aspects of patient flow in GSH.**

**Process**

**The supervisors or shift leaders will be responsible to distribute the questionnaires. The researcher will assist the supervisors and shift leaders to create awareness of this study to motivate potential participants to complete questionnaires. After the questionnaires are completed and placed in the box provided, the supervisors or shift leaders must store the sealed box in their lockable office for collection by the researcher at the end of their shift. The participants will receive the questionnaires at the beginning of their shift (07h00) and must complete and deliver the questionnaires before the end of their shift leaders shift (16h00).**

**The researcher will collect the sealed boxes filled with completed questionnaires (in sealed envelopes) and store it in a lockable cupboard in the researcher's office for analysis. Therefore, the anonymity of each participant is guaranteed and the researcher will be the only one that has access to the completed questionnaires.**

**The researcher will make an appointment with the relevant departmental managers and establish a time when to conduct the interviews. The interviews will be recorded and the researcher will also make important noted while conducting the interview. The interviews will be conducted in the comfort of the interviewees own office.**

## 12. POTENTIAL RISKS AND DISCOMFORTS

**There are no reasonable foreseeable risks or harm to you or your work environment involved in this study. The only discomfort will be the short time used to complete the questionnaire.**

## 13. POTENTIAL BENEFITS TO SUBJECTS AND/OR TO SOCIETY

**You will not directly benefit from this research. However, the results of this research can be used to make valuable improvements to the current patient flow processes in GSH.**

**This research will also provide science regarding patient flow management with knowledge on how the frontline workers within hospitals perceive patient flow.**

## 14. PAYMENT FOR PARTICIPATION

**You will receive no financial or any other reward for participating in this study.**

## 15. CONFIDENTIALITY

**Any information that is obtained in connection with this study will remain confidential if participants chose so, and will be disclosed only with your permission or as required by law. Confidentiality will be maintained by means of anonymous completion of the questionnaires. The completed data will be kept in a lockable desk drawer and only the researcher will have access to this drawer.**

**The information obtained will be used for academic purposes, unless hospital management request to obtain access to the research results in order to make patient flow improvements. If the researcher plans to publish the results of the study, confidentiality will be maintained by ensuring you stay anonymous.**

## 16. PARTICIPATION AND WITHDRAWAL

**You can choose to participate in this study or not. If you volunteer to be in this study, you may withdraw at any time without consequences of any kind. You may also refuse to answer any questions you don't want to answer and still remain in the study. The investigator may withdraw you from this research if circumstances arise which warrant doing so.**

## 17. IDENTIFICATION OF INVESTIGATORS

**If you have any questions or concerns about the research, please feel free to contact Mr Garth Hankey on 072 592 1792 at time.**

## 18. RIGHTS OF RESEARCH SUBJECTS

**You may withdraw your consent at any time and discontinue participation without penalty. You are not waiving any legal claims, rights or remedies because of your participation in this research study. If you have questions regarding your rights as a research subject, contact Ms Maléne Fouché [mfouche@sun.ac.za; 021 808 4622] at the Division for Research Development.**

| SIGNATURE OF RESEARCH SUBJECT OR LEGAL REPRESENTATIVE |
|---|

**The information above was described to me by Mr Garth Hankey in English and I am in command of this language or it was satisfactorily translated to me. I was given the opportunity to ask questions and these questions were answered to my satisfaction.**

**Please tick appropriate Box**

| | |
|---|---|
| **I have read and understood the information provided above and voluntarily consent to participate in the research under the stipulated conditions.** | |
| | |
| **I have read and understood the information provided above but voluntarily decline to participate in the research under the stipulated conditions.** | |

**Date: _____**

| I want to remain anonymous. | Yes | NO |
|---|---|---|
| | | |

Interview Questions

General patient flow

1. Are you familiar with the concept of patient flow management?
2. Do you agree that Patient flow management is the movement of patients through a set of locations in a Hospital? If not, please elaborate what your perception of patient flow is.

3. Poor patient flow usually results in emergency department overcrowding and is usually caused by the inability to move patient to admission wards. If you have another view, please elaborate on it.
4. Bottlenecks that exist in a patient flow system can delay patient movement and will increase waiting times.
5. Now, would you agree if I say GSH has a good patient flow system? If not, what is your main reason for your answer?
6. Do you agree that Patients move through GSH without any delays? If not, what do you identify as one of the biggest delays in the patient flow system of GSH?
7. GSH patients waiting for ward admission are transferred to a ward bed within a reasonable timeframe. If no, what contributes to patient not moving to admission wards timeously?

Policy

8. Are you aware of the current GSH Patient flow management policy of 2009?
9. Have you read the above mentioned policy?
10. Do you think the content of the patient flow policy of GSH is being implemented correctly? If not, why do you say that?
11. Do you think it is important that all staff adhere to the guidelines of this policy to ensure effective patient flow practices?
12. Would you agree that the current policy of 2009 policy is contradicting to current patient flow processes?

Discharge planning and transit lounge use

13. What is your opinion around the discharge planning methods currently implemented at GSH, especially in your department?
14. Do you agree that 80% of all discharges leave the wards before 12h00 daily?
15. Do 80% of all discharges leave the wards before 16h00 daily? If Not, why are discharges taking so long to vacate their ward beds?

16. Do you agree that GSH has a functional transit lounge? Are all the patients that are discharged and that fit the transit lounge criteria sent to the transit lounge? If no, why do you think not?

Emergency/Trauma units

17. Does your EU/TU departments experience overcrowding regularly? If yes, why do you think these areas are regularly experiencing overcrowding and what mechanisms do you have in place to address it when it occurs?
18. Do you agree that patients in the emergency/trauma unit that wait for ward admission adds to the work load of the staff, which causes staff burnout and frustration. Do the wards ever experience overcrowding?
19. How do the UE/TU employees know when a bed is available in the wards?
20. Do patients wait long hours in the EU/TU before they are transferred to the wards. What do you think is the biggest factor that prevents patients that wait for a ward bed to be transferred to the wards sooner?

Data capturing and improvements

21. Patient flow improvement strategies are important to address patient flow challenges?
22. Do you agree, the accurate capturing of data is important to measure patient flow performance? Is data capturing and the collection of information considered a priority for GSH departments/employees? If not, how did patient flow or departmental performance measured?
23. Who identifies and initiates improvement strategies in your department and how is the buy-in from operational employees?
24. Do you think it is important for GSH to attempt new improvement strategies or projects to develop the current patient flow system in order to process more patients through the hospital without delays?
25. How sustainable are improvement strategies implemented at GSH? Do they disappear or do they actually form part of the employees ‘operational duties?

26. Last question, what recommendations do you have to further improve the patient flow system of GSH?

**Thank you**