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Patient Experience Informs Health Care Strategies in Irish Hospitals

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Patient Experience Informs Health Care

Strategies in Irish Hospitals

By

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Thesis submitted in fulfilment of the requirements for the degree of

Doctor of Philosophy (Ph.D.)



Dublin Institute of Technology

Institiúid Teicneolaíochta Átha Cliath

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ABSTRACT

Patients are central to health care facilities and institutions; therefore, a dire need arises to include feedback of their experience in the decision-making process. Patient experience is increasingly recognised as one of the three pillars of quality in healthcare alongside clinical effectiveness and patient safety. A comprehensive literature review (more than 2500 peer-reviewed articles) has identified five key frameworks for patient experience including: UK Picker Institute Principles and US H-CAHPS. The frameworks have enabled the identification of a potential range of patient experience dimensions and helped in grouping them into nine categories. However, there are still opportunities to address research gaps in developing a unified index to represent patient experience, and offering a practical framework to inform quality improvement strategies in hospitals.

An extensive exploratory study is developed to complement the literature review. This study aims to confirm the importance of the identified nine dimensions from patients' views, explore staff perceptions of patient experience, then compare patients' views and staff's perceptions. Semi-structured interviews with 77 participants (26 senior staff members and 51 patients) across three major acute Irish hospitals are conducted. Five important dimensions are highlighted from patients' responses such as: staff communication and being treated with respect. While dimensions such as: continuity of care and involving family members are identified as less important. While staff in this study perceive dimensions such as quicker access to care and informing the patient with their status updates as more significant in shaping the patient experience. Both the exploratory study and literature review outcomes have contributed to the design of a patient experience questionnaire which examine dimensions that matter most to patient experience. The questionnaire is included as a component of a multi-method framework that integrated data analytics, simulation modelling, and optimisation. With an ultimate objective to improve patient experience, the proposed framework has been piloted in an Emergency Department of one of the leading and busiest university hospitals in Dublin.

Fifty-eight patients responded to the questionnaire and their responses are analysed using a Partial Least Squares (PLS) model. PLS results have identified access to care as a negative predictor to patient experience. Improvement strategies such as increasing the internal capacity of the department are proposed by the management team to improve the Length of Stay (LOS) and provide better access to care. To examine and assess the impact of proposed strategies on LOS, a simulation model has complemented the solution framework. Results have showed that internal capacity of an ED has no direct impact on LOS and does not act as a performance constraint. However, other factors such as increasing downstream department's capacity and the staffing levels can lead to a reduction in LOS (up to 25%).

DECLARATION

I certify that this thesis which I now submit for examination for the award of PhD, is entirely my own work and has not been taken from the work of others, save and to the extent that such work has been cited and acknowledged within the text of my work.

This thesis was prepared according to the regulations for graduate study by research of the Dublin Institute of Technology and has not been submitted in whole or in part for another award in any other third level institution.

The work reported on in this thesis conforms to the principles and requirements of the DIT's guidelines for ethics in research.

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Signature _____
Candidate

Date _____

ABBREVIATIONS LIST

AMAU	Acute Medical Assessment Unit
AMP	Acute Medicine Programme
AMU	Acute Medical Unit
ANP	Adult Nurse Practitioner
BSC	Balanced ScoreCard
CNM1	Certified Nurse-Midwife (Level 1)
CNM2	Certified Nurse-Midwife (Level 2)
CNM3	Certified Nurse-Midwife (Level 3)
CT	Computed Tomography
DES	Discrete Event Simulation
DOE	Design of Experiments
ECG	ElectroCardioGram
ED	Emergency Departments
EMP	Emergency Medicine Programme
ENT	Ear, Nose, and Throat
EPR	Electronic Patient Records
GP	General Practitioner
H-CAHPS	Hospital-Consumer Assessment of Healthcare Providers and Systems
HSE	Health Service Executives
IOM	Institute of Medicine
IT	Information Technology
KPI	Key Performance Indicators
LH	Latin Hypercube
LOS	Length of Stay

MRI	Magnetic Reasoning Imaging
MTS	Manchester Triage System
NCHD	Non-Consultant Hospital Doctor
NHS	National Health Services
NOLH	Near-Orthogonal Latin Hypercube
PCA	Principal Component Analysis
PLS	Partial Least Square
PR	Public Relations
SA	Simulated Annealing
SEM	Structural Equation Modelling
SHO	Senior House Officer
SSU	Short Stay Unit

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LIST OF PUBLICATIONS

Published Articles

- (1) Rashwan, W., Habib, H., Courtney, G., Kennelly, S., & Arisha, A., "An Integrated Approach of Multi-Objective Optimization Model for Evaluating New Supporting Program in Irish Hospitals." – Winter Simulation Conference (WSC), 2016.
- (2) Habib, H, Abo-Hamad, W, Arisha, A “Optimization of Resources to Improve Patient Experience.in the New ED of Mater Hospital Dublin” – SIMUL, 2014

In Review Process

- (1) Habib, H., Arisha, A., “Assessment of Patient Experience to Inform Healthcare Policy Reforms” – International Journal for Quality in Health Care
- (2) Habib, H., Swallemeh, E., Arisha, A. “Patients Expectations and Satisfaction with the Emergency Department at Tallaght Hospital.” – BMC Health Services Research.

CHAPTER 1: INTRODUCTION

1.1. Background

Health care institutions around the world are striving to provide their patients with a high-quality service. However, minimizing the costs of health care and improving the quality of health care are ubiquitous challenges in health care organisations and systems today. In response to concerns about quality and mounting costs, health care leaders at all levels are in search of effective methods for improving the quality of health care in organisations.

Since patients are central to health care delivery, their perspectives and input should be considered by health care providers to improve the quality of the service and care provided to them. Yet, this has not always been the case and patient feedback is rarely taken into consideration (Rozenblum and Bates 2013). Over the last two decades this has begun to change, and patient-centred care is drawing increasing interest. This shift in focus, from provider-based to patient-based, is highlighting the importance of incorporating patient needs and perspectives with the care delivery. Furthermore, patients are becoming more engaged in their care, coinciding with the onset of patient-centred health care as a major domain of quality by many health care providers.

One of the widely-used tools to collect feedback from patients is gathering the patient experience with care. Policy makers worldwide are increasingly interested in collecting patient experience data to assess providers against a range of performance indicators and to stimulate quality improvement. In parallel, new technologies are driving innovative and cost-effective approaches to measuring patient experience. The attention to patient experience was partly initiated by the Institute of Medicine report, "Crossing the Quality

Chasm" (2001), and further encouraged by the public reporting of experiences. Despite the increasing presence of a variety of measures of patient health care experiences in research and policy, there remains a lack of consensus regarding measurement. Patient experience does not simply reflect clinical outcomes or adherence-driven outcomes; rather it seeks to represent a unique encompassing dimension that is challenging to measure.

Until recently, the emphasis has been on data collection in itself rather than data being used to improve the quality of care (Reeves et al. 2013). Measurement of patient experience is necessary, but not always sufficient (Roland et al. 2009). Patient experience cannot be viewed in isolation of broader concerns about quality and cost of health care. Eliciting feedback from patients by engaging them in their health care delivery affords an opportunity to highlight and address aspects of the care experience that need improvement. It also allows an opportunity monitor performance of meeting patient experience goals in the delivery of care (Lavela and Gallan 2014). However, simply providing hospitals with patient feedback does not automatically have a positive effect on quality standards (DeCourcy, West, and Barron 2012). Thus, the use of data regarding patient experience as part of systematic measurement and performance monitoring in a health care setting would clearly improve measurement of the 'total' patient experience. This would heighten our understanding of the patient experience within and across settings.

This research aims to include the experience of the patient to help improve the Irish health care system and point out its inefficiencies to health executives from a patient perspective. Therefore, this research aims to explore and investigate the common facilitators and barriers of using patient experience data to improve health care services. Thereby enabling

the data collected from patient experience in hospitals to inform policy makers and guide quality improvements.

1.2. Research Motive

According to the latest European Health Consumer Index Report (EHCI 2016), Ireland’s national health care systems is ranked 21 out of 35 surveyed countries in Europe (Figure 1.1). This constitutes a fall from 14th place in 2013 which is considered a dissatisfactory position by the Irish community.

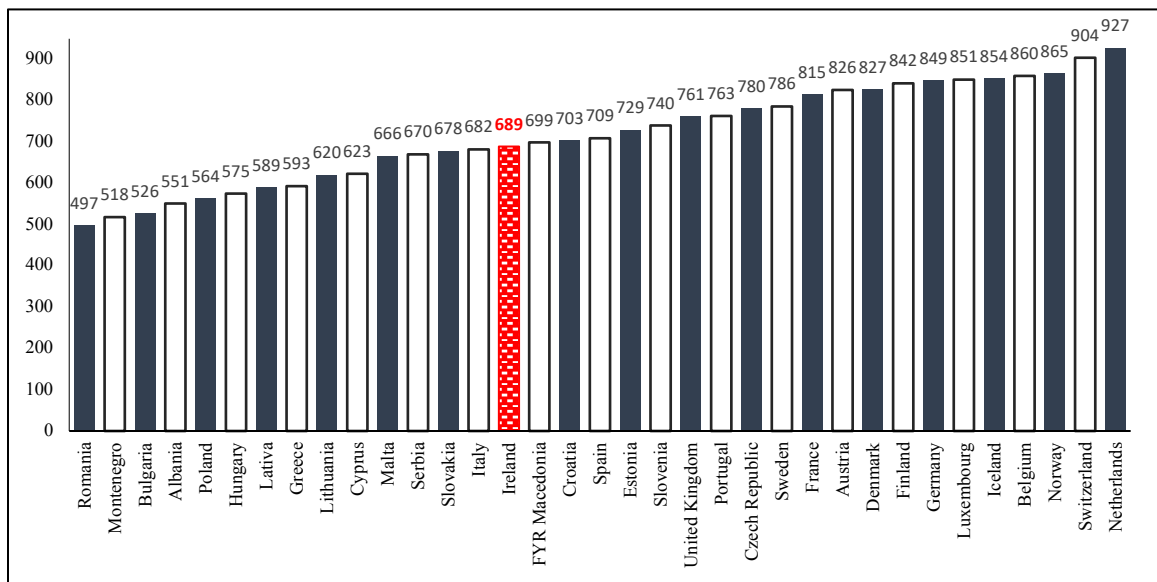


Figure 1.1: European Health Consumer Index per Country (2016)

Moreover, the EHCI report has shown a slump in the Emergency Departments (ED) performance in Ireland. It has shown that Ireland has slipped to last place in terms of waiting time in EDs within the 34 surveyed EU countries since 2013. This result is not surprising; long waiting lists, overcrowding, and patient dissatisfaction are the main symptoms of poor patient experience in the health care system in Ireland. With 78,696 patients on hospital waiting lists during 2016. Of this number, 11.4% were waiting for more

than 15 months and 5.9% were waiting for more than 18 months (HSE 2016b). These unsatisfactory results raise an issue of patient dissatisfaction with the Irish public health care system and accordingly, this research is a step towards addressing this problem; by developing a patient experience framework. The aim of the proposed framework is to collect and monitor the experience of patients, and use that data as a resource for quality improvements in hospitals.

Accordingly, the motivation for developing such a framework with focus on improving and informing policy making is based on the following:

1. Health care service is of crucial importance to individuals in their daily lives. For example, over 1.4 million people receive either inpatient or day care treatment each year by the Health Services Executives (HSE) in Ireland (HSE 2014).
2. The HSE stated that “one of the key focus areas for 2014 is the measurement of the quality of the services which we deliver,” (HSE 2014, p.13). They emphasised that patient experience is a focus in Ireland currently, to avoid issues such as the Stafford Hospital case in the UK and the Galway Hospital case in Ireland. Patient experience continued to be a part of the HSE performance indicators in subsequent national service plans (HSE 2016a).
3. The assessment of patient experience is not only important to help service improvement initiatives, but also for clinical and financial reasons (i.e. in health care strategic planning – ‘money follows the patients’).
4. Promoting a cultural change in Irish society by encouraging patients to provide their feedback, by providing clinicians and health care service providers with a platform to assess, monitor and inform quality improvements based on that feedback.
5. Incorporate the patient voice in important policy and strategy improvements.

1.3. Research Questions and Objectives

This research ultimately aims to develop an innovative and comprehensive framework to collect and use data regarding the experience of patients with their care. Therefore, the main question of the research is:

"What is the optimal use of patient experience data to inform quality improvement strategies in Irish hospitals?"

The main question can be further divided into three sub-questions:

- RQ1. What are the current practices of gathering and monitoring patient experience (e.g. factors, measures, methods...etc.)?
- RQ2. How is patient experience data being analysed to help with the decision-making process of a hospital?
- RQ3. What indicators are used to represent the patient experience in hospitals?
- RQ4. How useful would a developed patient experience framework be for decision-making in emergency departments and to what extent can it be applied?

Consequently, to fully address these questions, taking into consideration the uncertain elements of the ever-changing health care environment, the principal research objective is:

"The development of an integrated patient experience framework to allow the feedback collected from patients about their experience with care to inform hospital's patient strategy"

This research will combine several different technologies and methodologies into an integrated decision support system which health care managers and planners can use in a practical and reflective way to guide quality improvements. The main objective is therefore divided into the following sub-objectives:

- RO1.** Gain an in-depth understanding of current practices of patient experience in hospitals (e.g.: factors, measures, methods and challenges... etc.).
- RO2.** Investigate the types of analytical tools used to analyse patient experience data in hospitals.
- RO3.** Design a strategic decision support index for patient experience to inform quality improvements in hospitals.
- RO4.** Evaluate and validate the proposed framework to examine its applicability.

The ultimate aim of this research is to produce applied and actionable solutions that enhance management practice. Since this research attempts to provide both theoretical and practical applicability, validation of the proposed framework is a critical objective. Accordingly, a managerial questionnaire followed by an organisational case study are planned to accomplish this objective.

1.4. Thesis Outline

The outline of this thesis is comprised of seven chapters as follows:

- **Chapter One** introduces the research project and its objectives and outlines the structure of the thesis
- **Chapter Two** summarises the literature pertaining to; the existing patient experience frameworks, dimensions, collection methods and different uses. The purpose of this chapter is to gain insights regarding the currently applicable approaches for collecting, monitoring and managing patient experience, therefore highlighting gaps in the current literature.
- **Chapter Three** presents the research methodology by first highlighting the research philosophy and paradigms as the basis to conduct this research. A

description of the different existing research approaches and methods is then given, followed by a detailed design of the research process. Based on the pragmatic stance of the research, a mixed-method research design is discussed. It is justified in its ability to address the research questions and achieve the objectives.

- **Chapter Four** investigates conceptualisations of medical and nursing staff perceptions about the experience of their patients while in the hospital. This is conducted using a qualitative exploratory study through a set of interviews with a number of medical and nursing staff in an emergency department. The findings of the study are presented and highlighted in light of the academic literature.
- **Chapter Five** demonstrates the development of the proposed patient experience framework, starting by addressing the gaps in the research that were derived from chapter two in the design of the integrated framework. The framework is then described in detail; and is broken down into three distinct stages. Each stage is outlined thoroughly while clarifying the aims, methods, and techniques that will be used.
- **Chapter Six** reports the results obtained from each stage as designed in the previous chapter. It also provides an account of the implementation of the framework in an existing emergency department through an in-depth case study.
- **Chapter Seven** concludes the thesis by summarising the main findings and contributions of the research to date. The potential future work of the research and next steps along with a detailed timeline is included.

The structure of the thesis is represented in Figure 1.2 and illustrates the outcome of every chapter in relation to the following chapters in addition to the research objectives addressed in each one.

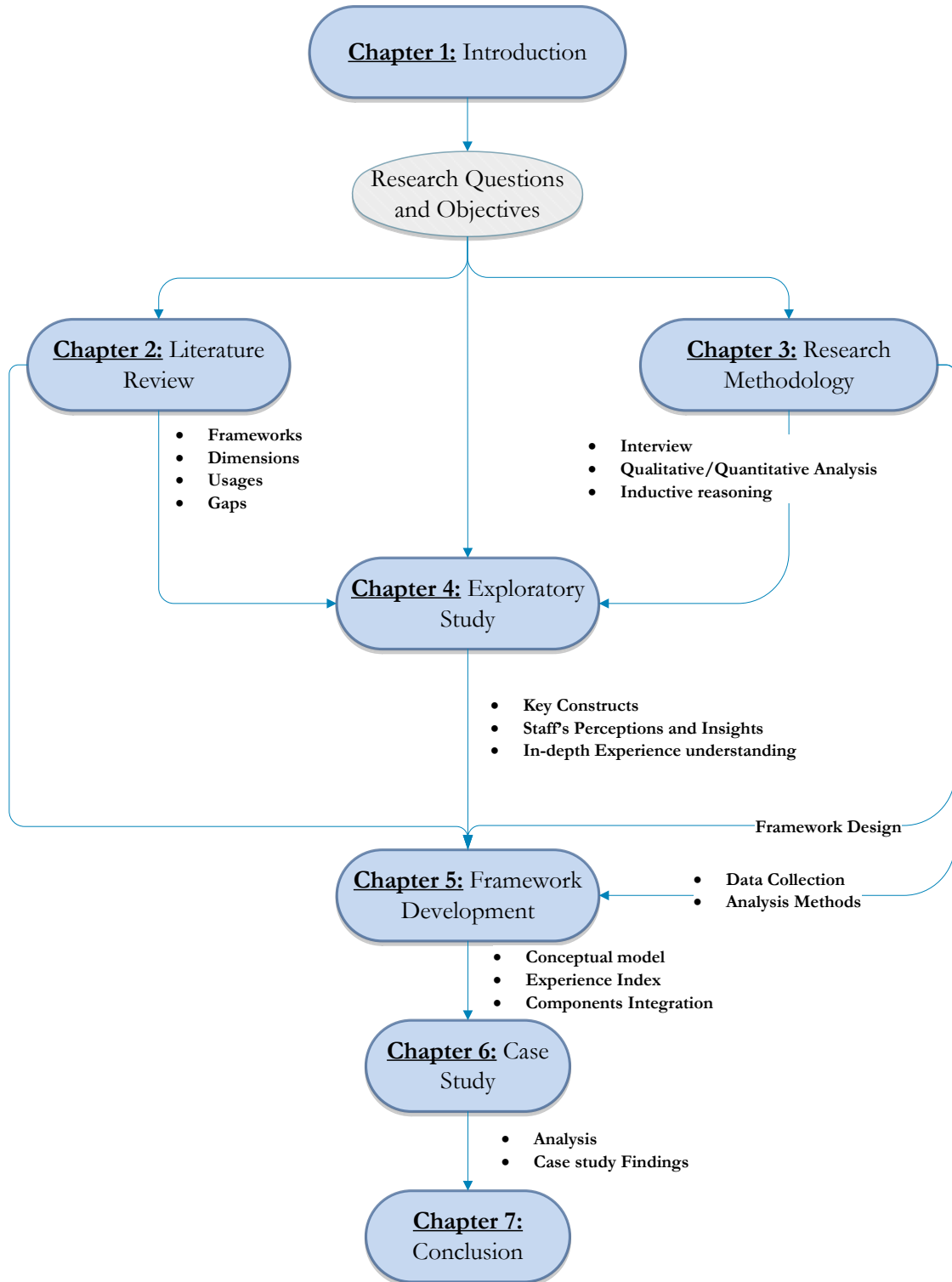


Figure 1.2: Thesis Layout

CHAPTER 2: LITERATURE REVIEW

2.1. Introduction

Due to the shift of most health care institutions to be more patient-centred, patients are increasingly asked for feedback regarding their health care experiences. Motivated further by public reports of patient experience and satisfaction, many health care organisations around the world strive to become more patient oriented, and use patient surveys to assess their progress. However, staff and hospital managers often find it difficult to make improvements to services based on this feedback. It is a complex multi-tiered process and not something that ward staff can simply do (Sheard et al. 2017). A number of reasons explain these difficulties, most importantly of which is that clinicians tend to be mistrustful of data, defensive or merely lacking interest in acting upon patient feedback (Sanderson 2000). Another critical reason, is that patient experience data often draws attention to the attitudes and behaviours of frontline staff, which can cause anxiety amongst individuals (Cornwell 2015). The aim of this chapter is to build up an academic basis for this research and link theory to practice in the field of patient experience. This review is following an inductive/bottom-up approach; it starts by exploring the patient experience and satisfaction literature. Then, towards a focus on the experience of patients in hospitals specifically. This chapter focuses on hospital care, and considers all possible implementation strategies described in the literature. The purpose of this chapter is to firstly identify which dimensions of care are being measured in regards to patient experience, and how these dimensions relate to the theory in the field. Secondly, a review of the literature to identify different purposes of patient surveys and how they can be used to inform hospital management in improving the experience of care.

2.2. Social Sciences and Patient Experience

At first, a generic literature search of how patient experience is perceived in social sciences was initiated. Primarily, most of the literature reviewed focused on the experience of patients with chronic and/or specific diseases and the different factors affecting that experience. This is due to the wealth of records and data from such patients, along with the potential of conducting longitudinal or comparative studies. Several researchers concluded that the design, delivery and evaluation of services for patients with chronic and/or specific illnesses should involve the public (as individuals, communities and the voluntary sector) and the experience of those patients (Greenhalgh 2009). Several factors were identified that were affecting the experience of patients with chronic and/or specific diseases. Those factors included: self-management (Cramm and Nieboer 2012), treatment burden (Ridgeway et al. 2014), chronic condition distress (Street et al. 2009) and provider satisfaction among others. Those factors affecting the experience of patients with chronic and/or specific diseases can be visualised as a pyramid with several hierarchical levels similar to Maslow's hierarchy of needs (Maslow 1943). With the burden of treatment at the bottom and self-management of the disease at the top. For many researchers, patients' involvement in managing chronic disease and/or self-managing their conditions is critical and has been tied to physical and mental health outcomes (Eton et al. 2017). While several self-management programmes had been adopted in many countries, there is still a weak evidence base for their efficacy. Therefore, a need arises to support clinicians to engage with the unique challenges that every patient faces in getting on with life despite chronic illness.

2.3. Review Strategy and Design

Following the generic review, a comprehensive literature search was conducted using multiple databases (Science Direct, Emerald Insight and PUBMED) for the period of 2005 to 2017. The search included both peer-reviewed journal articles and non-academic research. Many articles were retrieved in response to individual search terms. For example, in the PUBMED database a search using the term “patient satisfaction” retrieved 18,711 references. A Boolean combination of search terms refined the search to identify a more specific body of literature. The search strategy used in each database was to search for: [patient* satisfaction OR patient* experience] AND [quality of care] IN [Title/Abstract/Key Words]. Including “patient satisfaction” in the search strategy is due to the fact that satisfaction and experience are often used interchangeably, however the concepts encompassing both of them are distinct (Ahmed, Burt, and Roland 2014). The initial search was followed by a search in the databases of the most common journals for additional relevant references. Search outputs were merged and duplicates were removed. Figure 2.1 shows the search strategy adopted to conduct the literature review.

Primarily, studies were selected based on the relevance of the focus of each study. The main concern was to include studies reporting on collecting, measuring, and analysing the data of patient experience of care in hospitals, with a focus on studies reporting focusing on emergency departments. Studies concerned with primary care, e.g. dental care and mental health were excluded because the delivery of care may differ considerably in these care settings from the hospital setting.

Moreover, studies collecting experience of care from patients with specific or chronic diseases (e.g. cancer, diabetes, HIV) were excluded. Data from each publication was extracted and the following fields were used to summarise each article. Study setting (number of patients and hospitals included, clinical area targeted... etc.), the instrument used to collect experience data, dimensions of experience measured, and the study results (which dimensions mattered most to patients, which areas need improvements, and how the health care organisations managed to improve the experience of their patients). Finally, data regarding outcomes related to professionals and systems, e.g., views, barriers, and facilitators were extracted. Each study was summarised, and a descriptive synthesis of the results was produced.

Most of the articles studied experience of patients in a single country, with the US in the lead followed by the UK and Germany. Also single studies were included from Australia (Parry and Hewage 2009), Canada (Brown et al. 2005), Norway (Bjertnaes, Sjetne, and Iversen 2012), Switzerland (Schwappach et al. 2003), Iran (Soleimanpour et al. 2011), Hong Kong (Wong et al. 2013), India (Ghosh 2014), Scotland (Bikker and Thompson 2006) and Israel (Shadmi 2013). However, some articles collected and measured the patient experience of care from a group of different countries, including the US, Canada, Australia, and other EU countries (Hargreaves et al. 2015; Secanell et al. 2014; Aiken et al. 2012; Groene et al. 2015). This geographical diversity shows the interest of different health care providers in transforming their organisations towards patient-centeredness with a focus on patient experience with care.

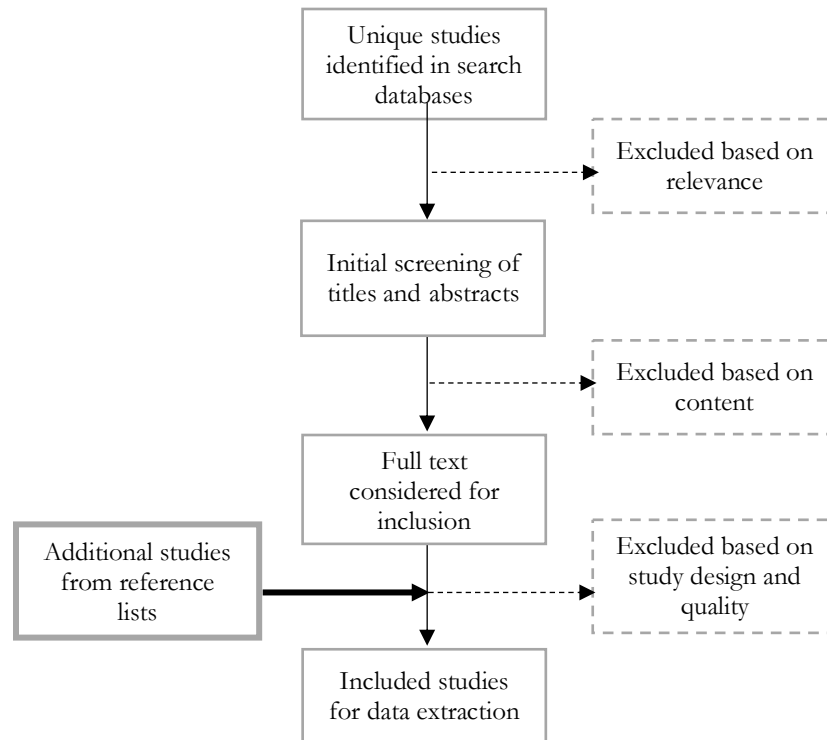


Figure 2.1: Literature search strategy

2.4. Patient Experience Definition

Several challenges exist when measuring patient experience, due to in part it's complexity and ambiguity that lacks a common definition. Also, there are multiple cross-cutting terms (e.g., satisfaction, engagement, perceptions, and preferences) in health care that make conceptual distinction (and therefore measurement) difficult. There is a debate between scholars about the relationship between patient experience and patient satisfaction (Ahmed, Burt, and Roland 2014). However, there is a consensus that they are totally different albeit very related. Patient satisfaction, in its widest sense, is seen as being a complex process balancing patient's expectations with perceptions of the service in question (Staniszewska and Ahmed 1999; Jackson, Chamberlin, and Kroenke 2001). Patient satisfaction is usually objective and rational because it describes the mental happiness with the service. However,

patient experience is subjective and usually irrational as it is mainly emotional and associated with the service. On one side of the debate, most scholars posit patient experience as a key determinant of patient satisfaction and loyalty (Bleich, Ozaltin, and Murray 2009). They describe patient satisfaction as a wider scope than experience and conclude that patient satisfaction is only achieved if both, (1) the experience of the interaction with the facility was positive and (2) the provided service was perfect. Accordingly, supporters for this opinion consider the emotional, subjective, and irrational experience of the patient as a partial factor in determining the overall satisfaction.

On the other hand, some scholars consider patient satisfaction as a part of the overall patient experience and it is usually related to the patient's happiness with the health service provided (Staniszewska and Ahmed 1999). The patient could be well satisfied if the service fulfilled his/her needs as expected. However, patient experience is much wider in scope, as it is related to the full interactions between the patient and the health care provider: before, during and after the visit. Most commonly, when investigating the perceived quality of hospitals or General Practitioners (GPs), questions to patients about their satisfaction with the care provided form one minor aspect of a wider set of items about their overall patient experience, which combines both views on and descriptions of care. The distinction between experience and satisfaction at the early stages of the research facilitate the inclusion and exclusion decisions of some of the reviewed articles. The focus of this research is mainly on patient experience and its dimensions rather than the satisfaction or other cross-cutting terminologies.

2.5. Patient Experience Frameworks

To identify existing patient experience frameworks, a search of the literature was undertaken. These frameworks capture the key dimensions of patient experience that will help to build the foundation of the research and provide an initial structure about patient experience. The review was not intended to be definitive or exhaustive but to include frameworks that have been influential. Arguably the most widely known framework is the Institute of Medicine (IOM) framework (Institute of Medicine 2001), which contains six dimensions of patient-centred health care and was based on the work of Gerteis (1993). However, the most recognised frameworks in a European context, are the Picker Institute principles of patient-centred care (Shaller and Consulting 2007), and the National Health Service (NHS) patient experience framework (NHS 2012). Both of which are also informed by Gerteis' work. In a North American context, the Hospital Consumer Assessment of Healthcare Providers and Systems (H-CAHPS) quality assurance guidelines are the most prominent to collect perceptions and views of patients (Centers for Medicare and Medicaid Services, n.d.). Figure 2.2 shows the timeline of different frameworks that define the diverse dimensions of care used to measure patient experience in health care facilities. A description of the most influential frameworks in the literature is provided below, along with the dimensions of patient experience that each one of them has adopted to collect experiences of patients.

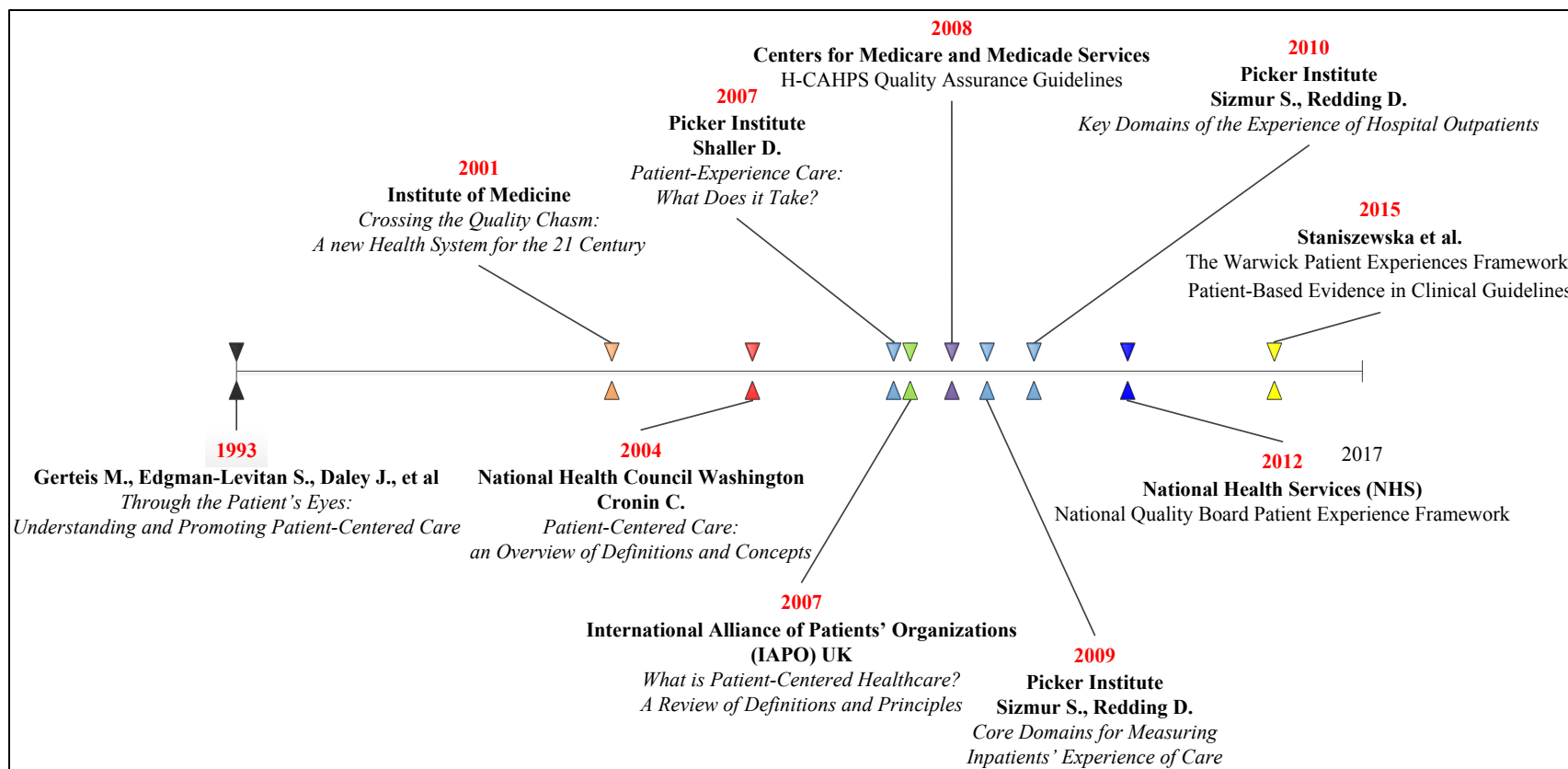


Figure 2.2: Patient Experience Frameworks Timeline

2.5.1 *Through the Patient's Eye*

This is one of the most commonly quoted frameworks and was used in the development of many other frameworks (NICE and National Clinical Guideline Centre 2012). Developed in 1993, this framework outlines seven dimensions considered important for patient-centred care. Namely: respect for patients values, preferences, and expressed needs; coordination and integration of care; information, communication and education; physical comfort; emotional support and alleviation of fear and anxiety; involvement of family and friends; and transition and continuity (Gerteis et al. 1993).

2.5.2 *The Institute of Medicine (IOM) Framework*

Another common framework, that inspired the works of many others, is the IOM framework. In 2001, the IOM published a report outlining six major aims for all health care organisations. Stating that health care should be; safe, effective, patient-centred, timely, efficient and equitable. Patient-centred care was described as encompassing qualities of compassion, empathy, and responsiveness to the needs, values, and expressed preferences of the individual patient. The IOM framework includes the themes of compassion, empathy and responsiveness, coordination and integration, information, communication and education, physical comfort, emotional support, relieving fear and anxiety, and involvement of family and friends (Institute of Medicine 2001). Although there are similarities between the IOM dimensions of care and those outlined by Gerteis et al. (1993), the IOM combined “Transition and continuity” dimensions with the “Coordination and integration of care”.

2.5.3 The Picker Institute Principles

In 2007, Shaller et al. added an eighth dimension of care to the work outlined by Gerteis. This dimension “Access to care” is described as follows: Patients need to know they can access care when it is needed, and attention must also be given to time spent waiting for admission or, time between admission and allocation to a bed in a ward (Shaller and Consulting 2007).

2.5.4 NHS Patient Experience Framework

The surveys which are based on this framework are used to assess patient experience, to examine how the NHS performs and to identify which aspects of patient experience are most important to patients. Picker Institute Europe coordinates a National NHS Patient Survey Coordination centre for the Care Quality Commission. The following aspects of health care are included as being the most important to patients: Fast access to reliable health advice; effective treatment delivered by trusted professionals; involvement in decisions and respect for preferences; clear, comprehensible information and support for self-care; attention to physical and environmental needs; emotional support, empathy and respect; involvement of, and support for, family and carers; and continuity of care and smooth transitions (NHS 2012).

2.5.5 H-CAHPS Guidelines

The H-CAHPS have been using a standardised survey instrument since 2006 to measure patient perceptions regarding their hospital care. The survey is designed to produce comparable data on patient perspectives, to create incentives for hospitals improvement strategies, and to enhance public accountability in health care. The guidelines involve critical aspects of hospital experience (communication with hospital staff, and their

Staff Collaboration and Communication, Family and Friends, Continuity of Care, Access to Care, Pain Management, and Patient Involvement.

2.6.1 Information and Communication

This aspect is one of the most common dimensions. It encompasses diverse information that a patient might need throughout his/her journey in the hospital such as information about drugs, procedures, and waiting times (Rahmqvist and Bara 2010; Parra Hidalgo et al. 2014), and results. It also includes communication between the hospital staff and the patient, where the staff members need to be supportive and comprehensive to the patient’s questions regarding his/her case. Information and communication emerged in some frameworks as two separate themes but were combined because of the interrelations between their identified sub-themes (Holzer and Minder 2011).

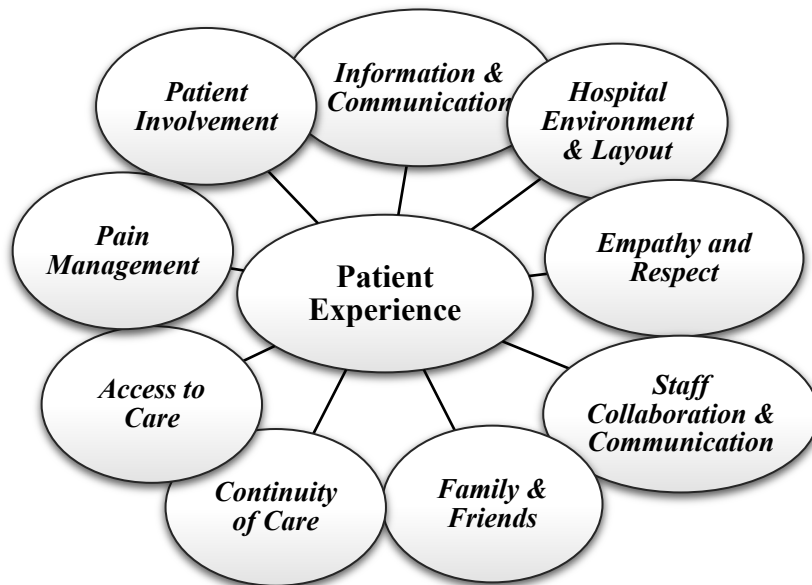


Figure 2.4: Patient Experience Dimensions

2.6.2 Hospital Environment & Layout

Another well-established dimension of experience in care, which comprises all aspects of physical comfort, environment needs (Ghosh 2014), the cleanliness, and quietness of the hospital environment (Irish Society for Quality in Healthcare 2010).

2.6.3 Empathy and Respect

This element includes all aspects of compassion and empathy from staff members towards patients, their concerns and beliefs, and the degree to which staff cared about the patient as a person (Boudreaux et al. 2000; Squire et al. 2006). It also includes elements of fear and anxiety regarding how the hospital staff dealt with such elements to make the patient's journey less stressful (Bakar et al. 2008; Vieth and Rhodes 2006).

2.6.4 Staff Collaboration and Communication

An important dimension to patients is the communication between staff members. Whether there is mutual respect between the hospital staff (doctors and doctors, doctors and nurses, nurses and nurses (Aiken et al. 2012)...) or not. Also, patients need to feel some coordination between the staff with their treatment and medication plan (Shadmi 2013).

2.6.5 Family and Friends

The role of family and friends was important and appeared in broader themes of lived experience and support (Gordon, Sheppard, and Anaf 2010). Throughout their journey in a hospital, patients need to feel that their family and loved ones are treated with respect and are well informed with the case as needed (Davies et al. 2008).

2.6.6 Continuity of Care

Continuity of care becomes increasingly central for patients as they age, develop multiple morbidities or complex problems, or become socially and psychologically vulnerable. This

dimension captures the care and guidance offered to patients in order to ease their move from the hospital setting to their home (Manary et al. 2013). It is vital to patients to be discharged with clear information regarding their case, their drugs, and their follow-up care (Sun et al. 2000).

2.6.7 Access to Care

Patients need fast access to reliable health services whenever it is needed (Naidu 2009). They need to have a clear idea about the expected time they'll have to spend waiting for admission (Soremekun, Takayesu, and Bohan 2011) or the time between admission and allocation to a ward (Pines et al. 2008).

2.6.8 Pain Management

This dimension would assess patient satisfaction with the management of pain and the responsiveness along with the reliability of their health care team (Welch 2010). Also, it would measure if effective treatment has been brought by trusted professionals to each patient.

2.6.9 Patient Involvement

The Patient Involvement dimension reflects the role of patients as potential active participants in their health care, co-creators and co-managers of their health, and use of services (Groene et al. 2015). This aspect is responsible for self-care, participators in health care, shared decision-makers, self-management, risk managers and life-style managers. It examines patient participation in decisions affecting their care, patient complaints, patient knowledge of their rights, and patient interactions with medical students (Wong et al. 2013).

The most common dimensions of experience included in the frameworks are “Information and Communication,” and “Hospital Environment & Layout.” With all five frameworks including them as aspects of experience of care. Four frameworks included the dimensions of “Empathy and Respect,” “Staff Collaboration and Communication,” and “Family and Friends.” While three of them mentioned “Continuity of care” as a separate dimension, and two mentioned “Access to care” and “Pain management” as significant to measure the patient experience in hospitals. Finally, only the NHS surveys included “Patient’s Involvement,” as a different dimension (Table 2.1).

Table 2.1: Patient Experience Dimensions in each framework

	Gerteis	IOM	Picker	NHS	H-CHAPS
Information and Communication	√	√	√	√	√
Hospital Environment & Layout	√	√	√	√	√
Empathy and Respect	√	√	√	√	
Staff Collaboration and Communication	√	√	√		√
Family and Friends	√	√	√	√	
Continuity of Care	√		√	√	
Access to Care			√	√	
Pain Management				√	√
Patient Involvement				√	

While the frameworks demonstrate the potential range of dimensions regarding patient experience, it is not always clear how these dimensions have been extracted from a wide and diverse body of research. Also, the extent to which patients and the public have been involved in developing or selecting these dimensions has always been overlooked in the description of those frameworks.

From the literature review, it is noted that the dimensions of patient experience can be grouped into two categories: relational and functional (Murrells et al. 2013). Functional

dimensions, such as Access to Care, and Hospital Environment and Layout can be easily transformed into quantitative targets for health care providers to achieve. While relational dimensions are more difficult to describe formally, especially regarding dignity, empathy, and emotional support. Hence, developing new strategies and enforcing policy improvements in health care organisations based on patient experience can prove difficult if relational dimensions are not correctly described. Robert et al. (2011) claims that most patient surveys focus on functional aspects. They argue that more attention should be paid to the relational aspects of patient experiences.

In the past, surveys focused on a specific health care service, and not individual practitioners. As such, they focused on functional aspects of health care services, not aspects of the practitioner-patient interpersonal relationship. Increasingly, studies have focused on patient experience with a specific practitioner. For example, Kenten's (2010) findings highlight that aspects of medical consultation can have a significant impact on the patient experience. They found that actions as simple as doctors smiling or greeting patient or introducing themselves, could result in the patient feeling more comfortable. Other aspects included the clothes that doctors wear (Hueston and Carek 2011) and how patients receive test results (Elder and Barney 2012). Although these behaviours may affect patient experiences, it is unlikely these behaviours will affect patient clinical outcomes.

In line with how the frameworks divided their aspects of care, plenty of attention from research extracted from the literature, has been paid to the dimension of "Staff collaboration and communication" with most of the studies including it as a separate dimension of experience (Schoenfelder, Klewer, and Kugler 2011; Lyratzopoulos et al.

2012; Murrells et al. 2013). Also, the “Information and Communication” dimension has been considered in 18 studies, with focuses on the discharge (Secanell et al. 2014), drugs, waiting times (Davies et al. 2008), procedures and the communication between patients and health care staff (Bjertnaes, Sjetne, and Iversen 2012; Welty et al. 2012). Similarly, most research found in the literature expressed the importance of the “Hospital Environment & Layout,” to the overall experience of a patient in a hospital. Most of the studies agree with the findings of the frameworks regarding the dimensions of “Patient Involvement,” and “Pain Management,” to be the least important aspect of care.

However, unlike the above-mentioned frameworks, the majority of the studies found that “Access to Care,” is an important indicator for experience of care (Doyle et al. 2010). Fewer researchers attributed the experience of care to the dimensions of “Continuity of Care,” “Empathy and Respect,” and “Family and Friends”. While these dimensions can be included as sub-themes for other dimensions of care, they were not as frequently mentioned as a unique aspect of care to influence the patient experience. Table 2.2 shows a sample of reviewed studies, the experience dimensions used in each one, the collection methods and tools used, and how the collected data has been engaged.

Table 2.2: A sample of reviewed research with instruments used and application of data collected

Article	Staff Collaboration & Communication	Information & Communication	Hospital Environment & Layout	Access	Empathy & Respect	Continuity of Service	Patient Involvement	Family & Friends	Instrument Used	Application
(Hargreaves et al. 2015)	√	√		√			√		Commonwealth Fund 2013 International Health Policy Survey	- Highlight improvement areas - Compare groups of patients
(Groene et al. 2015)			√			√	√		Generic patient experience instrument (NORPEQ)	- Assess effectiveness of QI
(Schnitzer et al. 2012)	√	√			√				Complaints	- Highlight improvement areas - Monitor experience data along time
(Stein et al. 2015)	√	√	√		√				H-CAHPS	- Highlight improvement areas
(Secanell et al. 2014)			√			√	√		Generic patient experience instrument (NORPEQ)	- Compare groups of patients
(Schoenfelder, Klewer, and Kugler 2011)	√	√							Post-visit questionnaire	- Instrument Design
(Schwappach et al. 2003)	√	√	√						"Report-like" questionnaire	- Highlight improvement areas - Assess effectiveness of QI
(Soleimanpour et al. 2011)	√	√	√	√					Press Ganey questionnaire	- Highlight improvement areas
(Murrells et al. 2013)	√	√			√				Patient Evaluation of Emotional Care during Hospitalization survey (PEECH)	- Instrument Design
(Davies et al. 2008)	√		√	√		√		√	Modified CAHPS	- Instrument Design - Assess effectiveness of QI
(Wong et al. 2013)	√	√	√	√	√		√		Hong Kong Inpatient Experience Questionnaire (HKIEQ) based on General Inpatient Questionnaire (GIQ)	- Highlight improvement areas - Instrument Design

Article	Staff Collaboration & Communication	Information & Communication	Hospital Environment & Layout	Access	Empathy & Respect	Continuity of Service	Patient Involvement	Family & Friends	Instrument Used	Application
(Ghosh 2014)	√	√	√	√					Structured survey questionnaire	- Highlight improvement areas - Instrument Design - Compare groups of patients
(Bjertnaes, Sjetne, and Iversen 2012)	√	√	√					√	National patient experience survey	- Highlight improvement areas
(Wong et al. 2012)		√	√	√		√			Telephone interview	- Highlight improvement areas
(Aiken et al. 2012)	√	√	√	√		√			Hospital Consumer Assessment of Healthcare providers and systems (H-CAHPS) survey	- Compare groups of patients
(Parry and Hewage 2009)	√	√							Complaints	- Highlight improvement areas
(Welty et al. 2012)	√	√	√	√	√				Paper-based satisfaction survey	- Highlight improvement areas - Compare groups of patients
(Bikker and Thompson 2006)			√	√					Telephone survey	- Instrument Design - Compare groups of patients
(Shadmi 2013)	√	√			√				The Perceived Hospital Environment Quality Indicators (PHEQIs) telephone interview	- Highlight improvement areas - Compare groups of patients
(Greaves et al. 2014)	√	√	√	√					Tweets	- Highlight improvement areas
(Doyle et al. 2010)	√	√	√	√	√	√		√	NHS inpatient surveys based on the Picker Institute framework	- Instrument Design - Monitor experience data along time
(Seghieri et al. 2009)	√	√	√	√					Press Ganey questionnaire	- Highlight improvement areas
(Lyratzopoulos et al. 2012)	√			√		√			The General Practice Patient Survey)	- Compare groups of patients

2.7. Patient Experience Analysis

According to the literature, patient experience is traditionally measured offline by collecting data over a predetermined period of time; using surveys, focus groups, interviews or any other collection method. Therefore, the analysis of data collected about patient experience with care, is affected by the collection method. For instance, gathering experience data in the form of patient surveys or questionnaires has often been analysed using multiple regression analysis models to predict factors with the highest impact on the experience of patients, with regard to their willingness to return and the likelihood to recommend the hospital to a friend or relative (Sun et al. 2000; Otani et al. 2009). Those studies are generally followed by the development of hospital quality-improvement initiatives that focus on the strongest dimensions from these models. However, regression techniques are found to only consider the magnitude of the association between the individual dimension and global experience measures (Sandoval et al. 2006). Although focusing only on the strongest dimensions to improve the experience of patients seems to be the correct strategy, it might not necessarily be the most efficient (Seghieri et al. 2009). One study proposed an integration between regression and optimisation techniques based on patient survey data (Brown et al. 2005). That proposed technique favours those dimensions with the highest magnitude from the regression analysis and those that currently have a relatively low performance measure, to produce a greater effect in the overall experience score.

While interview data analysis can be conducted using a number of qualitative analysis methods, choosing the appropriate method depends heavily on the objectives of collecting

data (Burnard 1991). When choosing an appropriate method of analysing qualitative data, the researcher is required to consider the purpose of the analysis and the type of outcome desired from the data (Kondracki, Wellman, and Amundson 2002). During interviews, the researcher will take notes taking into account the that high-quality data analysis depends on high-quality data collection and the strategy that the researcher has to consider. Interviews will be transcribed and analysed using content analysis (Braun and Clarke 2006). Content analysis is used for any type of interview to identify key words, paragraphs or themes. It is suitable for simple reporting and if the phase is run over a short time. Computer-aided qualitative analysis software Nvivo can be used to facilitate the overall process. Nvivo allows textual data to be coded under “nodes” which represent themes that emerge from the data. Codes are not pre-assigned and the coding scheme shall develop from the patterns surfacing from the data. Concepts and constructs from the interview that are mentioned by more than one participant will be highlighted and coded as potential themes. After several iterations, key themes in the data will be identified and reported, providing valuable insights.

2.8. Beyond Data Collection & Analysis

A robust association can be found between higher levels of patient experience and improved clinical outcomes (Jha et al. 2008; Doyle, Lennox, and Bell 2013; Anhang Price et al. 2014). Also, evidence has been found on the positive effects of patient engagement on health-related business metrics (Glickman et al. 2010). However, patient experience does not simply reflect clinical outcomes, rather it seeks to represent a unique factor that is challenging to measure.

From the literature, many studies have drawn on the data extracted from patient experience reports and their analysis for diverse purposes. The increasing interest in recent years in gathering and collecting data regarding patient experience, highlights the importance of incorporating such experiences into the care delivery. Yet, despite the desire of health care providers to improve patient experience and achieve higher patient satisfaction scores, relatively little attention is paid to integrating patient experience with the hospital's improvement process (Rozenblum et al. 2013). Even with expanding initiatives, health care organisations attempting to transform their organisational culture from 'provider focused' to 'patient focused', still fall short of achieving high scores on patient satisfaction/experience. At the same side, studies have shown that those organisations that succeed in fostering patient-centred care into their organisations incorporated it as a strategic investment priority mainly by committed leadership, active measurement and feedback of patient, as well as engagement of patients and staff (Luxford, Safran, and Delbanco 2011).

At present, no clear evidence is available regarding strategies incorporating patient experience data actively into the decision making process to improve the overall service (Robert and Cornwell 2013). Some reviews do address the issue of data collection methods and measurement techniques, but do not focus on the management side. In literature, the collected data regarding patient experience is used to highlight improvement areas, to design a standardised instrument for data collection, to compare the experience of different groups of patients, and to monitor and evaluate interventions intended to improve experience of care or to assess the effectiveness of a new quality improvement (Figure 2.5).

Most of the studies collecting patient experience data, used it to serve two or more purposes.

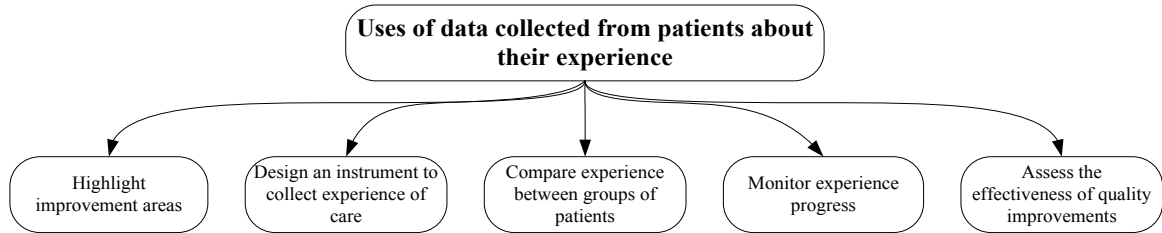


Figure 2.5: Uses of patient experience data in literature

Highlight improvement areas - To draw the attention of health care providers to underlying issues from the patient’s eye based on their experience of care. Those areas are not necessarily the most important drivers to experience, rather they are aspects of care that need more attention from the management (Stein et al. 2015). The majority of such areas tend to be related to waiting times, interpersonal communication for minorities, information, preservation of privacy, food quality, and overall cleanliness.

Design an instrument to collect experience with care - To help hospital management in assessing and identifying the most important aspects of care that affect the experience of patients and their satisfaction with their care (Wong et al. 2012; Wong et al. 2015). Another study designed an in-house experience questionnaire to assess the environment of the hospital, doctor care, nursing care, aftercare, the behaviour of staff, and how they influence the satisfaction of patients. The questionnaire is reported to be valid and reliable for their hospital setting and analysed results show high levels of satisfaction of patients with minor room for improvement (Mirza et al. 2016).

Compare experience between different groups of patients - To determine whether socio-demographical factors play a significant role in determining the important aspects of care and how patients perceive their experience (Bauer, Alegria, and Alegria 2010; Lorant and Bhopal 2011). Studies show that women from ethnic minorities and patients with low incomes are more likely to have bad experiences (Lantz et al. 2005). They also find that the experience of patients who need to avail of interpreter services differ greatly with the presence or absence of an interpreter (Bauer, Alegria, and Alegria 2010), and that those who actually benefit from those services report very positive experiences (Welty et al. 2012). In the same sense, Lyratzopoulos et al. (2012) used the data they collected from patients across many hospitals in several countries to determine the similarities and differences in the patient experience. Another study used an experience questionnaire to evaluate and compare the inpatient experiences at both department and hospital level. The results are used to facilitate meaningful comparisons in individual departments and within the entire hospital (Smirnova et al. 2017).

Monitor experience progress – There are few studies reporting on collecting and gathering experience data from two different points in time to monitor the progress of the experience of their patients, for the same health care organisation. For example, Schnitzer et al. (2012) used the complaints submitted by patients to highlight any change in perceived experience. While Doyle et al. (2010) used the NHS inpatient surveys to achieve the same goal, analysing 77,000 patient surveys collected in 2006 and 72,000 surveys collected in 2007.

Assess the effectiveness of quality improvements - Data collected and analysed from patient experiences can be used to measure the effectiveness of certain interventions that

are intended to improve the experience of patients. One of the findings of the European project DUQuE (Groene et al. 2015), that aimed to assess the complex relationships between quality management strategies and patient experience, shows little relationship between the quality management strategies and experience of patients. There are no substantial associations between hospital-wide quality management strategies with any of the patient-reported experience measures. Previous research suggests that countries who wish to introduce national programs for measuring quality of care from the patient's perspective should pay attention to three main things (Delnoij 2009). First, they need to measure detailed experience rather than overall satisfaction. Secondly introduce an integrated system for internal measurement and improvement. Finally use standardised questionnaires and methods.

2.9. Discussion

This chapter aimed to explore the literature concerned with patient experience; defining the definitions used, the available frameworks and dimensions included and collected from studies reported in the literature. In theory, several frameworks were developed to include patients in the service and promote the notion of patient-centeredness. These frameworks provided a useful overview of important patient experience dimensions, with significant overlaps identified between them. Thus, they were helpful in demonstrating the potential range of experience dimensions.

However, uncertainty arose about how the dimensions had been extracted from a wide and diverse body of research, the extent to which patients and the public had been involved in

developing or selecting the dimensions and the extent to which the dimensions reflected patient-identified experiences, as opposed to those identified by researchers and clinicians (NICE and National Clinical Guideline Centre 2012; Staniszewska et al. 2014). The results of this review show that the majority of the studies reported using a custom-made instrument to collect data from patients about their experience in hospitals. Only a few studies mentioned developing their tools based on established frameworks. Thus, revealing a theory-practice gap that needs to be addressed.

Another objective was to categorise the different uses of patient reports to inform changes in policies and improvements. However, despite the wealth of feedback collected from patients, there is little evidence that this feedback leads to improvements in the quality of health care (Coulter et al. 2014). Most of the literature reviewed, focused only on highlighting areas of possible improvements to enhance the experience of the patients during their hospital stay. Few studies reported using the data collected from patients to inform quality improvements and assess the effectiveness of different interventions on experience of care. It may be possible to achieve measurable progress in improved patient experience in relatively simple areas, over short periods of time. However, it is difficult to sustain these improvements or to leverage more substantial change without a more comprehensive strategy that is organisation-wide and regarded as fundamental to organisational success. Such a strategy is likely to require a committed and engaged leadership, a work environment that supports clinicians and other staff in the redesign of patient care using patient survey feedback, and the involvement of patients and families in the process (Davies et al. 2008).

Existing research highlights the importance of including doctors and nurses in the designing and development of data collection tools and the potential positive improvements based on their daily interactions with patients (Farrington et al. 2016; Asprey et al. 2013). With some exceptions (Boiko et al. 2014), little research has focused on staff engagement with experience questionnaires at the individual staff level, or on how staff working in different care settings engage with those questionnaires.

The emerging picture is that patient experience reports of care are not a quality improvement tool in themselves. The reports can monitor trends and provide comparative data, but simply providing hospitals with patient feedback does not automatically have a positive effect on quality standards. The implications of the findings reported in the present review must be considered within the context of the limits of the study. The tight inclusion criteria allowed to avoid collecting too broad a spectrum of methodologies. The exclusion of other providers of care such as: general practitioners, patient medical-centred homes and private clinics could be regarded as limitations. These approaches helped to maintain focus whilst producing a rich picture of patient experience of care.

In conclusion, collecting and measuring patient experience data is now well established in countries around the world. The principle that patients must be consulted and their feedback is an important indicator of hospital performance is now embedded in many health care organisations. However, there are still questions in regard to its use and value, and although health professionals in principle have positive attitudes towards patient feedback, they raise objections to its use when presented with results that appear critical of their own care. This review shows that information alone does not automatically translate

into improved experience of care. Sustained improvement tends to be achieved when backed by national government campaigns and targets. Finally, it has been shown that there is a need for further investigation into the analysis methods used to study and investigate data collected from patients, and there is a great deal of potential for further analysis of patient experience data.

CHAPTER 3: RESEARCH METHODOLOGY

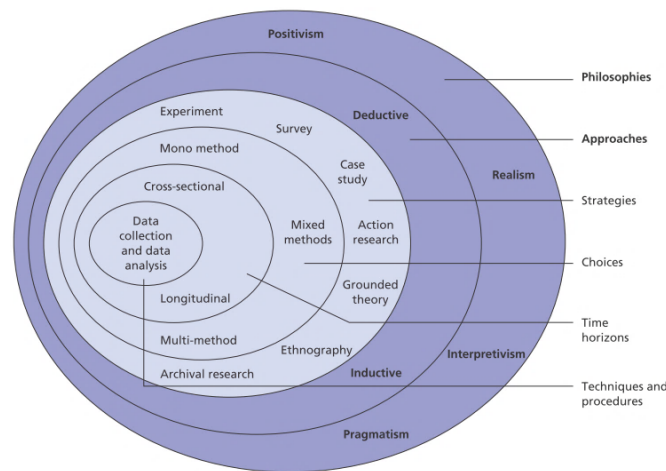
3.1. Introduction

Research can be defined as “something that people undertake to understand things in a systematic way, thereby increasing their knowledge” (Saunders, Lewis, and Thornhill 2009). There is no standard methodology that applies to all research problems, rather the methodology has to be selected based on the nature and scope of the topic at hand and the type of data available. Framing the research topic in a formal structure as a starting point of the research project results in the selection of the most appropriate research strategy, data collection, and analysis techniques (Collis and Hussey 2009). This framework of the research methodology serves as a guide to how research should be conducted (Myers 1997). Therefore, while developing the research methodology, a researcher should gain a broad understanding of the various research methodologies, and subsequently be able to justify the selected methods, depending on the research questions.

This chapter discusses research philosophy in literature, and highlights the main research paradigms and approaches relevant to the study. At a philosophical level, a pragmatic stance has been adopted and thus supported by its associated research methods, with a justification to the rationales of the chosen research philosophy. This research is composed of five distinct research stages, with each stage having its own sub-objectives, administration procedure, and techniques employed which seek to answer one of the research questions to achieve the ultimate research goal. Finally, ethical issues and the measures taken to address them are clarified.

3.2. Philosophies & Paradigms

The starting point of any research project provides direction to the most appropriate strategy, data collection, and analysis techniques. However, Saunders et al (2009) argued that questions regarding data collection methods are secondary to questions of research paradigm. They claim that research steps resemble the layers of an “onion”, where issues underlying the choice of data collection methods belong in the centre of the research rather than the outer layers (Figure 3.1).



Source: (Saunders, Lewis, and Thornhill 2009)

Figure 3.1: Research Onion

It is essential to all researchers that careful consideration is given to the research philosophy. Since it will shape the methodological approach used to answer the research questions, it will therefore allow researchers to make informed decisions (Easterby-Smith, Thorpe, and Jackson 2011). A research philosophy is comprised from the researcher’s ontological and epistemological stances (Amaratunga et al. 2002). Ontology is how one “views the nature of reality” (Burrell and Morgan 1979), and epistemology is “concerned with what the study accepts as valid knowledge” (Collis and Hussey 2009).

The two perspectives of ontology are objectivism and subjectivism. An objective person views reality as a tangible entity regardless of people's actions (Holden and Lynch 2004). An objective position can be applied to social sciences in that it assumes social phenomena can exist externally to individual social actors. Conversely, a subjective researcher provides an explanation regarding a social phenomenon as a contextual outcome of the actions and perceptions of social actors (Holden and Lynch 2004). Thus, while objectivists believe in a single reality, subjectivists believe that multiple realities could co-exist according to the different views of the world (Morgan and Smircich 1980).

A timeless debate among researchers has centred around the two ends of the epistemological spectrum; positivism and interpretivism (Becker and Niehaves 2007). A positivist is a person who believes that there is only one reality that is independent of social actors and that a scientific stance has to be adopted to research (Collis and Hussey 2009). The positivist paradigm assumes the researcher objectively obtains data while remaining external to the research process (Remenyi et al. 1998). The outcomes of positivist research are replicable factual generalisations about social phenomena (Easterby-Smith, Thorpe, and Jackson 2011).

On the other hand, interpretivism is developed as a result of the inadequateness of positivism to meet the need of social phenomena (Collis and Hussey 2009). Social phenomena are considered unique, since they are created by individuals in certain environments, and are too complex to be reduced to generalised rules and formulae. Contrary to the positivism stance, social phenomena can be studied from within their own context using the phenomenological paradigm and suggests that there is an affiliation

between both the researcher and the research subject. Interpretive research looks at human beings as social actors which are partially engaged in the domain of the research subjects. This engagement enables the researcher to understand the phenomena being studied from the research subject's point of view in a subjective and empathic manner (Holden and Lynch 2004). The outcomes of interpretive research offer an understanding of the social phenomenon under investigation, and not the absolute truth, and therefore cannot be generalised to other contexts (Burrell and Morgan 1979).

Positivist and interpretivist scholars have always claimed that researchers must take a stance on the extremities in ontology and epistemology by adopting one research philosophy (Guba and Lincoln 1994). That debate led to the emergence of a third philosophy (Figure 3.2); pragmatism which shifts the focus to the practical outcome of the research by rejecting the forced selection between research paradigms (Tashakkori and Teddlie 1998). It authorises researchers to apply whatsoever philosophical approach they see fitting and would have an effective contribution to achieving their research aims (Saunders, Lewis, and Thornhill 2009). Pragmatism facilitates the usage of mixed method approaches to address complex research questions (Tashakkori and Teddlie 1998).

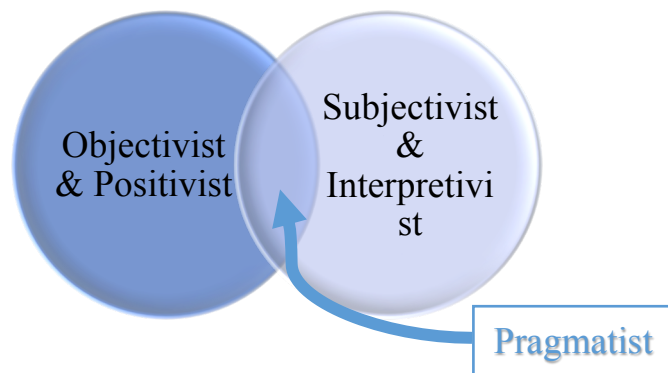


Figure 3.2: Research philosophies

3.3. Research Approaches

Two approaches are well established in the literature of research methodology to develop a new theory; the deductive approach, also known as the top-down approach and the inductive approach or bottom-up. The deduction theory testing approach is a highly structured methodology that usually begins with a broader more general subject, which is then narrow into more specific statements and hypothesis to be tested (Figure 3.3.a) (Easterby-Smith, Thorpe, and Jackson 2011). While the inductive theory-building begins by specific observations in which patterns and relationships are identified to form a theory regarding certain phenomenon (Figure 3.3.b) (Saunders, Lewis, and Thornhill 2009). Induction is a flexible approach which shows less concern for generalisation, thus provides a deeper understanding of the research phenomenon within the research context being studied (Easterby-Smith, Thorpe, and Jackson 2011).

In this research, the application of integrated tools and methods for improving, managing, and optimising the complex experience of patients in the health care sector is a relatively new topic. With limited data availability and guidelines on development and deployment of integrated decision support frameworks. Thus, an inductive approach has been applied for the first part of the research, to collect secondary and primary data needed for the analysis.

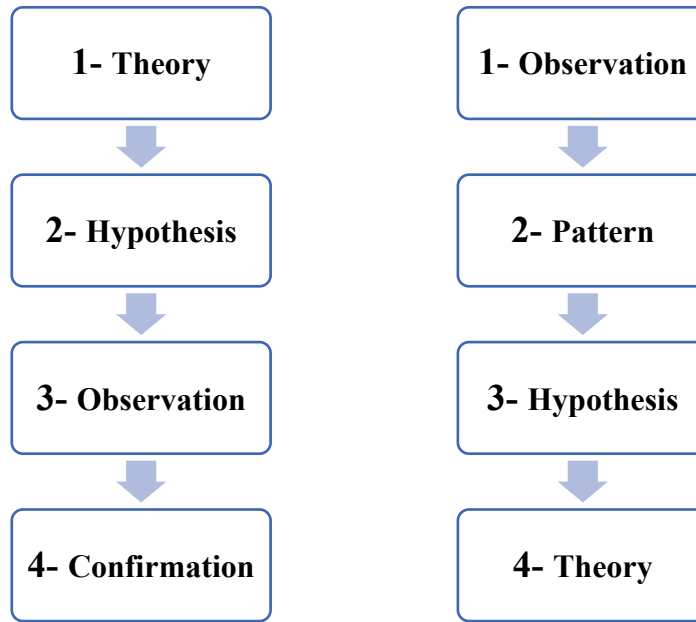


Figure 3.3: (a) Deductive approach, (b) Inductive approach

Secondary data is a useful source of knowledge for the pursued research topic since it provides a wide range of related information which is collected and analysed by other researches or studies. Starting the research with secondary data saves a time, cost, and effort, since research objectives can be met by reanalysing or manipulating the collected data. In this research, a literature review and other material (reports, surveys and others) were used to collect the preliminary information about patient experience. By reviewing the literature, a state of knowledge regarding research elements and their potential integration have been explored.

The purpose of secondary data is to support the generation and refinement of the research idea and help to set the study's objectives, while also providing the required secondary data that contributes in achieving the following objectives:

1. To gain in-depth understanding of existing factors and dimensions of patient experience;
2. To highlight the possible areas of using patient experience data; and
3. To explore the common challenges and problems in order to enable strategies and policies to be informed by data collected from patients.

3.4. Research Methods

In consideration of the research paradigms and approaches, there are two types of methods in conducting any research project: quantitative and qualitative. Quantitative methods investigate phenomena through the collection of numerical data (Amaratunga et al. 2002). Mathematical techniques are often applied in quantitative data analysis (Creswell and Clark 2011). The quantitative approach looks to correlate the variables which produce a result that is predictive, explanatory, or confirmatory (Williams 2007) and the findings are generated through formulae. Quantitative research is generally associated with deductive and positivistic studies. These methods include experiments, surveys, structured observations, and structured interviews (Williams 2007). Their key shortcoming, however, is that in the studies of humanistic variables such as sociological and physiological factors cannot be analysed quantitatively. Quantitative research lacks the ability to uncover underlying meanings in these social phenomena (Amaratunga et al. 2002).

Qualitative research can be described as discovery research in that it depends on words rather than numbers. Contrary to quantitative research, qualitative research methods aim to provide an in-depth understanding of social phenomena by exploring and interpreting data

(Amaratunga et al. 2002). Qualitative data includes narrative or descriptive accounts mostly in the form of text. While performing qualitative research, content analysis methods and thematic analysis methods are used to expose hidden patterns and themes from within the text (Braun and Clarke 2006). For this reason, qualitative research is more suited to interpretivists and inductive research matters as it is less structured and focuses more on the development of meaning. Methods for conducting qualitative research are case studies, grounded theory, content analysis, and phenomenological studies (Williams 2007). The inability to generalise the findings through qualitative research is considered problematic as the findings are generally taken from a small population who share the study's context (Amaratunga et al. 2002; Johnson and Onwuegbuzie 2004).

Gathering and collecting patient experience data can be accomplished using mixed methods, quantitative, or qualitative approaches. The strength of the mixed methods design lies not only in obtaining the “full picture,” but in triangulating qualitative and quantitative data to see if and where findings converge, and what can be learned about patient experience from each method. Similar to deciding which measures to use, and which approaches to utilise in measurement, the timing of measurement must also fit the need at hand, and make both practical and purposeful sense and be interpreted in light of the timeframe context.

Most frequently in routine clinical practice, patient views are assessed using questionnaire surveys. Until recently, these were most often administered on paper, either handed out in clinic or posted to patients following attendance at a health care provider. In practice, surveys were the most used instruments to measure patient experience of care, whether in

the form of a structured questionnaire (Soleimanpour et al. 2011; Wong et al. 2013; Hargreaves et al. 2015) or a telephone survey (Bikker and Thompson 2006). Though they are not the only collection methods described in the literature. Patient experience can also be gathered using interviews or focus groups, which are not commonly used in research because of the costs of routinely collecting and analysing such data.

3.4.1 Interviews

Numerous studies have been identified regarding methodological aspects of measuring patient or carer experience using in-depth interviews, either in person or by telephone. This refers to detailed discussions with probing and qualitative feedback, rather than merely asking structured survey questions verbally. Interviews have been used to good effect to collect information from patients or carers which is then fed into initiatives to improve quality or safety (Eriksson and Svedlund 2007; Bick et al. 2012). For instance, researchers in England interviewed patients in the community and in nursing homes to explore how their experiences and their perceptions could be used to reduce safety incidents during transfers between organisations (Gibbons, Casañas I Comabella, and Fitzpatrick 2013). Patients say that good communication, responsiveness, and avoiding risks are all important to them. This feedback is used to improve services (Scott, Dawson, and Jones 2012). Elsewhere in England, researchers examined patient perceptions of the quality and safety of care for people with long-term conditions. Interviews with 33 people with long-term conditions identified problems gaining access to primary care consultations, diagnostic tests, and specialist care (Burgess, Cowie, and Gulliford 2012). In a European setting, readmitted patients are interviewed from 15 different hospitals in four different countries to assess the discharge process which affects the predictability and preventability of their

readmission. Several factors are identified as potentially associated with predictability and preventability, such as a patient's readiness to go home. Therefore, it is concluded in this study that to improve patient experience and prevent readmission, health care workers should ask the patient if he/she is feeling ready for discharge (Galen et al. 2017).

Although interviews are a well-known technique, there is little empirical research evaluating their effectiveness for measuring patient experience, or monitoring changes over time. A limited number of studies have begun to draw conclusions regarding this, though. For instance, a team in Spain examined whether patients are a good information source regarding the occurrence of safety issues and adverse events. Twenty-eight patient interviews were combined with record reviews. The researchers concluded that patients can contribute to identifying adverse events affecting them with reasonable accuracy (Mira et al. 2011).

However, other studies have questioned the value of patient interviews for identifying issues related to quality and safety. One study compared four methods of detecting medication errors at a US hospital: doctors' reports during their morning conference, nursing reports during shift changes, patient reports at discharge interviews, and standardised medical record reviews. All methods were compared with the hospital's electronic medication misadventure reporting system. Forty-seven per cent of admissions experienced at least one medication misadventure. There was little overlap among the four reporting methods. No single method captured all incidents and only 20% were reported by more than one method. 51% of incidents were identified by medical record review, 11% by patient interview, 9% by doctor reports and 8% by nurse reports. Of five life-threatening

adverse drug events, all were preventable, but only one was reported by a patient at discharge (Kaboli et al. 2010). This suggests that patient interviews may omit important aspects of the quality of care, particularly when looking for specific details.

Overall, the evidence base suggests that interviews may be useful for providing in-depth information about patient experiences, but may not be the most appropriate method when trying to identify specific numerical information or safety concerns.

3.4.2 Focus Groups and Panels

Another strategy is to engage patients or carers in discussion groups or ‘group interviews’. Ten studies were identified about the methodological aspects of discussion groups or patient panels for measuring patient experience. In the US, a network of services provided through community-based clinics and small hospitals used focus groups to explore patient experience. Groups were run at clinics and at hospital sites, particularly targeting those who may not usually respond to surveys or those who may be most disadvantaged. Patients were willing to participate and the researchers found it easy to draw out themes and potential areas for improvement. Patients were most concerned about eligibility and enrolment policies, patient advocacy, and access to primary care services and areas for improvement (Young et al. 2004).

While patient involvement groups are common in the UK, there are few empirical studies describing the pros and cons of this approach or the merits for measuring improvement over time. Many policymakers, managers, and practitioners espouse the value of involving patients in discussion groups of this nature, but the extent of engagement may be somewhat limited. There may be a number of barriers, as evidenced by one health centre in England.

A discussion group was set up along with patient panels to help people participate in developing better quality and safer services. Dilemmas surrounding patient participation included concerns about how to reward volunteers, how doctors and patients can share knowledge, how participation is affected by professional boundaries and whether or not a regular group meeting is the best way to involve patients in decision making (Pietroni and Chase 1993). Researchers in Canada concluded that variable patient interest and the attitudes of health professionals may act as barriers to patient involvement in discussion groups for improving services (Gagliardi et al. 2008).

However, the more patients are engaged in planning and developing services, the more accepted this may become among both patients and professionals. Researchers from England examined whether engaging patients in service development impacted on health care professionals' and service users' attitudes toward engagement. Focus groups before and after lung cancer teams that were supported to engage with patients and family members found that staff and patients who participated had more positive attitudes towards involvement than those who did not participate (Forbat et al. 2009).

3.4.3 Other methods

Complaints and compliments to medical staff are other sources of feedback from patients regarding their hospital experience (Parry and Hewage 2009; Schnitzer et al. 2012). New developments in technology, however, allow patient feedback to be collected through SMS messages to patient's phones, through online surveys, or using handheld devices or kiosks to get real-time feedback, e.g. daily assessments by patients of their care on a ward. Also, with the development of social media and websites such as Patient Opinion in the UK,

patients can give their feedback in an unsolicited manner (Greaves et al. 2014). While several studies have outlined the ethical considerations of using social media in health care research (McKee 2013), many researchers have attempted to harness the cloud of patient experience using rating sites and social media (Verhoef et al. 2014; Greaves et al. 2013; Thackeray et al. 2012).

Different methods of feedback may draw different pictures: for instance, data collected through surveys has always been criticised for generating mild positive responses, while data collected through interviews more frequently result in reports of negative experiences (Tsianakas et al. 2012; Bikker and Thompson 2006). Nevertheless, general summary measures of patient experience are popular with policy makers because of their simplicity, e.g. the ‘friends and family test’ now widely used in the UK NHS in which patients are asked whether they would recommend a facility (e.g. hospital or GP practice) to their friends and family (NHS Choices 2014). It can be argued that surveys can be more generalised compared to the use of complaints and online tools to capture patient experience (Silva 2013), but there is no ‘best’ or most effective method; each has its pros and cons (Table 3.1). Therefore, policy makers should be made aware when deciding on using such methods and determine the most suitable method based on the context of the study. This is to ensure that bias is avoided as certain methods can be biased towards a certain group of the population.

Due to the nature of quantitative and qualitative methods, researchers should not perceive them as opposites but rather as complementary. Therefore could integrate them to achieve research goals (Johnson and Onwuegbuzie 2004). The mixing of qualitative and

quantitative methods provides multidimensional insights into many management research issues, and has been noted as a trend in management research (Tashakkori and Teddlie 1998). The main aim of a mixed methodology approach is to maximise the advantages of qualitative and quantitative methods, and to indemnify the weaknesses of both (Creswell and Clark 2011). As an example, qualitative studies could enhance quantitative methods with deeper understandings and insights, while quantitative methods may support qualitative studies in producing statistically significant findings (Amaratunga et al. 2002).

Table 3.1: Comparison between different collection approach

Approach	Main advantages	Main limitations
In-depth interviews	<ul style="list-style-type: none"> • In-depth information • Probes reasons • Handles sensitive topics 	<ul style="list-style-type: none"> • Resource intensive • Difficulty interviewing same people over time • Generalisability issues with small samples
Focus groups and panels	<ul style="list-style-type: none"> • In-depth information • Ability to reconvene same group over time • Group dynamic can spark ideas 	<ul style="list-style-type: none"> • Generalisability issues/selection bias • Resource intensive • High rates of drop out over time
Surveys	<ul style="list-style-type: none"> • Can gain large amount of feedback • Can use multiple administration methods (post, kiosks, online, text messages, comment cards, telephone, in-person) • Wide range of validated surveys available 	<ul style="list-style-type: none"> • Collects only a surface level picture, rather than understanding why people feel a certain way • Subject to self-selection and literacy bias • Closed-ended questions may be more likely to gain positive feedback
Online rating tools	<ul style="list-style-type: none"> • Increasingly promoted and available to • many people, so can get ratings from large numbers 	<ul style="list-style-type: none"> • Only those who use websites provide feedback • Surface-level information only • Covers selected dimensions

Source: (Silva 2013)

A number of other benefits of using mixed methods were determined by (Greene, Caracelli, and Graham 1989). These include:

- **Triangulation** – Corroborating the finding of research from different sources to increase the validity of result.
- **Complementarity** – Explanation and illustration of the results from one method with the results from the other method.
- **Development** – Employment of the results from one method to develop or inform the other method.
- **Initiation** – Discovery of new perspectives, modify the result from one method or from the other method to decrease the weakness of results and their interpretation.
- **Expansion** – Extension of the range of research by using different methods for different stages of inquiry components.

3.5. Justification of Selected Paradigm

Given the complex nature of this research and its context, the goal was not to explore the research phenomena using only quantitative or qualitative methodologies; the problem area identified did not assume that answers could be found by enacting a single methodology or a single philosophical perspective such as absolutism or relativism. The problem area assumes that answers can be found through an integrated approach that involves both quantitative and qualitative approaches. Therefore, the mixed methods methodology has been selected as the most appropriate methodology. Several paradigms and frameworks of research have been discussed in literature in relation to mixed methods methodology. Some of them can be easily discarded since they are not relevant to this research, for example, the feminism paradigm, which focuses research around women's rights. Another discarded

paradigm is the Transformative-Emancipatory developed by Mertens (2009), which focuses on the intersection between the mixed methods methodology and social justice.

Moving towards more relevant paradigms, a selection of those have been considered for this research. The first is the post-positivism paradigm, which is developed out of a criticism of positivism and therefore views reality as probabilistically true where positivism (the paradigm of science) views reality as really true and fully independent of the mind (Creswell and Clark 2011). Whilst post-positivism works with quantitative methods and methodologies, it also works with qualitative approaches and many who identify themselves as post-positivists do utilise mixed methods. But post-positive researchers use quantitative approaches to analyse qualitative data. As an example, content analysis is utilised to quantify thematic occurrences through frequency rates, and qualitative data is used in a way that enables the development of more effective quantitative approaches. Giddings and Grant (2007) called post-positivism a “lite” version of positivism, stating that the “post” prefix indicates a development or extension of positivism, and offer various examples of the way in which post-positivism extends the concepts of positivism. Onwuegbuzie et al. (2009) (along with many other researchers) confirms this methodological mirroring. Therefore, post-positivism is not a suitable philosophical perspective for this mixed methods research because it is not suited to exploring social phenomena and social reality. This is due to issues regarding social are too chaotic and dynamic to be represented and explained statistically.

The second paradigm that has been considered is critical realism which reconciles absolutism and relativism perspectives at the ontological level. According to Creswell and

Clark (2011) critical realism adopts and supports characteristics from both quantitative and qualitative approaches to fully explore and understand the structures and mechanisms of what can be observed and experienced. Critical realism does not assume reality to be a single, observable, measurable, determinable layer whose actions and events are independent of the mind. Nor a single layer that is understandable through exploring experiences and perspectives. It assumes reality to have multiple layers containing structures and mechanisms that influence the observable and what can be experienced. These structures and mechanisms are beyond the realm of human observation and experiences; they cannot be detected, known, or perceived, but can be, as defined by McVoy and Richards (2006), inferred through a research design consisting of both deductive (empirical investigation) and inductive (theory construction) processes. Thus, the exploration of these structures and mechanisms provide the basis for the exploration of reality using critical realism. However, critical realism is not used to cause change at a practical level, it goes beyond the research question and places the research problem at the centre of the research project to develop new theories. The aim of this research is to develop a product to answer the main research question: *“What is the optimal use of patient experience data to inform quality improvement strategies in Irish hospitals?”* Therefore, the most suitable research paradigm must be product and outcome focused, that can cause change at the practice level.

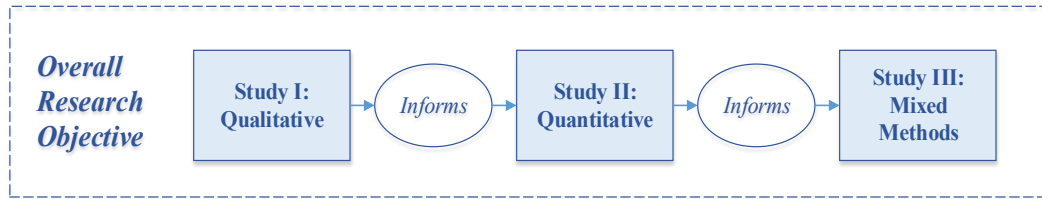
The last paradigm explored is pragmatism and it is well acquainted with mixed methods. Key differences between this and post-positivism can be found at the epistemological level in that post-positivism understands reality as a single reality that is probabilistically true and independent of the mind. Whilst pragmatists view reality as containing elements that

are accessible and independent of the mind, as well as elements that are constructed and therefore dependent on the mind. From an epistemological perspective, pragmatism already leans more towards mixed methods than post-positivism. Also, unlike critical realism, pragmatism focuses on changes that can be made at the practical level rather than only exploring and understanding the structures and mechanisms of reality. Pragmatism does not place emphasis on the philosophical and methodological considerations of a research project. Research questions are elevated to the central position of all considerations and there appears to be a suggestion that research questions are the basis of philosophy. Pragmatism assists the researcher in fulfilling research objectives by adopting different paradigms and their associated approaches at different stages of the research (Howe 1988). It also allows the identification and implementation of the best-suited research methods and tools at each stage. Which results in an effective research process yielding valid results. Moreover, alternating between varying epistemological positions under a single pragmatic paradigm allows the use of mixed methods including both qualitative and quantitative techniques in data collection and analysis. Benefits of such combinations for this research include triangulation and complementarity of findings, in addition to a rigorous process for framework development. For those reasons, the pragmatic paradigm was selected as the underpinning philosophy of this project in order to answer the research questions in a complete and comprehensive manner.

3.6. Research Design

Research design can be described as the phases required to complete the research project. Adopting a pragmatist paradigm, this research uses a mixed method approach which

follows the multiphase design proposed by Creswell (2012). The mixed methods multiphase design consists of three distinct phases (Figure 3.4).



Source: (Creswell and Clark 2011)

Figure 3.4: Adopted Research Design

In this design, the researcher first collects and analyses the qualitative (text) data. The quantitative (numeric) data is collected second in the sequence and allows elaboration on the qualitative results obtained in the first phase. The second, quantitative phase builds on the first, qualitative phase. The two phases are then connected in the final stage of the study. The rationale for this approach is that the qualitative data and their subsequent analysis provide a general understanding of the research problem. The quantitative data and their analysis refines and explains those statistical results by exploring participant’s views in more depth.

The sequential use of a qualitative study followed by a quantitative study and then integrated into a mixed method, has the benefit of allowing the generalisation of findings. Results obtained in the first qualitative phase will be used to inform the analysis in the second quantitative study. Moreover, the findings of the first study will be used to draw insights from both the patient and medical staff in a hospital, which should enhance the relevance for quantitative data analysis. Those benefits are well-suited for the research objectives as the development of a framework which incorporates patient experience, with

the strategic plan of the hospital, requires the investigation of the relevant dimensions by adopting an exploratory approach. This is usually followed by the validating and testing of the constructs and dimensions that would be used in the development of the patient experience framework.

3.7. Research Strategy

This research helps to provide health care planners and strategists with a continuous data collection and analysis framework (Figure 3.5). Initially, data will be collected from patients about their experiences, as well as collecting insights from the staff about what other factors might be affecting the experience. That will be followed by both qualitative and quantitative data analyses to identify important dimensions of care that affect the experience of patients and highlight which areas need to be addressed. Finally, presenting the collected and analysed data to management in a dashboard to help monitor the progress of patient experience with the proposed quality improvements.

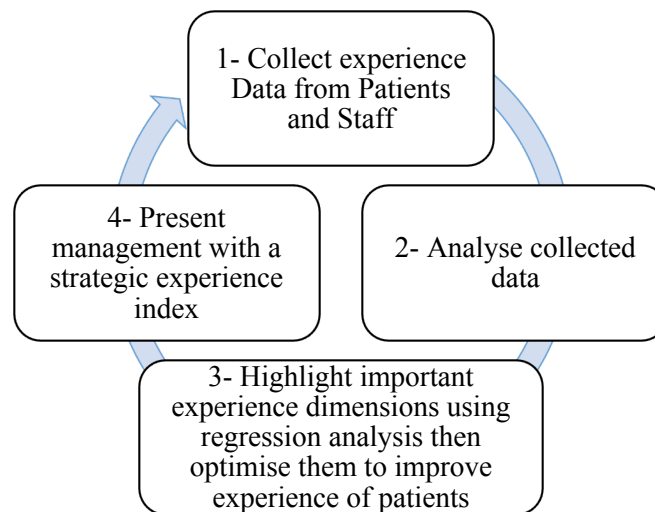


Figure 3.5: Research Plan

Based on the literature and research methodology presented in chapter 2, the conceptual patient experience framework consists of three main phases other than the literature review: the exploratory phase to collect data from patients and front-line staff regarding their perceptions and insights of what influences the experience of patients. The design phase to develop an integrated framework which can be used to analyse the gathered data and present to management with a framework for monitoring and improving the patient experience. Then finally an implementation phase where a case study is selected as a pilot for the framework’s deployment to validate it for applicability and generality. Figure 3.6 gives an overview of the research plan introduced in this chapter, outlining the different phases needed to achieve the research objectives. A detailed description of each phase is provided in the following sections and summarised in Figure 3.7. Further, the coordination between the different components of each phase is explained along with highlighting their points of integration.

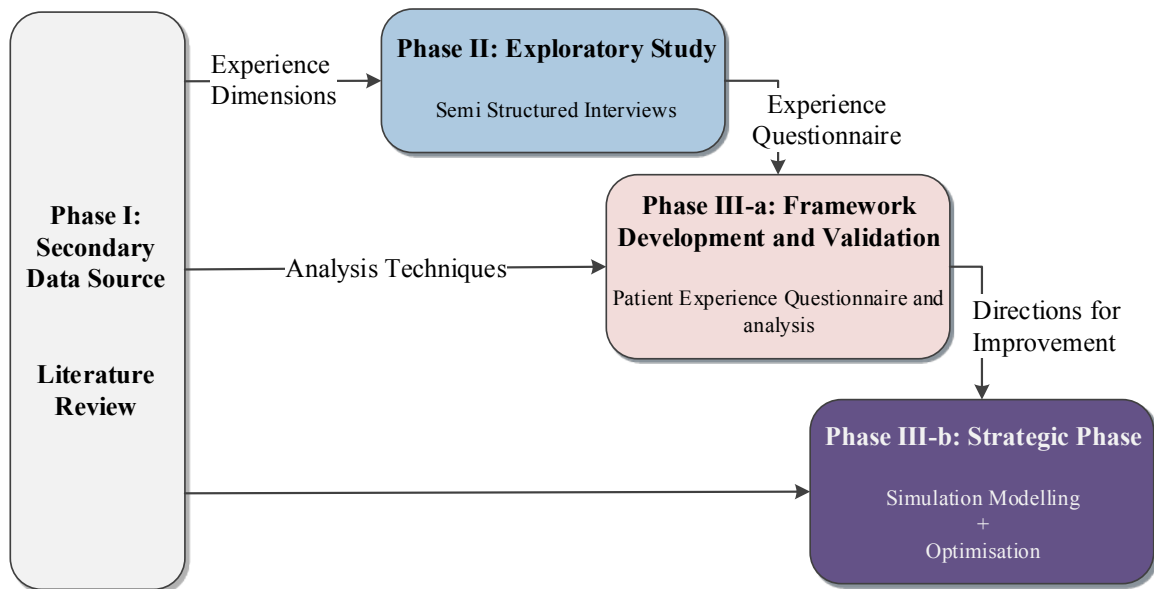


Figure 3.6: An overview of the research phases

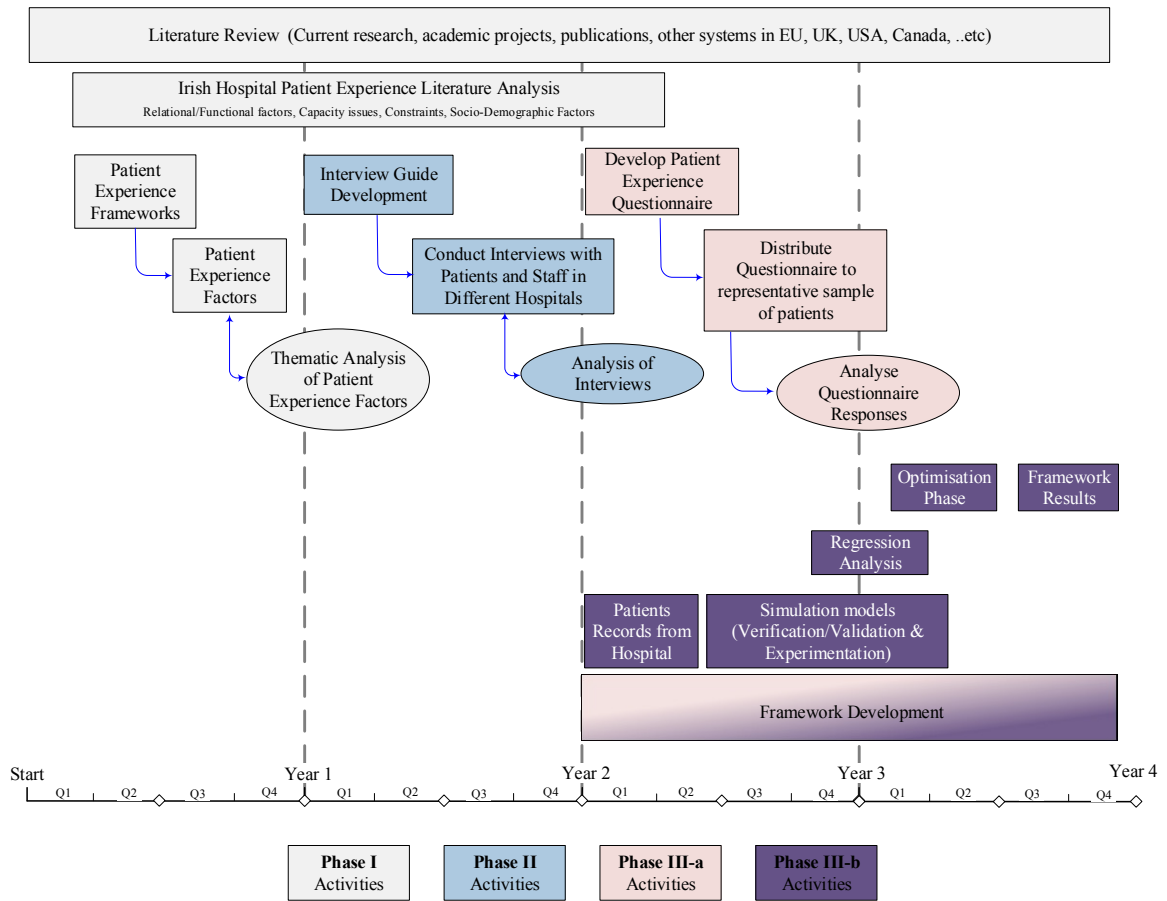


Figure 3.7: Timeline of research activities in each phase

3.7.1 Exploratory Study

An exploratory study “is a valuable means of finding out ‘what is happening; to seek new insights; to ask questions and to assess phenomena in a new light” (Saunders, Lewis, and Thornhill 2009). It is mainly a tool if the researcher needs to clarify and better understand a problem. Researchers have always emphasised the advantages of the exploratory study in its flexibility and adaptability (Adams and Schvaneveldt 1991). Therefore a researcher should be willing to change the direction of the study as a result of new data acquired if new insights appeared within the course of the study (Kothari 2004). This does not mean that there should be an absence of a direction to the enquiry. However, the focus should be

initially broad and then narrowed as the research progresses. The exploratory study in this research was designed mainly to identify the perceptions of front-line staff regarding which dimensions of care influence and have the greatest impact on the experience of patients. Selected staff are those who are in direct contact with patients during their hospital visit; specifically, doctors. The study is also designed to capture the lived experience of patients while they are visiting a hospital in order to validate the dimensions identified from the literature review.

A qualitative research method in the form of interviews is chosen as the appropriate method for data collection from staff and patients in order to convey the experiences of patients and views of staff. This research stage extends the literature review by introducing a practitioner perspective on patient experience by exploring the real-life experiences of their patients. Identifying the main dimensions of care for patients visiting Irish emergency departments is the research objective and this exploratory study will aid in providing a deep understanding of patient experience and its constructs. The sampling for the interviews, administration of questions, and the findings of the study are outlined in detail in Chapter 4.

3.7.2 Framework Development and Validation

The insights from the literature review and exploratory study stages are used as a starting point for the design and development of the patient experience framework. The framework along with its components and different stages are discussed in Chapter 5.

3.7.3 Strategic Phase

The final research stage is aimed at the holistic validation of the proposed framework to provide a complete answer to the last research question: *“How useful would a developed patient experience framework be for decision-making in emergency departments and to what extent can it be applied?”* The answer to this question is addressed through implementation of the framework in one of the busiest emergency departments in the country in order to evaluate its applicability and effectiveness. Due to its applied and multifaceted nature, the case study method is found to be the most appropriate to achieve the objective of this stage.

A case study is, “an empirical inquiry that investigates a contemporary phenomenon within its real-life context” and “relies on multiple sources of evidence,” (Yin 2014). Case studies are widely used in business research as they offer rich and reliable results due to the amalgamation of quantitative and qualitative data collection and analysis methods and the triangulation of information from multiple sources (Robson 1993). They serve a number of research purposes such as providing descriptive accounts, theory development, and theory testing (Yin 2011). In situations where the aim is theory development, case studies adopt an exploratory and inductive approach that requires limited prior theoretical knowledge and aims to generate theory from close observation of the phenomenon within its own context (Eisenhardt 1989). However, when utilising case studies for testing purposes, propositions that are tested should be predetermined by the researcher to allow the comparison of actual outcomes of the case study with expected outcomes based on the proposed theory (Darke, Shanks, and Broadbent 1998). In this case, studies are deductive and result in either the validation of the theory, its modification, or its refinement based on

the results (Lee 1989). From the latter perspective, a case study in a real-life hospital is conducted to test the proposed framework and to confirm its validity as an individual knowledge assessment tool based on theoretical propositions developed from the outcomes of the previous research stages. The case study is eventually conducted in the emergency department of a large adult-teaching Irish hospital. The findings of the case study are outlined in Chapter 6.

3.8. Research Ethical Considerations

When conducting business research, specific ethical provisions should be taken into consideration (Saunders, Lewis, and Thornhill 2009). As the subjects are mostly patients in hospitals, the researcher must guarantee there is no procedure which could negatively affect the respondents. Institutional approval, confidentiality, and anonymity are required for the ethical dimensions of the research to be satisfied.

Furthermore, to seek access to companies and collect data, institutional approval to embark on the research was granted from the Dublin Institute of Technology (DIT) Ethics Research Committee, which confirmed that there is no ethical issues regarding the project. During stage of primary data collection, informed consent will be obtained from respondents who will voluntarily agree to participate in the interviews (Easterby-Smith, Thorpe, and Jackson 2011). The anonymity of the participants and the confidentiality of data will be maintained at all times and all private information that respondents may provide will not be disseminated (Saunders, Lewis, and Thornhill 2009).

This chapter explained the research philosophy and approach, as well as the rationale for using the different strategies for the research. Research design phases are elaborated and data analysis for each is outlined and discussed. The next chapter presents a detailed design of the proposed conceptual patient experience framework for health care planners to use in a practical and reflective way.

CHAPTER 4: EXPLORATORY STUDY

4.1. Introduction

The exploratory phase of the research was designed to identify the underlying elements of patient experience before further steps towards the assessment framework took place. The literature review contributed in pitching the theoretical grounds reported in this regard. However, given the applied nature of the study it was crucial to incorporate the medical and nursing staff perceptions in the early phases of the framework design. This can help bridge the gap between the staff and patient perceptions regarding the care process by exploring individual staff perspectives, and views of what matters to patients.

The literature review resulted in the identification of gaps, issues, and the available attempts to address these issues in the context of patient experience. The preliminary knowledge obtained from the literature review highlighted deficiencies with regards to which aspects of experience should be collected that required more investigation. However, the views of the medical and nursing staff did not receive much attention from the literature while developing the dimensions of patient experience. Thus, this exploratory study was conducted during the second phase of this research with the aim of gathering primary data regarding staff perceptions. This study aims to deepen the understanding of how medical and nursing staff view the plausibility of such surveys. Existing research highlights the importance that hospital staff are assigned to patient experience in principle and the potential for positive improvements based on patient feedback. The specific objectives of the exploratory phase are:

1. Explore the different dimensions affecting the experience based on the views of patients and medical staff, from registration to hospitalisation into the department to discharge.
2. Compare between the extracted dimensions and the ones identified from the literature.
3. Discuss how the medical staff and hospital managers view patient experience and its multiple dimensions.

4.2. Study Design and Sampling

This qualitative element of the research was designed to capture the perceptions of front-line staff (medical and nursing) regarding what matters throughout the lived experience of patients who made up the sample. Semi-structured individual interviews were the preferred data collection method due to their effectiveness for in-depth discussion, while looking for specific details from each member of staff regarding his/her perception of important patient dimensions of care. It also allows the patient experience to be captured individually.

Only medical staff of emergency departments and acute units in hospitals were recruited to participate in this study. As for participants from the patients, no exclusion criteria were applied based on race or ethnic background. Therefore, all patients attending the emergency department or the acute medical units who were over 16 years old were approached by their consultant for their consent to take part in the study and only if the consultant considered them in good enough physical and mental health to take part. It was estimated that at least 2 patients would be recruited each day for the study period of two

months (up to 60 in total), and that this would collectively provide a representative and adequate sample of patients seeking emergency services from hospitals for the proposed analysis. The number has been determined through experience and from the literature of exploratory qualitative research and non-probabilistic sampling taking into account the overall study design, data collection method, and available resources.

Interviews with medical and nursing staff were conducted in 3 public hospitals in Ireland that provide emergency services to their catchment areas. First the main emergency department’s consultants and head nurses were approached for consent to interview their team. Then individual members of staff were approached for consent to participate; recruitment took place on the basis of their availability for interview. The study was approved by the ethics committee in DIT and all participants approached received detailed information about the aims and objectives of the research. Figure 4.1 shows the steps adopted to conduct the exploratory phase of this research.

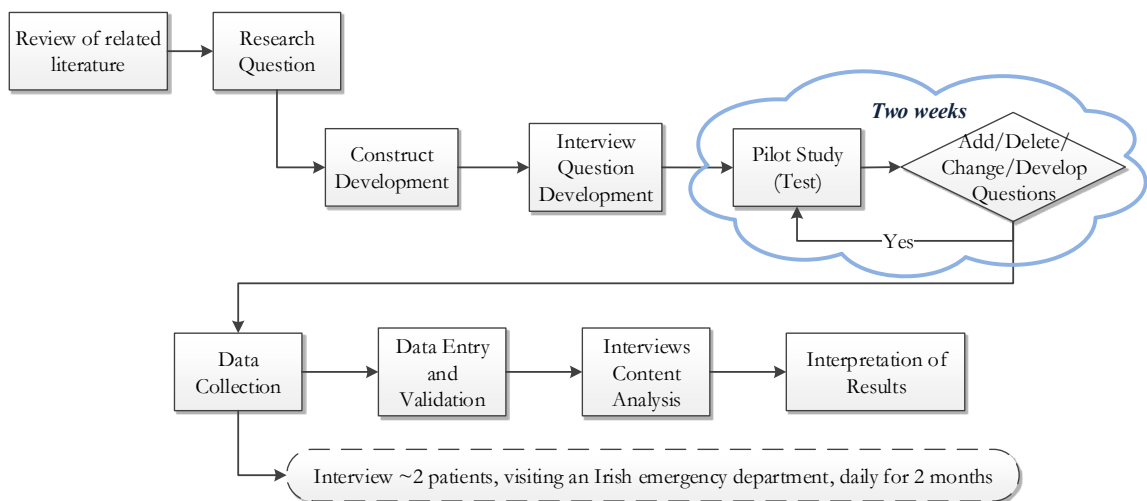


Figure 4.1: Detailed Steps of the Exploratory Phase

4.3. Data Collection

In total, 26 semi-structured, face-to-face, individual interviews were conducted with medical staff in emergency departments and acute medical units in three public hospitals. 51 face-to-face, individual interviews, were conducted with patients of those units over the period of two months. The semi-structured questions for both groups were developed specifically for the purpose of this study. Interviews with doctors and nurses focused on how they perceive the experience of patients and what dimensions affect it. A topic guide was developed in the light of existing literature and modified slightly where necessary to incorporate emerging themes and to align with contextual features of the emergency care. Staff interviews lasted between 15 to 30 minutes.

An interview guide was developed to interview participants in the patient's group and comprised a series of questions with prompts covering the following broad areas: Access to Care; Continuity of Care; Empathy and Respect; Family and Friends; Hospital Environment & Layout; Information and Communication; Pain Management; Patient Involvement; Staff Collaboration and Communication. Patients were asked to recount their experience in their own words, and the interview guide was intended to ensure the main areas were covered during the course of the dialogue. One to one interviews were conducted by the researcher either by the patient's bed in the ward or in a separate room to ensure privacy of the interview. Patient's interviews lasted between 15 to 40 minutes and were recorded. The resulting recordings from both groups were transcribed verbatim into Word documents.

4.4. Data Analysis

Free text data was transcribed from the audiotaped interviews, the transcripts were then uploaded to NVivo (V.11) software to facilitate a staged approach to the analysis. Interview transcripts were repeatedly read through (familiarisation), and a preliminary framework of themes was developed based on those extracted from the literature. Transcribed data was then analysed using content analysis where responses were coded and synthesised into identified conceptual themes as well as others as they emerged. The language of the dialogue from staff and patient interviews was maintained as far as possible to preserve the intended context. Analysis of the data from some of these themes (paragraph headings) forms the basis of the following results and discussion. Through interpretation of the responses to the questions it was hoped to be able to identify how staff perceive and understand the hospital experience of their patients and which dimensions help in shaping that experience.

4.5. Results

The sample of staff included a total of 10 doctors (4 consultants, 3 registrars, 1 SHOs and 2 interns) and 16 nurses (1 CNM3, 1 CNM2, 4 CNM1, 5 senior nurses, 3 staff nurses and 2 interns). This broad scope of interviewees is important to improve the quality of outcomes and enrich the data collection process. The patient sample included 25 men and 26 women from different backgrounds. The mean age of the patients were 58 years (range 19-91 years) with a mean age of 56 years for male (range 19 – 83 years) and 61 years for females (range 30 – 91 years) which was not significant at 95% confidence level (sig. 0.056).

Almost two-thirds of the patients were admitted to the hospital and the rest were either being discharged, waiting for more tests to be done, or results to be delivered. Patient experience with emergency care ranged from few hours to a couple of weeks with an average time of 3 days since admission to the emergency department.

The qualitative analysis of results presented outline the nine dimensions of care, previously identified from literature, and demonstrate that they were highly reflected throughout the patient and staff responses, with some clear and evident interrelationships between the themes. The following sub-sections illustrate the major findings of the study by demonstrating the similarities and differences between staff perspectives and lived experience of patients with key examples using quotes from both staff and patients.

4.5.1 Access to Care

All participants across staff members when questioned identified that access to care is an important factor in shaping the overall patient experience:

- *I would think delays within the system, kind of embitter people, a lot of people would say that they wouldn't come in if they had to wait for six to eight hours to get seen and I think in many ways that's reasonable. I think that is probably the biggest one.*
- *You see one of the things that annoy patients is waiting time. So sometimes you say for the patients early and the procedure will be done at 4:00 in the afternoon. So, they end up waiting six or eight hours fasting and they get really annoyed. This is what really needs to be addressed.*
- *Obviously, you know we're always trying to speed things up and get things done as quickly as possible and people have to wait for tests. People sometimes have to stay in*

when they're well but they need to have the test done soon. So, that's something maybe delayed in investigations which maybe is outside of our control.

However, participants from the staff suggested solutions to the access problems in order to enhance the flow of patients within their units. Three major solutions appeared from analysing the “access to care” theme:

1- Promoting the idea of protecting scan slots for different units for their patients.

- *We have good CT slots, we have really good access to the controlled clinic and active down testing, to inform our BP monitors we have access to cardiology, and ANPs come into the AMU to see patients directly, we are setting up links with the heart deficiency nurses, they are developing the epilepsy development pathways so that benefits us as well, we have good ties with the diabetic CNS, we have a wider base of contacts, so that somebody with MS they need certain things in place to go home. I've got links between MDT and the physio, and then I've got the MS nurses as well.*

2- Access to different pathways from emergency units such as the availability to access review clinics, where patients are discharged with the possibility of returning later for symptom checks or test results' reviews with the same consultancy team

- *I suppose more access to kind of pathway so that we could just discharge people and bring them back rather than admission them so like had a pathway or you know rapid access neurology clinics really, for maybe more access to OPD colonoscopy that's a long delay for people often.*
- *What is good is that we have the facility to maybe discharge people a little bit earlier which is what they would often want and bring them back and you know keep an eye on things here. We have the kind of access back to the unit which other people*

wouldn't have. They might be waiting months before they could see somebody in their clinic or they might not be able to get a place for them in their clinic there. So, that's a huge advantage for people.

- So, it's nice for patients because we're always really accessible and there's is kind of emphasis on getting people out nice and quickly like it's just the nature of the unit. And the review clinic is very good as well because we have loads of slots as well so we can get patient's back next week. Yeah, it's really good.

3- Availability of senior consultants and speciality teams in the unit

- Having come from the emergency department and previously medical wards and then coming here to having consultants here twice daily to see how quickly they can be turned over.
- I think there's just much more consultants present here and much more then decisions can be made more quickly basically.
- In the AMAU we have good patient experience, times are good but they could be so much better, on the ward our biggest delay is to diagnostic tests, or access to specialist teams or sometimes access to the next level of care so if we have someone that's waiting for rehab, convalescence or housing is becoming an issue.

For patients, one of the key causes of stress and frustration of going to a hospital is the thought of having to wait long hours before they get seen. Therefore, when asked to recount their hospital experience, many responses included how long they had to wait to get access to care, “Long wait, especially the first time until you get admitted. I can understand because there are other patients who come in with more priority but that's what I am saying that if they have more staff, they can get the flow going.”. It was clear however in

participants' responses that once they get in the system, the process gets quicker "*I think they need to improve the A&E coming in, waiting on trolleys, I think everyone is complaining about that. But once you get in, that's all right.*". Patient responses highlighted a general understanding of the necessities of waiting to get access to care. This does not seem to influence their attitude towards the staff, as they recognise that it's not their fault, "*You'd like to be seen quicker, but then again, it's not the doctors or the nurses fault, it's the government.*". However, most of the interviewed patients were happy regarding their waiting times unlike what they expected, "*It got better, it is so nice. I think how quick I have been seen, I didn't expect it*". That comment is repeated along every step of their care process from seeing a doctor to undergoing tests to discharge "*I was seen very quickly,*" "*It was fairly quick from the time the doctor has seen me, until they told me I am going to be discharged.*" "*I didn't have to wait a long time for an appointment and I didn't have to go on and see my GP, they were willing to see me today,*" "*I came in and they examined me straight away, got X-ray's and blood tests taken and an examination on my neck and I am having the MRI later on today.*"

4.5.2 Continuity of Care

In the literature, the dimension of continuity of care is often used to describe the care received within the hospital visit such as seeing the same consultants and doctors as well as dealing with the same nursing staff. It can also be used to describe the discharge plan for a patient once they get out of the hospital and how they would continue their treatment plan outside of the hospital. However, most of the responses from the staff group showed that they only focus on that aspect within their unit.

- *Some people have issues with the fact that in the unit, you might see a different doctor or you know a different consultant over the course of a week. And I suppose if people are on holidays you might see three different consultants over the course of a week. So, they're concerned about continuity of care. And I think the continuity is actually pretty good, but that's maybe how it's perceived by some people.*
- *Sometimes I wonder whether it would be better to have one consultant looking after the wards on a weekly basis you know. Then you kind of there will be that kind of element of continuity of care for people and which I still think the continuity is very very good.*
- *Yes, and especially in ED, say you might be seen by a different internal doctor and then you will be referred to medics and then when they come here they are seen by the doctor and a plan is put in place.*

While only a few of them projected the continuity of care to include the extended care outside the hospital.

- *We can often save a patient a night in hospital because we can bring them back to our clinics instead of admitting them for tests that we wouldn't necessarily be able to follow up. So, our review clinics morning facilitates that.*
- *We can't discharge someone because they have no fixed abode, and they have no housing to go to and they have medical needs, so they can't be put into temporary accommodation they need something for more comfy. That has a big impact here at the moment on our patients and on our length of stay.*

While for patients, this dimension of care was broader. They perceived it as the continuity of care they got within the hospital: *"The doctors, you'd go from one doctor to this doctor*

to that doctor, that hasn't gone to that doctor, this doctor is still waiting for that doctor to come back". As well as the mix-up of information that they receive from different doctors or nurses: "One of them said that I was going to be doing my camera next week, so I was actually a little disappointed because I was thinking I was going home, I was supposed to go home yesterday," "One nurse thought I was going home but the doctor told me I am going nowhere. It's not their fault, there are so many different doctors for this and that."

While others looked at this dimension of care from the information they received to how to manage their situation at home: *"I got from the asthma clinic a lot of really good information", "Also, I know because of my situation, I am living alone, so they're trying to fix me up so maybe this is taking longer. It's not the hospital's fault really but I am a difficult case", "They are organizing everything for me when I get home, they'll send a team there when I am discharged"*

4.5.3 Empathy and Respect

Staff responses showed that they are sympathetic towards their patients and that they are aware that a hospital visit can be a daunting experience for some. Thus, they aim to make their patients as comfortable as possible while they are being treated or admitted.

- *It's very frightening coming into hospital if your acutely unwell so the entire manner in which your dealt with is all going to come down to impact on your general experience.*
- *Just kind of making them feel comfortable because the hospital is going to be a very intimidating place for the patients.*

To make a hospital visit easier for patients, responses from staff showed that patients need to feel listened to when they talked about their worries and issues.

- *We take what the patient says seriously and the addressing of the issues that the patient have.*
- *Well I suppose obviously listening to what they say and making sure they feel heard that we're taking notice of their worries basically and investigating them appropriately or explaining to them as we're going along what we're doing, feeding back with any results we have.*
- *There is so many people coming and I just kind of be friendly with them maybe if they're concerned or worried if they mentioned something about their wife past away maybe to address that for a minute or two. It only takes a couple of seconds.*

Also, the attitudes of doctors and nurses when addressing patients has a huge influence on patients by making them feel respected and equal to their doctors and not just a number on their charts.

- *If your nurse is smiling at you and she seems approachable that's going to put you at ease but if your nurse looks like the thunder or angry face on her or really cross or short that has an immediate impact on the atmosphere in the ward you will see it immediately when you come on the ward.*
- *The consultants set the tone and our consultants here are extremely respectful, they're very nice, you know body language is always very open and they give the patients time and there is none of the surgeons' attitude and when they set that tone it benefits the team as well.*

- *I think welcoming people with non-verbal as well, the fact is people are not stupid they know if they are respected or not if they are liked or not, so it's all about putting people at their ease.*

Staff also seemed aware of the privacy concern that patients have. Where they find it difficult to discuss their cases with them in the open space of an emergency department and being in a mixed ward where there is no room for separation between patients.

- *Well I know an issue for some people is privacy, and some people find it very difficult to talk and there's no doubt everything would be heard everywhere.*
- *You know it's not ideal for every patient to be in a mixed ward. And it just bothers some people.*

However, they always attempt to find solutions and work-arounds to improve the entire experience of patients.

- *There was a man a few weeks ago, who was very upset that I mentioned something about his MS. in the ward. So, I brought him into the family room every time I spoke to him.*
- *We can't have it separated for males and females. But yes, sometimes that does affect them, so we'll just see if we can move the patient around or if that doesn't work, we'll explain it to them.*

All participants from the patients group reported that they felt they were treated with respect from all the staff members and that showed when nurses and doctors approached them: *"The nurses and the porters are absolutely 10/10, the assistance is amazing and the manners and they are respectful people too," "It's nice to see the nurse smiling and caring," "they have been really helpful, really chatty, they talked to me."* Patients

came, he closed the curtains. Just sometimes everybody can hear you talking, but what can you do about that? You know, there was a lady across from me and I could hear everything they had to say.”

4.5.4 Family and Friends

Hospital staff recognise the importance of having members of family with the patient during his/her hospital visit. They also expressed that they make an effort to free their time to talk to family members and answer their questions about their loved ones.

- *I suppose within reason because there isn't time to explain everything to every individual member family so there should be one representative maybe or people should come at the same time if people could come at the same time. From that point of view. So that's something I think we try to make an effort to do that to include families but I suppose you may not be aware with everyone that their family did want to speak to you and maybe not everyone would ask. Whereas, other people would be maybe much more confrontative Yeah I think that's very important. Definitely. Yeah.*
- *For the very young people and the old people, this is essential but for other people I think this is to a less extent because the mental status of the old people and the orientation of younger people they need some support.*

However, doctors and nurses stated that it might not always be the case that they would be welcoming a large number of family members, especially in busy units like emergency departments.

- *Sometimes it may not be comfortable to have four or five family members. We usually ask the patient if they want the family members to be around.*

- *And then maybe family members. If they ring to take 5 minutes just to talk to them or people coming in which is close to home time for us so it's kind of difficult to actually take time to talk to them because they'll come in at 5 o'clock when we're leaving. So sometimes they feel they can't see a doctor at all because we're kind of crossing over, we just miss them. Yeah talking to family members and communicating is important yeah.*

While patients were very clear about the importance of having their family members around and aware of their case. *“Yes, I have a very curious wife and she likes to know everything,” “The doctors would explain everything to them. It's important that my family is part of it,” “My son has been with me this morning and he spoke to the consultant with my present and consent of course.” “My mom has been with me every review appointment. She has been welcomed, they've spoken to her not just to me. They have included her in all of the conversation. You do need a second pair of ears, when you are trying to take everything.”* However, not all of them had an accompanying person with them. They were certain that if they needed it, it would not be a problem to the staff; *“It wasn't necessary but if it was necessary I think they would have the opportunity”, “There is been no need for it, but I am sure they would if it was needed.”* Few patients mentioned that staff were not always available to meet their family, which was unpleasant experience for those ones; *“Yes, but you never get a doctor when you can and I know they have to come and look through your papers and all, but the time they come and see them they can't always make. So sometimes that's not fair,” “I think there should be a PR there doing all the paperwork and they call the family in and tell them exactly what's going on, it mightn't take 5 minutes, at least they're aware.”*

4.5.5 Hospital Environment & Layout

This dimension of care is a multi-facet one that includes many interrelated features of the hospital that need to be addressed, like: the cleanliness, temperature, or crowdedness of the wards, the entertainment options, the food or the signage of the hospital. However, the hospital staff only identified the cleanliness of the wards to be the most important aspect regarding this dimension to affect the overall experience of patients.

- *I would absolutely say obviously if its dirty, unkempt. It wouldn't be pleasant for patients, I don't think it's ever been an issue in here I think that's it*
- *I know people have issues with the toilet, people have issues with the temperature of the place.*
- *Like, lack of toilets and facilities, lack of privacy, very busy staff. This place doesn't fit for purpose really in a lot of ways.*

Another aspect of the hospital environment that received attention from the staff was the temperature of the wards.

- *We have a complaint when this building is a brand-new building and we have a problem with the heating in the beginning and the patient felt cold in the room. And we kept having this complaint quite a lot until we fixed it because of the ventilation that we have. So, the hospital does everything actually in its capacity to address all patients.*

The patients on the other hand had a general complaint about the cleanliness of the place; “Well, there are a lot that could be improved. They can do with cleaning and everything else possibly, absolutely. I can show something on my phone and it'll prove a point to you and it's just a simple thing, and that was in the emergency,” “It's just this part of the hospital is a little bit more neglected. It's an older part, and I think it's not as clean. I mean

I don't see any dirt here, but the toilets when I went downstairs, it was completely stuffed with paper so I couldn't use that,” “The only thing I don't like is the smell of the bathroom, that's the only complaint.” They also complained about the temperature: *“I was up 5 times this morning, fixing that rad (heating radiator), you just have to switch it and turn it. If it happens and you were here at night time, it's like engineers outside,”* the overall appearance of the hospital *“Maybe the general appearance, I have seen the cleaners doing a good job,”* and some mentioned the food *“The cleanliness in general and treatment in general and food that's very important.”*

4.5.6 Information and Communication

Medical and nursing staff agreed that information and communication with the patients is one of the key factors affecting their overall experience

- *I think, good open communication and actually treating your patients with respect and seeing your patients as your equal, is very important.*

Four broad sub-themes emerged while analysing the information and communication code from staff perspectives. For example, the majority of staff agreed that patients need to be well informed about their condition and their treatment plan, and that they work on keeping their patients well educated about their problems and medications

- *We here give the patient information about his problem so he can read and can understand his problem and its solution.*
- *Here there is a good patient communication and we contact the patient from the rollover from the SHO then the registrar then the consultant and all of them explain in detail the patient's problem and the way of management. This affects the patient's*

decision because the patient will be well oriented about his problem and then he can decide and consent for any procedure that can be done for him on scientific basis.

Another emergent sub-theme was the ability of patients to ask questions and feel comfortable and not be or feel intimidated by medical staff.

- *Every time we'll ask the patient after explaining everything, if they have any concerns or any more questions or sometimes we ask them to repeat what we said to them and to see what is their understanding from what we explained and if there is any misunderstanding, we can correct it.*
- *And if we don't listen to them, obviously, they won't be very happy with a discharge. If you are unable to explain it to them. What's our plan so why are we doing different tests. They will be confused and will keep coming back. And they won't be very happy.*

The third reported sub-theme of the information and communication dimension is the follow-up on results. Where staff stated that it is important to keep patients in the loop about their results and what the next step would be.

- *I think we follow up on the investigations that are done kind of as they're done we're waiting for the results we do the next thing then.*
- *Maybe communicating back to them the results of those as well. I find as well at times patients having chest x-rays that is normal and we know it's normal but they don't.*

Waiting time communication was a repeated comment from the staff and that appeared to play an important role in setting the expectations of patients and manage their discontent and dissatisfaction.

- *I think if it's not communicated well, that they are going to be there for a few hours, they can get kind of annoyed. So, once you communicate with them really well, and*

keep telling them what they are waiting for, their bloods, their scans or anything, they'll be okay.

- *So maybe explain to the patients that we take some time if there going for other testing try and give them an idea of the times involved. They might have kids, might have work, they are worried about other things, they are finding out what's going on there and then at least there stress levels go down. At least they know they have children to pick up or they know to collect my daughter or not to pick up, or you know that kind of things and make sure that the patient gets their medication when needed.*

As for participants from the patient's group, they reported that communication received from the staff regarding their condition plays an important role to their overall hospital experience: *"The way everything was explained, if the doctor went away she tells me what she is doing. And then the nurse would explain things to me, so that's made it very good."*

This encompasses the entire process of care from initial admission to the department until discharge. The major theme was that patients wanted to feel heard; being informed of their next tests or their test results; being able to ask their doctor questions about their case: *"He turned around and explained to me in a way I could understand, and then say "if you don't understand anything I am telling you, I'll come back to you" and he kept saying "if you want to ask anything sent to us, I am on the unit."*

Continuous communication was likely to enhance satisfaction with the hospital experience and overall outcome even in cases where they had to wait longer than they anticipated *"I don't mind waiting if you know what you're waiting for..."* On few occasions, patients highlighted the lack of communication and information provided regarding their case or treatment and that it had an impact on their overall experience: *"I had a very bad chest*

infection and I had never been on a nebulizer in my life and I was on 5 of them. The only thing was, they were left there on the counter for you, they were left there in your locker. They haven't got the time to show you how to do it. There weren't enough nurses to stand there with you, to make sure was it working or was it not. They would go to that patient, that patient, but they'd come back to you and check. It's just not their fault cause the staff isn't here."

4.5.7 Pain Management

Staff realise the importance of having the patient's pain managed and clearing them from their complaint and how it has a positive effect on the experience.

- *The first is that patients come here to get treated. So, if they get the right treatment, they will be happy.*
- *From the admission, the first person that the patients see in the hospital is the admission officer to the nurses who admit the patient, the standard of the facility, the food quality, the medical service provided, pain management. All those factors affect the patient's satisfaction.*
- *Make sure that the patient gets their medication when needed. Sometimes they come without medication or they don't know what their medication is, so making sure that the things that will worry them are taken care of.*

Patients agreed that their pain is well managed in a hospital, and that nurses always ask them if they are in pain or not: *"Basically 100%. Very good. They want to get you out of here clear of your complaint," "They always ask," "I am on waiting lists for various procedures but when I'm unwell, I am treated straight away."* However, all patients need to be monitored so they will not overdose on pain killers: *"I was a little bit upset, but they*

were right. There is paracetamol in my handbag and they took it away. But it was my own, and I was afraid they wouldn't give me any, so I was very angry, but they were right. I am no longer upset. Now they ask about my pain all the time,” “*They are giving me my tablets and my medications whenever I am supposed to get them.*” In general, patients were satisfied with the level of treatment they were getting “*It's unbelievable, the treatment I got was really good,*” “*I feel much better now, 80-90% better.*”

4.5.8 Patient Involvement

Patient involvement comprises of two main things: making the patient aware of their case and their treatment plan at all times, and involving them in the decision making if there is any that needs to be made. The staff, however, try their best to keep their patient involved and educated about their case, tests and results as much as they can.

- *And I suppose involving them in things really that's the main thing. I suppose the main thing is that we obviously treat any medical problem and then but in doing that it's important that we make sure to involve the patients as well and make sure that they understand what's going on.*
- *We should get consent for the patient for everything. So, we cannot proceed without the patient's agreement for any procedure. So, the patient should have a good experience about his condition to make a good decision for himself because nothing can be done against the patient's willingness.*

But they mentioned that it depends on the patient whether they want to be really involved or not, and that it is something they can assess after their communication with the patient. So, if the patient does not want to know and trusts the doctors, then they will not involve him as much.

- *I mean obviously, you have to kind of take it from the new individual patient and there are some people maybe older people who say they don't want to know and that's about various things and that's you know that's fine. And I think basically involve the patient as much as you can and as much as they want to be involved because I think it's always kind of important to say to people that it's you know they have kind of, they should take responsibility for their own health.*
- *Well some people are like I don't want to know anything, more sinister things, but most people really want to know exactly what's going on and why this test is happening and why are they on this antibiotic, because people have access to internet and everyone googles everything and the side effects and medications. You just have to reassure them.*

Patients have praised the doctors and nurses for involving them in their care as much as possible; *“I have been involved. It's never been a problem here, they always try to involve me,” “The staff really, they kept me aware of what's going on,” “They let me be part of it.”* Most of the patients wanted to know what is going on and have a say about their treatment: *“They give me the option as I preferred to be involved in the decision process,” “I'm happy with my involvement. They have listened to me and they were helpful and trying helping me,” “I'd like to know what's happening, you know if you're sick you would want that.”* On the other hand, a few mentioned that they prefer to leave the decision making to the doctors as they're the professionals and they trust them; *“I have been involved in the decision as far as I make an assessment of my own case to them, and they will make their own decision on that. They are the professionals, I am an amateur,” “I am happy with just understanding the plan they have for me.”*

4.5.9 Staff Collaboration and Communication

Different aspects need to be addressed when assessing this dimension of care. There is the communication and collaboration between the different staff members. This was evident in the responses of the doctors and nurses as they indicated that kind of communication between staff to be an important factor to a positive experience for patients.

- *I think the whole team is very nice, a very competent team I think that competency of the staff that people are going to go away from and have a good experience.*
- *I think it's the staff that do it I think yeah. I haven't been here that long and they've been all very welcoming to us and we just came here. Because like all the nurses are here for years but I think it's the community. The communication between everyone is quite good here. You know like what nurses looking after which bed. If you want something done or if they want something done, I think it's quicker that way.*
- *And then obviously, the nursing staff are very efficient. They're always very on the ball. The system works by repairing the patient and the nurse does the initial tests. We take it from there. Well you know I think we have good communication between ourselves and the nurses.*
- *We do try to chat to each other about what we're doing so there's a consistency but that wouldn't be a problem.*
- *The fact that we communicate effectively with the nursing staff is so important because a lot of times that patients will tell nurses things that they won't say to the doctors. And sometimes it's the other way around, you know so we all communicate well with each other.*

- *We also have a kind of a good working relationship with the staff nurses can talk to the consultants can talk to communicates very well communications is easier, the space isn't quite as large, so it's easier to communicate because you can find people quickly or you can access things quickly then of course.*
- *Yeah there is sometimes there can be a bit of a teething period, when the doctors are paged and when they adapt to their environment of the area then they tend know what the story but generally once everyone adapts to their routing it's fine.*

Another feature of this dimension of care is the communication between the staff and the patients, which is interrelated with the dimension of “Information and Communication”. However, this dimension focuses on staff communication among themselves and with patients in keeping them informed. Aspects of care like informing patients about their waiting times and test results, answering their questions, listening to them and communicating their treatment plan to them are addressed within this dimension.

- *Introducing yourself is very important. And then if you come back them a couple of hours later to introduce yourself. There is so many people coming and I just kind of be friendly with them.*
- *That definitely contributes to a more thorough approach than anything else, I mean the doctors here are very good but the fact they're consistently being observed by a consultant which means it's very safe and very thorough. And nothing gets brushed under the carpet or anything like that.*
- *Well, I suppose obviously listening to what they say and making sure they feel heard that we're taking notice of their worries basically and investigating them appropriately*

or explaining to them as we're going along what we're doing, feeding back with any results we have.

- *And then the quality of care that you get from the staff. Their provisional rise and also the way they deal with the patients. All this will affect the patient's experience.*
- *And if they get the right treatment and if the staff deals with the patient in a nice way, they will also be more likely to be happy.*
- *So, most people just want to have things communicated to them. So, without an article communicator, tendency is the patient's feel because we work in a very busy system but if you don't even communicate without taking a long time with his patients. So basically, support communication can give someone a very negative experience.*
- *You will sense it when you walk on to the ward, so we are quite lucky here on the ward our nurses are very approachable and we have a lot of return patients. So, a lot of our patients would be very familiar with us as well.*

The general comment when patients were asked to describe their experience with the staff whether nurses or doctors, was that they could not fault them. Patients were very happy with the care and attention they received from their doctors and nurses. That they had the highest praise for them. Patients used words like “*fantastic*,” “*obliging*,” “*approachable*,” “*attentive*,” among others when describing their experience with different staff members. Figure 4.3 shows a word cloud of words patients used to recount their experience with doctors (a) and nurses (b).

- *Very good experience, no fault with them. They will listen and will explain. They do their job as good as it should be done.*
 - *They are brilliant, every one of them.*
-

- *The nurses are very attentive and very obliging.*
- *They talk and you can ask all the questions and they'll answer them.*
- *The nurses and the doctors are fantastic, they'll do anything for you or get you anything.*
- *Sometimes they use words that are professionally used that regular people like me won't understand,*
- *I always ask them the meaning. Sometime they don't like to be asked.*
- *And the triage nurse was asking me questions, but she didn't hear everything that I said. So she sent me back outside, you know the way where they check your blood pressure and everything, and she sent me back outside and then she took me back in again, and she said "How is your ear now?", I said "My ear AND my head" I said "The pressure is unbelievable", she said "You never said my head", I said " I actually did" I said it 3 times to her, whether she was trying to look at the computer or just something else or watch the blood test, she didn't hear me, but I did say it.*
- *I found the doctor brilliant, he spoke to the other doctor in doctor's language and he turned around and explained to you in a way I could understand, and they say "if you don't understand anything I am telling you, I'll come back to you" and he kept saying "if you want to ask anything sent to us, I am on the unit".*



Figure 4.3 (a): Patients’ descriptions of their doctors



Figure 4.3 (b): Patients’ descriptions of their nurses

It is believed that interaction of the staff is the main indicator affecting the experience of patients, this was clear when patients recounted negative experiences that happened to them with nurses or doctors a couple of years ago.

- *I had a bad experience over a year and half ago, and I said next time I'd be in the A&E, I'd have to be dead. That other time, I wasn't feeling well and I called the ambulance at 6:30 and they brought me down here, and I have waited until 8 o'clock when I saw a nurse and I didn't see a doctor until 1:50 in the morning, and he was like you're good to go home but I'll check your blood first and my potassium*

was kinda too low, so he had to put a drip to me for 8 hours to get my potassium back up, but I must have got a kind of reaction to it because I started to shake, my heart was pounding out, I called someone to help me and I took that thing out. But the nurse hasn't been a bit nice to me, she said "You're making an awful night, get there and be quite". I said "I am 77 years of age and my heart is racing", she looked at the heart monitor and said: "it doesn't look too bad". Next morning I was out of there and I swore I would never go back to A&E

- *Very good, very approachable, speaking at your own terms. A couple of years ago, they were very intimidating*

4.6. Discussion

This study qualitatively explored doctor and nurse perceptions regarding the dimensions of care affecting a patient experience. It also examined the lived experience of patients in emergency departments. Patients and staff members agreed on the identified themes extracted from the literature. However, they disagreed on the importance of those dimensions to patients.

For patients, the most important aspect of care is the relationship between the staff and how they communicate and collaborate together as well as their interaction with patients. It was very clear to patients that medical and nursing staff are doing their best to provide them with the best service they can. They are trying to make them feel at ease in their perceived frightening experience during a hospital visit. While staff members believed that providing patients with better and quicker access to care is the most important aspect, eliminating all unnecessary delays.

However, patients seemed to understand that delays in the health care systems are inevitable. They also showed an awareness of the current struggles and issues of the health care systems. Therefore, they tended to be more sympathetic with the staff that have to deal with these struggles on a daily basis. In this study, “medical and clinical outcome,” comments were not a common feature of the responses and were not identified as driving satisfaction/dissatisfaction responses of patients. Instead, general factors related to the access to care, information and communication, staff collaboration and communication, and empathy and respect of staff were mostly associated with the recounted experiences. Figure 4.4 shows the different dimensions of care from the perspective of the two groups.

4.7. Strengths and limitations

Using interviews as the primary data collection method of this study was useful to explore new ideas, eliminate or clarify any misunderstanding from both groups the staff and patients and seek further explanations from participants. Interviews are considered advantageous in this case as they offer a comprehensive in-depth insight collection. A further strength of this study is that patients feedback was collated during their hospital’s visit; thus, eliminating the possible bias influenced by a patient’s memory.

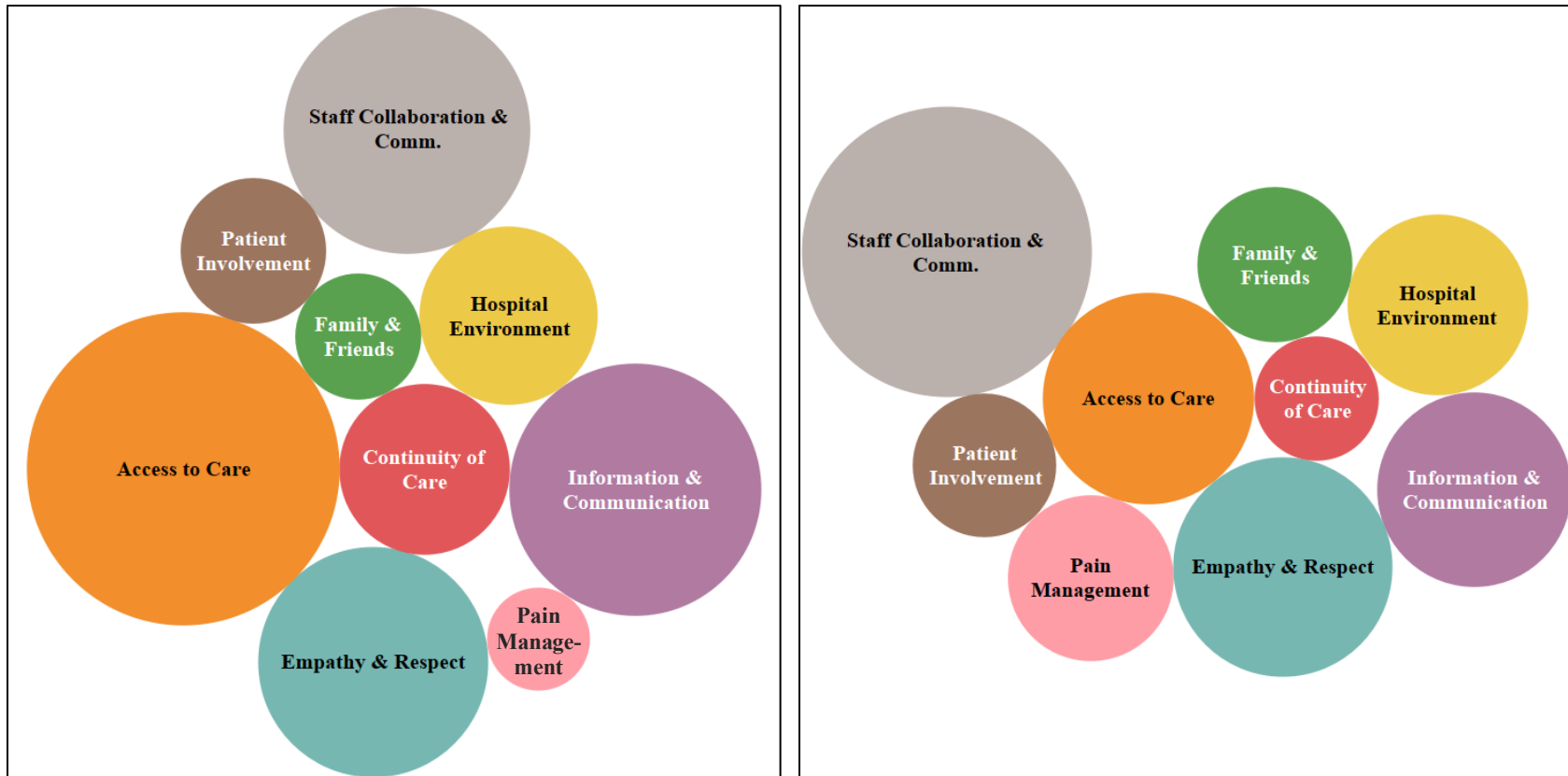


Figure 4.4: Staff's (left) and patient's (right) perceptions of dimensions of care

The study, however, has several limitations that should be presented when interpreting the results. The sample size of staff participants was relatively small and included only front-line staff. Also, the patient sample comprised largely of older patients. To assess the generalizability of the findings, future research should evaluate the perceptions of more hospital staff and managers from different departments. Future research should also evaluate the care experiences of demographic such as the younger and middle-aged, as it is likely both will have different needs and desires for support. In addition, racial or ethnic groups were not examined but warrant additional research. Whilst there are limitations to different elements of the research, the exploratory nature of the work suggests mitigating many of the risks outlined above for this qualitative element and that it is able to make useful observations and recommendations for future work.

4.8. Conclusion

In conclusion, the findings of the exploratory interviews provided valuable theoretically-grounded measures of dimensions of patient experience. These are used in the identification of the different dimension's importance, hence direct the efforts of quality improvement initiatives towards those important factors within the proposed framework presented in the following chapter.

CHAPTER 5: THEORETICAL FRAMEWORK

5.1. Introduction

Developing an integrated framework to assess and monitor patient experience which can be utilised in informing quality improvements, is lacking in existing literature. Building on the insights and gaps identified from the literature review, a framework was developed to address those gaps and achieve the main research objective. To design and develop such a framework, the following steps have been adapted from (Robinson 2008), and are outlined as follows:

- Understand clearly the problem situation;
- Determine the modelling and general project objectives;
- Identify the model outputs (responses);
- Identify the model inputs (experimental factors);
- Determine the model content (scope and level of detail), while identifying any assumptions and simplifications.

The following sections introduce the proposed integrated framework and describe its different components by discussing the aspects and requirements for development. The integration between the various components is aimed at addressing the literature gaps, as well as providing a practical guide on assessment, monitoring, and improvement of patient experience. Figure 5.1 gives an overview of the framework where a detailed description of each component is provided through the next sections. Furthermore, the coordination between these components is explained in detail along with the highlighted points of integration.

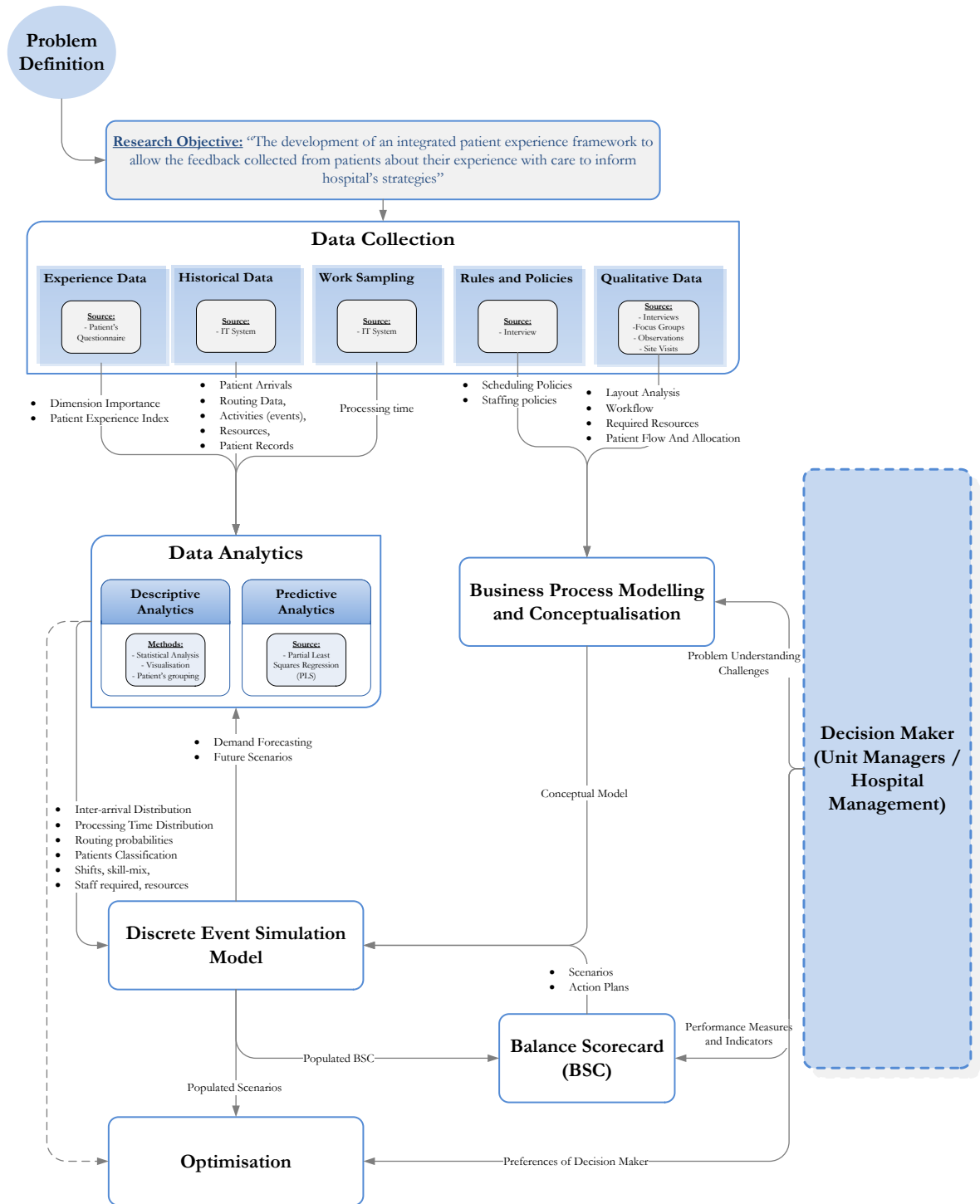


Figure 5.1: An overview of theoretical framework

5.2. Theoretical Framework Design

Initially, the framework is designed to be applied in four distinct stages, namely: Primary Data Collection, Data Analysis and Conceptualisation, System Modelling, and finally Evaluative and Strategic Decisions (Figure 5.2).



Figure 5.2: Stages of Theoretical Framework

The following sub-sections introduce the framework structure by describing its different components and the interactions between them.

5.3. Stage 1: Primary Data Collection

Primary research data is collected in this phase to satisfy any data that may be required for the other research phases to achieve the main objective. Primary data is any new data specifically collected for research that has not been collected or analysed previously. Primary data collection is time consuming as access is needed to the institution's resources and participants to acquire the required data. For the sake of this research, four different data collection methods are employed to address the nature of the different data sources:

- *Interviews:* They are usually conversations between two or more people with the aim to obtain specific information using questions directed from the interviewer to the interviewees. In this case, interviews will be held with upper and middle hospital management teams. This is to achieve an agreement on the research scope and to understand the challenges blocking the full potential of patient experience

feedback to inform quality improvements. Interviews will also be used to acquire significant input from hospital's management to support the development and validation of different phases of the framework.

- Observations: During site visits, detailed viewing and documentation of the studied system is required, identifying all necessary inputs and outputs, the different processes included, and the interactions between the system's entities. Site visits should be carried out several times per week on different weekdays to observe the variability of the service demand and performance at different time intervals.
- Historical Data: Factual data will be collected including anything related to patient data, e.g.: patient electronic records in order to extract all relevant steps and times for each patient. Also, quantifiable data like work sampling, staff rotas, and facility capacities.
- Experience Questionnaires: Data is collected from patients regarding their experience using experience questionnaires. The design and sampling required to collect experience data is explained in detail in the next sub-sections.

5.3.1 Hospital Data

The hospital data collection components consist of both qualitative and quantitative collection methods. To provide holistic insights about system issues and aspects, interviews along with focus groups undertaken with experts and practitioners, are to be conducted. Electronic patient records have to be extracted from hospital databases to gather relevant information regarding the underlying processes which can be used to build the conceptual data model for the hospital units. Site visits and direct observations of the processes will be carried out on different weekdays and at different hours to observe the

variability of care demand and the unit's performance at different time intervals. They will also be used to collect data regarding the work flow and the various steps that a patient can have while in the hospital.

5.3.2 Patient Experience Questionnaires

5.3.2.1 Administration and Sampling

The questionnaire developed for this research will be administered using face-to-face interviews based on a structured survey, so that any concerns can be clarified by the interviewer. This collection method provides the interviewer with an opportunity to talk with patients to gather their perceptions of questions and the overall survey. Participants will be asked for their consent and briefed on the subject of the questionnaire and guaranteed their confidentiality to encourage them to participate. The sample size will be selected using Slovin's Formula as follows, $n = \frac{N}{(1+Ne^2)}$, where:

n = Number of patients sampled

N = Total population

e = Error tolerance

The adopted questionnaire contains a list of 28 questions and is divided to 3 parts. First, socio-demographic data relating to each participant which is collected at the beginning of the interview (described in Table 5.1). The second part of the questionnaire includes questions relating to the assessments of patients to the care they receive in the hospital. Generating new constructs and dimensions usually requires a strong understanding of the existing literature (Burton and Mazerolle 2011).

Table 5.1: Socio-Demographic questions in patients survey

<i>Variable</i>	<i>Response Options</i>
<i>Socio-Demographic Characteristics</i>	
Gender	- Male - Female
Age Group	- 18 – 24 years - 25 – 34 years - 35 – 49 years - 50 – 64 years - 65 years or above
Educational Level	- Primary - Secondary - Third Level
Nationality	- Irish - EU citizen - Other: -----
<i>Hospital Stay Characteristics</i>	
Length of Stay	- Less than 1 day - 1 – 2 days - 2- 4 days - 4 – 8 days - 8 – 12 days - More than 12 days
Hospital visits in the last year	- None - 1 – 2 visits - 2 - 4 visits - 5 – 10 visits - More than 10 visits

Based on the literature review conducted in chapter 2, it was clear that most of the studies did not refer to previous literature as a strategy. The analysis of the literature showed that those studies used less valid and reliable measurements, than studies that are based on previous instruments. Therefore, to develop a validated questionnaire instrument, international patient experience surveys and questionnaires were reviewed. In addition to the review of nation-wide surveys, local hospital surveys were also examined to provide suitable templates for a minimum dataset for a patient experience questionnaire. Thus, after the extensive literature review and based on the exploratory study conducted in chapter 4,

two survey tools were chosen based on the extensive work done to guarantee the reliability and validity of their questions. Questions were mainly chosen from the UK NHS Picker Survey and the US H-CAHPS questionnaire. Since they are supported by significant investment and rigorous attention to methods and for the potential international comparison with other countries. The H-CAHPS questionnaire was reviewed and found limited as it did not include several core aspects of care, such as: treatment with respect and dignity, staff coordination and collaboration, patient involvement and hospital's environment. Which based on the previous exploratory study showed a high correlation to the overall care experience, echoing the results obtained from the literature (Cleary et al. 1991; Jenkinson et al. 2002). So, the questionnaire is mainly based on questions derived from the Picker Survey and appropriate questions from H-CAHPS survey are included complementing those dimensions within the Picker Survey. The adopted collection method is believed to be valid and reliable and can be used internationally. Basically, due to the development of the two selected instruments involved extensive consultation with experts, systematic literature reviews and in-depth interviews with patients from different countries. A logical sequencing of questions is ensured based on the patient's journey; non-leading language is used; and only one question is asked at a time per item. The final list of questions included the following dimensions of patient experience,

Table 5.2 illustrates the dimensions collected and their original sources.

- 1- ***Access to Care:*** All issues relating to waiting for a service, including waiting to be admitted to a ward/bed, waiting to undergo a test or a procedure, waiting for test results...etc. The issue is not the actual waiting but the patient's perception of how challenging it is.
 - 2- ***Continuity of Care:*** Information relating to discharge and how to manage the condition at home.
 - 3- ***Empathy & Respect:*** Perceptions of patients of whether they received the needed courtesy, respect, and consideration from the hospital's staff. It can also include patient's views of how their cultural and religious needs are respected and if their privacy is respected throughout their treatment process.
 - 4- ***Hospital Environment & Layout:*** Assessment of the cleanliness of the wards and the toilets, the quietness of the place, the quality of food, and if there is clear signage around the unit are included in this dimension.
 - 5- ***Family & Friends:*** Patients are asked to assess how their family and friends who wanted to visit them are treated from the hospital's staff and if family members had the chance to ask questions regarding the patient's condition
 - 6- ***Information & Communication:*** Survey questions for this dimension focus on patient's assessments of the adequacy of information provided to them about their condition, treatment, and test results and if they believe they were given enough opportunity to ask questions.
 - 7- ***Pain Management:*** Patient assessments of the way their pain is managed through their hospital visit.
-

8- *Patient Involvement*: This dimension focuses on the suitability of patient involvement with their care and decision-making process.

Table 5.2: Origins of survey's questions

Dimension of Experience	Original Source
1- Access to Care	Picker + own adaptation
<ul style="list-style-type: none"> • Did you have to be admitted to a bed? • Did you have to wait to undergo your tests? 	
2- Continuity of Care	H-CAHPS and Picker
<ul style="list-style-type: none"> • How often did you receive verbal/written information about how to manage your condition and recovery at home? 	
3- Empathy and Respect	Picker
<ul style="list-style-type: none"> • Overall, how often were you treated with respect and dignity while in the hospital? • How often were you given privacy while being examined or treated? 	
4- Hospital Environment & Layout	H-CAHPS
<ul style="list-style-type: none"> • Were the hospital wards and toilets kept clean? • Did the doctors and nurses wash or clean their hands before touching you? 	
5- Family and Friends	Picker
<ul style="list-style-type: none"> • How often did staff members have enough time to answer your family's questions and concerns? 	
6- Information and Communication	Picker
<ul style="list-style-type: none"> • How often did you receive enough information about your condition? • How often did you receive information about your test results? • How often did members of staff communicate with you the reasons of tests and procedures? 	
7- Pain Management	Picker
<ul style="list-style-type: none"> • Was your pain well controlled? • Did doctors/nurses explain the amount of pain to expect? 	
8- Patient Involvement	Picker
<ul style="list-style-type: none"> • Did you receive enough information about your condition and treatment? • Did staff involve you in decisions about your care and treatment? 	
9- Staff Collaboration and Communication	H-CAHPS and Picker
<ul style="list-style-type: none"> • Did the nurses treat you with courtesy and respect? 	H-CAHPS
<ul style="list-style-type: none"> • Did the nurses listen to you carefully? 	H-CAHPS
<ul style="list-style-type: none"> • Did the nurses explain things to you in a way you can understand? 	H-CAHPS
<ul style="list-style-type: none"> • Did the doctors treat you with courtesy and respect? 	H-CAHPS
<ul style="list-style-type: none"> • Did the doctors listen to you carefully? 	H-CAHPS
<ul style="list-style-type: none"> • Did the doctors explain things to you in a way you can understand? 	H-CAHPS
<ul style="list-style-type: none"> • Did the doctors/nurses say different things? 	Picker

9- *Staff Collaboration and Communication:* The questionnaire includes questions concerning the way the patients are treated from their medical and nursing staff, also if they feel they were listened to and treated respectfully or not. It also includes patient views on how staff communicate and collaborate.

All experience related statements use a five-point Likert scale ranging from (1) 'never' to (5) 'always,' with high scores indicating a greater level of satisfactory experience. A 'does not apply,' option is included for all relevant sections, to avoid forcing the respondents to select a side. Variables with dual response levels are coded as one for 'yes,' and zero for 'no.' Lastly, to measure the overall experience with the hospital, three questions are added to the end of the questionnaire asking the participant to rate their overall satisfaction with the hospital (on a scale from 1 to 5), their willingness to return and their willingness to recommend the hospital. The assumption made is that, having completed several experience questions in the questionnaire, patient answers to the overall experience questions will be influenced by thinking about all those features of care. Thus, each experience response will be correlated with these three overall ratings (overall satisfaction rating, willingness to return and to recommend) that will be used later to determine which experience dimensions have the strongest relationship to the overall experience.

5.3.2.2 *Validation of the questionnaire instrument*

Once the previous step of data collection is completed, the survey is evaluated for face and content validity. In order to maintain the validity of the questionnaire tool, attempts are made to retain all the applicable items within each domain. Survey validity refers to the degree that an instrument actually measures what it is designed to measure. Face and

content validity are qualitative measures of validity and secured using a panel of experts who judge the surveys appearance, relevance and representativeness of the items. Face and content validity are important first steps to establishing construct validity because they establish the accuracy and connection among the items and variables measured (Burton and Mazerolle 2011). A pre-test procedure was carried out to begin face and content validation of the questionnaire. First, a panel of experts who had a recent hospital experience as patients reviewed the items for clarity of the questions, and consistency in the terminology used in the questions and in health care settings. After several iterations, the questions are judged to be unambiguous and comprehensible. The terminology used in the questions is deemed to be the same as the terminology that is easily understandable by patients. The experts are asked to comment on the appearance and content of the questionnaire. The comments are reviewed and the instrument is revised based on their feedback. After evaluation and revision as a result of the above comments, the questionnaire is deemed ready.

5.4. Stage 2: Data Analytics

The component of data analytics included in the framework is called up for different reasons through the framework implementation. The focus of this stage is on analysis of the data extracted from the hospital visits and from patients themselves regarding their experience. An analysis is conducted and the results obtained from the modelling stage. After collecting hospital records, data mining, and analysis methods are employed. Hospital records usually lack accuracy and consistency, since patient data is recorded by different staff throughout the different care processes. Therefore, data mining methods are

needed to extract a trustworthy set of records, followed by a further analysis using descriptive statistics (means, standard deviation or percentages), and frequency tables whenever appropriate. Descriptive statistics are used to describe the patient population and their basic features, to provide simple summaries of the data and to detect any patterns or missing information.

For the administered experience questionnaire, correlation analysis is initially used to assess the dimensionality of survey items, where questions are analysed to ensure that a single question helps to explain only one dimension, not multiple dimensions. Survey's that have more than 20% of the data as missing or '*does not apply*,' will be discarded from the analysis. Cronbach's alpha is the best method for reliability testing because it requires only one administration and is the most general form of reliability tests Sitizia (1999). Cronbach's alpha coefficient is used to assess the internal consistency of the scales and normally produces a number between 0 and 1, where higher values of the coefficient indicate a higher degree of internal consistency with the set of questions (Crocker and Algina 1986) A value greater than 0.7 is considered satisfactory, therefore questions with a Cronbach's alpha coefficient of 0.7 or higher are retained and the rest are removed.

Next, factorial analysis is employed to discover patterns of the correlations among the measured dimensions from patient responses. In general, factorial analysis can serve different purposes. One main function is to help determine how many latent variables underlie a set of items. Therefore, factor analysis can help determine whether one broad factor or several more specific ones are needed to describe a variable. It can also be used to explain the variability among different constructs using relatively fewer newly created

variables. This kind of analysis is based on Principal Component Analysis (PCA). Two types of factor analysis exist in literature: exploratory and confirmatory. In this study we use confirmatory factor analysis to cluster the different questions into groups together which are correlated. The analysis also aims to reduce the dimensions into a smaller number of experience constructs to identify the most important and influential factors on the overall experience of patients.

5.5. Stage 3: Modelling and Conceptualisation

The next phase of research is the model development and system conceptualisation. Several methods of modelling are discussed in this section to identify the experience dimensions and the most important factors affecting the experience of patients. First a Partial Least Squares (PLS) model is used to describe the patient experience in terms of its constructs. Next the modelling of patient pathways in the hospital to dynamically analyse the different patient processes and evaluate generated values for decision variables is presented using a discrete event simulation (DES) model. Finally, results from the regression analysis and simulation model can be fed to an optimisation model to help hospitals focus their efforts when planning improvement strategies.

5.5.1 Partial Least Square (PLS) Model

PLS path modelling is one of the diverse set of models belonging to Structural Equation Modelling (SEM). SEM is recognised as a main compound of the methodology of the social and behaviour sciences (Bollen and Long 1993). It is a statistical technique tool that is testing the relationship among one or more independent variables with one or more

dependent variables (Hoyle 1995). SEM provides an appropriate framework that includes numerous traditional multivariate processes such as factor analysis, regression analysis, and correlation analysis (Livote 2009). It is a common data analysis technique that is commonly used in business research (Čagalj et al. 2015). Recently, SEM has become increasingly widespread in many sciences such as education, psychology and social science (Fan, Thompson, and Wang 1999).

PLS analysis is adopted to analyse the data using SmartPLS 2.0 software. PLS has the merit of predicting latent constructs as linear combinations of the observed measures and their subsequent constructs. Consequently, PLS aims to maximise the proportion of variance of the latent dimension that is explained by the predictor dimensions. This feature becomes extremely useful when there is a considerable amount of highly collinear factors. PLS also supports both reflective and formative types of relationships. While reflective measures are dependent on their associated constructs, formative measures form or cause changes on them (Bollen and Lennox 1991). Distinguishing the nature of measures in constructing the soft model of constructs and measures could help mitigating computational errors. PLS clarifies the relationships between these measures and the latent dimensions in a weighted manner. This could subsequently estimate values of the dimensions (Chin and Newsted 1999).

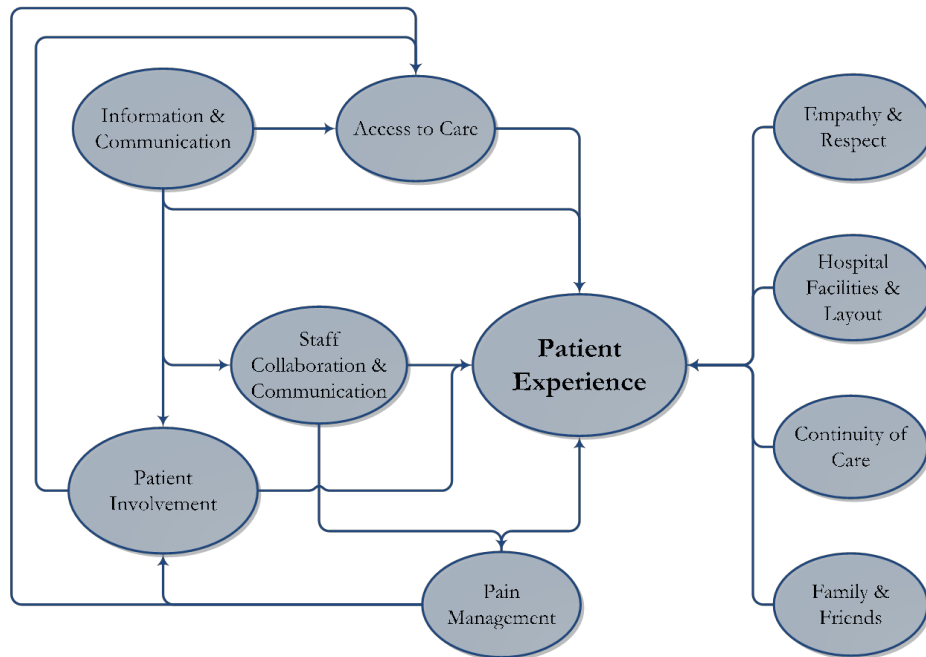


Figure 5.3: Conceptual PLS model to represent patient experience

The determinants of patient experience were evaluated by estimating multivariate models using PLS analysis. The model along with the independent or explanatory variables are shown in Figure 5.3. The statistical analysis explores the following main aspects:

- Patient characteristics are summarised using descriptive statistics (means, standard deviations or percentages).
- Regression models are used to test hypotheses relating to the association between patient experience, patient characteristics and experience dimensions.
- The independent variables are the patient experience ratings of each item within a dimension (e.g. access to care).
- The dependent variables include three patient experience outcome measures, namely: overall satisfaction with care (Y_1), willingness to return (Y_2) and willingness to recommend (Y_3). Those three measures are measures on a 5-point

scale, and they are used to determine the overall patient experience score by calculating their average.

5.5.2 System Conceptualisation And Simulation Model

One way to understand a phenomenon or a complex process is by directly observing it and studying its mechanisms. This delivers knowledge and understanding of how the system reacts to internal and external changes. In order to deepen this understanding, another way is to rebuild the system. Replication is done by building representative models of the original system (i.e., simulation). Once a representative model is established, controlling the parameters of the model allow knowledge to be retrieved regarding the system behaviour towards changes. Testing of hypotheses can then be conducted using the system model (Law and Kelton 1991). The process models along with the analysed empirical data are combined into a dynamic simulation model which puts the data collection phase and business process modelling in the context of developing a simulation model.

Once a conceptual model is built and validated, the model translation phase begins, which combines the validated conceptual model and the analysis of the patient's records from the first stage of the framework. The model can be developed by either using code programming or using a simulation software package, that can provide the modeller with tools that are typical and essential for creating the model. The procedure is often referred to as model translation, because it describes the transformation of the abstract conceptual model into a higher detailed complex executable simulation model. Verification during the modelling phase ensures that the model logic reflects the underlying business process. The difference between verification and validation within the context of simulation modelling

is that verification ensures that the transformation of the conceptual model has been applied correctly. Whereas, validation considers the representation of the model towards the system under investigation (Balci 1997). Verification and validation are an important part of simulation modelling as these provide the techniques with which the credibility of the model can be guaranteed. Verification of the simulation model is applied by comparing the outcome data of the simulation model with the data obtained during the data collection phase. Once the simulation model is verified and validated, the decision makers can use the replicated model to investigate a number of decisions and alternatives (i.e., what-if scenarios), to foresee the consequences of these decisions. For example, Design Of Experiments (DOE) (Kleijnen 2008) can be used to test a number of scenarios to obtain answers to ‘what-if’ statements. Depending on the set up of the model and the number of the parameters, the number of potential scenarios and experiments increases significantly due to the multiple possible parameter combinations. Following the experimental design, production runs are necessary to provide the data, which is used to analyse the simulation output, where performance measure(s) can be retrieved and compared with the system under investigation.

The final step is then to document, present, and implement the potential alternative. Documentation of the simulation result, as well of the project itself is necessary to follow and to understand the simulation results as well as for the decision-making process. Since decision making is based on the results, therefore the value of the presentation should not be underestimated. There are various ways to present simulation results: written reports, graphs and diagrams, and animation. Therefore, a combination of the three methods is more

appropriate. However, an animation will probably be superlative in order to visualise complex relationships within the simulation model.

Health care providers need tools to comprehend system complexity, due to uncertainty, complex dynamics, interactions of inputs, and activities and outputs, to enhance their understanding. Discrete-Event Simulation (DES) is a useful tool to assist managers in a health care context in their decisions (Jacobson, Hall, and Swisher 2006; Jun, Jacobson, and Swisher 1999) The simulation methodology provides a cost-effective means to help decision-makers to examine, test, and evaluate policies and programmes. They are also able to increase the understanding of the dynamic characteristics of a health care system.

Health care administrators can use DES to assess current settings and predict performance after operational changes. DES can be a useful tool to deal with hospital problems like operating rooms and emergency departments, where health care demand is variable, and resources are limited (Jun, Jacobson, and Swisher 1999; Eldabi, Irani, and Paul 2002). Several studies have discussed the suitability of DES to model health care processes details (Eldabi, Paul, and Young 2006), and such models have been used to examine outpatient clinics (Harper and Gamlin 2003); scheduling ambulances (Ramirez, Fowler, and Wu 2009); and improving capacity utilisation in intensive care units (Cahill and Render 1999). Harrison, Shafer, and Mackay (2005) reported a stochastic simulation model for bed occupancy, and other applications have included where resources are scarce, and patients arrive at uncertain times, such as emergency departments (Abo-hamad and Arisha 2013), and operating theatres (Ferrand, Magazine, and Rao 2010). The Dynamic capabilities of simulation can allow a more accurate interpretation of the utilisation of hospital resources

to be envisaged (Thorwarth, Rashwan, and Arisha 2015), supporting hospital managers in their decisions on bed usage and patient flow (Harper 2002).

5.5.3 Optimisation Model

Optimisation models can be used to serve different needs and requirements. They can be applied to the results of the regression model to outline the best combination of patient experience dimensions to target to increase the level of patient experience by a pre-set level. The results of the optimisation models should then help hospitals focus their efforts when planning improvement strategies. Applying optimisation to the results of the regression model will include the correlation between each patient experience dimension and three selected measures combined as one composite indicator to describe the overall experience: 1) overall satisfaction with the quality of care, 2) willingness to recommend and, 3) willingness to return.

It does not only identify the predictors to focus on, but also provides the percentage improvement required by the predictors to gain a desired increase in the score of the global satisfaction variable. The optimisation algorithm tends to avoid those that score relatively high, by considering the current performance of the predictors. Predictors from the optimisation algorithm are selected with a criterion that minimises the total combined percentage increase of the predictors. This criterion is important from a management perspective, as it allows managers and clinicians to focus initiatives linked to predictors that strongly influence global satisfaction and that may require less effort or resources to impact global satisfaction. The adopted optimisation model is classified as a constrained nonlinear optimisation problem. Decision variables, X_i , are defined based on the number

of questions (n) from the interviews that can be standardised. The obtained average values for those questions are expressed by Y_i . The optimisation goal is to identify a set of values for (X_1, \dots, X_n) that minimises the total relative improvement required for the independent variables to achieve a pre-set level for the dependent variable. The formulation is as follows:

$$\min \sum_{i=1}^n w_i \left| \frac{X_i - Y_i}{Y_i} \right|$$

Subject to:

$$X_i \geq 1$$

$$X_i \leq Y_i$$

$$X_i \geq m Y_i$$

$$\text{predicted value } (X_1, \dots, X_n) \leq p \cdot \text{predicted value } (Y_1, \dots, Y_n)$$

The first constraint states that none of the predictors can improve to a value of greater than 1 (i.e., more than excellent or yes). The second constraint forces the model to find better values for the predictors than their current performance. Constraint 3 states that none of the predictors can improve more than $1-m\%$ beyond their current performance. For example, if the current performance “the respect received from physicians” is 1.5, and the agreed level of possible improvement is $m=85\%$, then this predictor can only be improved to 1.275 (0.85×1.5). Finally, the last constraint pre-sets the increase for the dependent variable at $p\%$ or more.

5.6. Stage 4: Evaluative and Strategic Decisions

The last phase of the conceptual framework is to compile the collected and analysed data from the previous phases into a balanced scorecard, to influence the decisions regarding

the quality improvement strategies. The Balanced ScoreCard (BSC) is one of the main performance measurement frameworks used by organisations. It was originally introduced by Kaplan and Norton (1992). It is a systematic methodology that uses strategy-linked leading and lagging performance measures and actions for planning and implementing an organisational strategy. Four performance perspectives are recommended by the balanced scorecard; financial, customer, internal and innovation/learning. As a conceptual tool, the BSC can also help staff and stakeholders better understand an organisation's key strategies and activities that are related to it. It is considered an excellent way for communicating and gaining insights into strategic initiatives. It also allows key objectives and actions among decision makers and other staff to be presented. Finally, it can also provide the management with a tool that would align the organisation around its mission and strategies. Although applied in the context of health care management, the full potential of the BSC is not yet recognised due to its limitations and implementation challenges. However, a BSC with a mixture of measures about processes, clinical outcomes and patient experience may be useful and worthwhile as a strategic tool. In this research, the BSC will provide a tool to incorporate the data collected from the patients about their experience to be added as a customer perspective, along with measures and initiatives to improve the overall experience.

5.6.1 Internal Business Processes Perspective

The main objective in the internal business processes perspective is to improve the system performance which is affected by layout efficiency, patient throughput, unit's productivity, and resources utilisation. The layout efficiency measures the average distance travelled for doctors and nurses per day, while the unit's productivity can be measured in terms of

several indicators, e.g.: the ratio of patient per doctor, the ratio of patient per nurse, the percentage of patients treated, the percentage of patients admitted to the hospital, or the percentage of patients who left the unit without treatment. The patient throughput is measured through three dimensions: patient average cycle time, patient average waiting time, and patient average service time. The patient cycle time is measured across the different stages of a patient's journey in the hospital such as registration, triage, treatment, and diagnostics. This includes length of stay for both admitted and discharged patients. Similarly, the average waiting time of patients is detailed for each stage. Detailing these indicators is crucial for the detection of performance bottle necks and for taking effective decisions. Moreover, these indicators/measures of operations may be in fact drivers of other goals such as patient and staff satisfaction.

5.6.2 Community Engagement Perspective

The HSE performance targets and the national Emergency Medicine Programme (EMP) are considered in this perspective. The performance target of the HSE is that all patients are processed in 6 hours or less from time of arrival to time of separation (including admission for designated cases). The overarching aim of the EMP is to improve the safety and quality of patient care in hospitals and to reduce waiting times for patients.

5.6.3 Learning and Growth Perspective

Due to the critical role of health care professionals, two main performance measures are selected in this perspective: staff development and staff satisfaction levels. The staff development is measured in terms of the effect of training on one task and it should be dynamically allocated within the unit, while the staff satisfaction levels are related to —the

internal business processes perspective through the following indicators: staff utilisation, ratio of patients per doctor, and ratio of patients per nurse.

5.6.4 Customer Perspectives

The customer/patient perspective in the hospital BSC dashboard will be divided into two layers. The first layer will show a composite strategic index that summarises the data regarding the experience of patients. That strategic index is composed of four different measures: 1- overall satisfaction with the quality of care, 2- willingness to recommend, 3- willingness to return, and 4- number of patients who left in the middle of their service. The second layer of the patient perspective in the dashboard will compose of the trends of overall patient satisfaction with each experience dimension measured and collected to help the management visualise the areas that need more focus.

5.7. Conclusion

The design and development of the patient experience framework and its supporting components is complemented by an extensive validation phase. The critical validation goal is to examine the quality of the theoretical propositions of earlier stages of this research and to evaluate the patient experience framework from a practitioner perspective. The last research objective is thus achieved during this phase by investigating the validity, generalisability and applicability of the framework as a strategic tool.

CHAPTER 6: RESULTS AND ANALYSIS

6.1. Introduction

The design and development of the patient experience framework with its supporting components is implemented through an applied case study design. The goal of this phase is to examine the applicability of the framework on a real-life example and to assess its validity by examining the theoretical propositions of earlier stages of this research. The application of the framework also serves as an evaluation tool from a practitioner perspective. The last research objective is thus achieved during this phase by investigating the validity, generalisability, and applicability of the framework as a quality improvement solution based on patient experience feedback. The study is undertaken in the ED of a public teaching hospital in Ireland.

The selected hospital has a 24-hour ED which services nearly 50,000 patients annually. Seven distinct areas can be identified within the department: a waiting room for walk-in patients waiting for triage, a diagnostics area (e.g. X-Ray), an ED resuscitation area, an ED major assessment area, an ED minor assessment area, an Acute Medical Assessment Unit (AMAU) and a Short Stay Unit (SSU). The last two units: AMAU and SSU, have been introduced recently to offer possible alternative routes for the patients, by following the recommendations of the National Acute Medicine Programme (AMP) that is being applied in Irish hospitals. Although those two units are independent to the ED and are managed by the acute medical consultancy team, patients are not allowed to access them directly and have to be referred from the ED's triage. Therefore, the AMAU and SSU are considered a part of the ED.

The department has officially, 23 monitored trolley spaces; 4 of these trolley spaces (resuscitation area) are reserved for major trauma and critical care patients. The remaining spaces are divided between the major (13 trolley spaces) and the minor (6 trolley spaces). One triage room is also provided by the ED. The capacities of the AMAU and SSU are 11 and 24 beds/trolley spaces respectively. While the SSU has 24 beds, only 12 of them are under the management of acute medical consultancy team and the remaining 12 beds are under the management of the medical consultants in the rest of the hospital. Unlike the remaining areas of the ED, the AMAU works as a 12-hour unit; it opens from 9:00 – 21:00, but only accepts patients until 18:00 to allow beds to be freed for the next day. The SSU works on a 24/7 basis and is considered a short stay admission hospital ward. This ward is designed to accept acute medical patients who need to be admitted to the hospital, and whose length of stay is estimated to be 5 days or less. The only access to the AMAU is through the ED, after patients have been triaged and assigned a triage category. The triage nurse then contacts the AMAU consultant or registrar so that they can accept or reject the case. Patients routed to the AMAU are only medical patients triaged as urgent or very urgent cases, and would not need any resuscitation or isolation facilities. Patients can only be moved to the AMAU if a trolley is available for them. Figure 6.1 shows possible generic pathways of patients within the hospital and the layout of the ED, AMAU and SSU is shown in Figure 6.2.

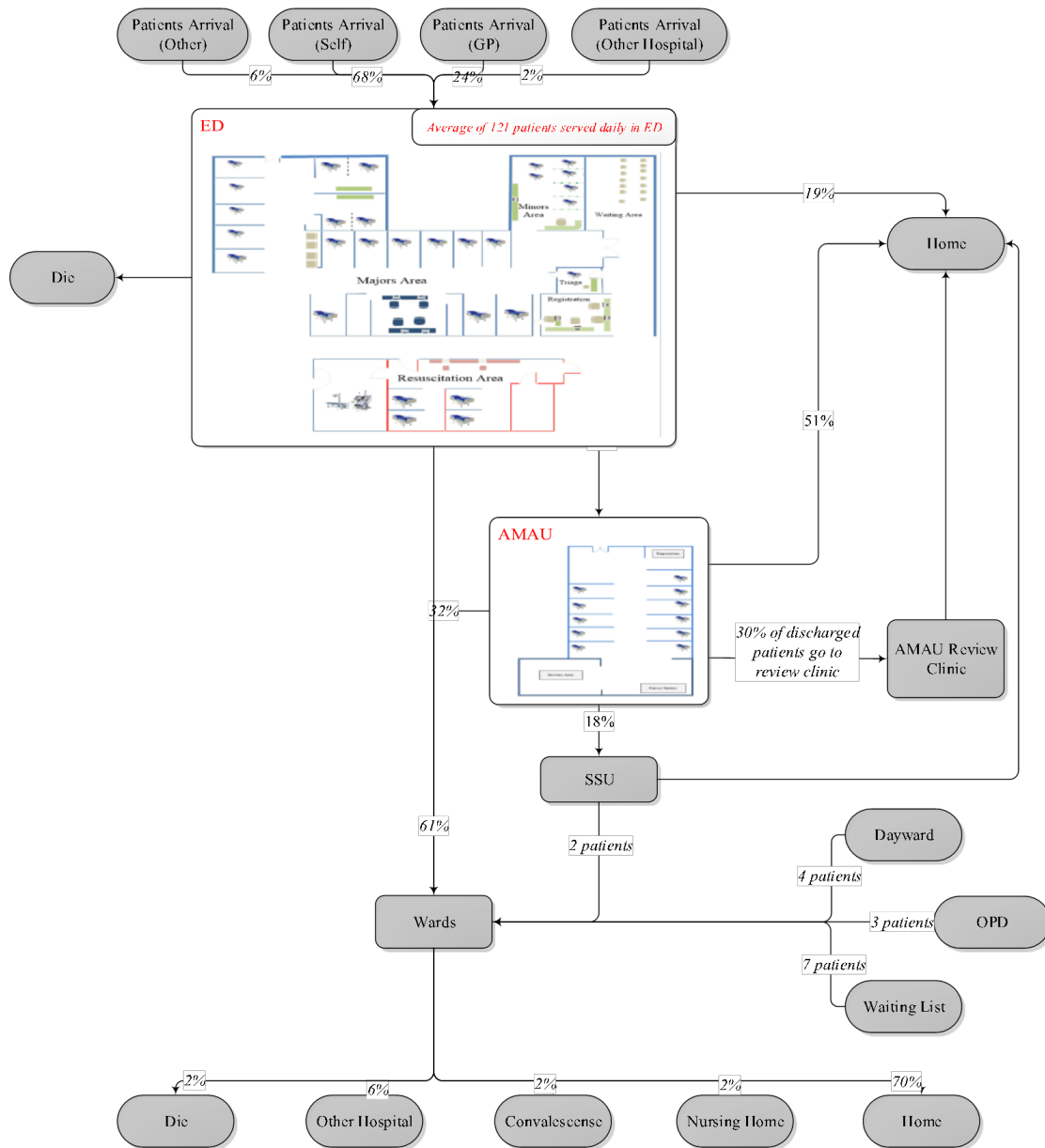


Figure 6.1: A generic patient pathways through the hospital

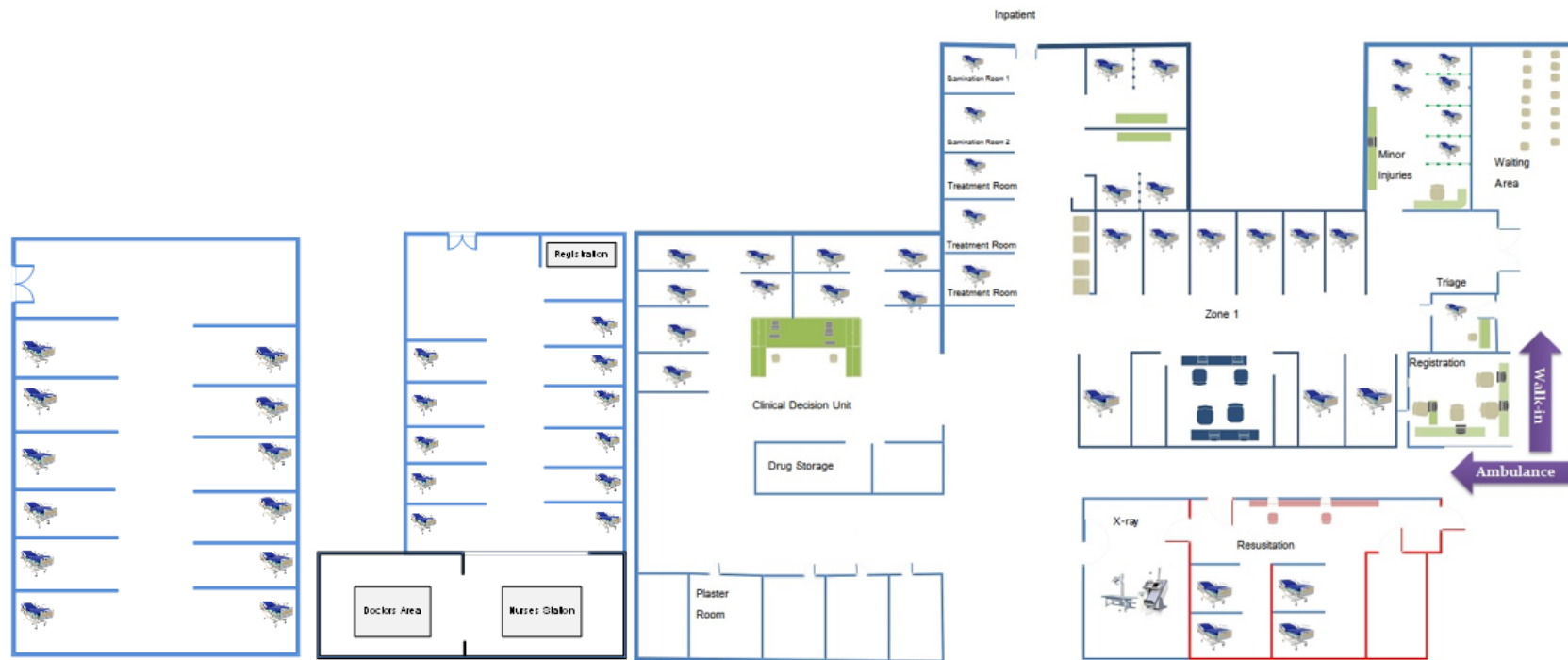


Figure 6.2: ED, AMAU and SSU Layout and main areas

The two units along with other areas of the ED share resources among them (e.g. porters, wheelchair, etc) and share some resources with the hospital (e.g.: MRI and CT...). As a 24-hour department, the ED has ten nurses during the day and nine nurses at night. Physicians (Non-consultant hospital doctor NCHD), are divided into three types: registrar/specialist registrar, Senior House Officer (SHO), and intern. They are distributed as follows when the roster allows: 7 registrars per day with a 10-hour shift starting at 8am, 12pm, and 10pm. Two interns with one shift per day from 8am to 5pm Monday to Friday; and overlapping shifts of SHOs during the day to make it possible to have more than one SHO at a specific time (i.e. from 2 to 6 SHOs during the day). While the AMAU runs with 1 consultant, 2 registrars, 1 SHO, an intern and 4 nurses due to the nature of its opening hours and limited capacity. Table 6.1 summarises the available resources for the ED, AMAU and SSU.

The introduction of the two new units (AMAU and SSU) in this hospital was to address the challenges and complexities faced by the ED. The figures of the ED from historical records show clear evidence of overcrowding with an average of 11% of patients leaving the ED before being seen. Moreover, the average time from registration to discharge is 8.21 hours which is 2.21 hours over the 6-hour national target set by Health Service Executive (HSE) in Ireland. Also, the average time from registration to acute admission is 15.14 hours, which is 9.14 hours above the national metric. That difference in time between an admitted and a discharged patient is partly due to the delays which can occur to allocate a bed, and transfer the patient from the ED to the allocated bed. Therefore, the opening of the AMAU and SSU was intended to facilitate the immediate medical assessment,

diagnosis and treatment of medical patients who suffer from a wide range of medical conditions, who present to the ED requiring urgent or emergency care.

Table 6.1: Resources of ED, AMAU, and SSU

Resources / Shift	ED Capacity	AMAU Capacity	SSU Capacity
Consultant	1	1	1
Registrar	7	2	0
SHO	8	1	1
Interns	2	1	2
Nurses	10 (day) & 9 (night)	4 (including 1 CNM)	4 (including 1 CNM)
Porters	2 to 8	Use ED's	Use ED's
Cleaners	1	1 (shared with SSU)	1 (shared with AMAU)
Trolley	7 in total 3 in front of nurses' station 1 outside reception 1 outside triage 2 in minors' area	11	12
Wheelchair	Use the hospital's chair	1	0
Cubicle	9 in main ED 1 in Triage 4 in Resus 4 in Ambulatory Care 2 single rooms (for isolation) 1 Psycho. Room 2 Family Rooms	11	12
Clerical Staff	2	1	1
MRI	Use Hospital's	Use Hospital's	Use Hospital's
CT	Use Hospital's	Use Hospital's	Use Hospital's
ECG	5	1	1
Radiography (X-ray)	Shared with AMAU and SSU	Use ED's	Use ED's

6.2. Framework Implementation

The project was conducted in one of the busiest units in the hospital. Patients accessing the unit belong to several clinical groups (medical, surgical and other). The initiation phase lasted for 4 weeks, where four preliminary interviews with senior hospital management were carried out, in order to get insights regarding the current challenges hindering the achievement of a better patient experience. During the initiation phase, several meetings were held with the consultant's team to set the scope of the project, outline its objectives and explain the different components of the framework. Subsequently, a briefing session was organised by one of the consultants for all members of the department to introduce the project and highlight its expected outcomes. The implementation was mainly undertaken with consultants and head nurses in the units under the supervision of the hospital's chief operations officer.

6.3. Data Collection and Analysis

The data collected for this project utilised both quantitative and qualitative data types. The quantitative data was collected from the historical data of ED logs, electronic patient records (EPRs) from the IT system, and direct observation. The direct and indirect time per activity and staff rota are not stored on the IT system. They are collected from interviews and observations. The qualitative data such as pathways, routing, and conceptual modelling have been gathered through observation, interviews, and focus groups. The sources of each data element are summarised in Table 6.2. All data and information collected are completely confidential and cannot be linked back to individual patients.

Table 6.2: The sources of data elements

Data Elements	Source
Patient Arrival times, patient acuity, diagnosis, and demographic data.	Historical Data from ED and AMAU electronic logs.
Starting direct of activities: Registration, Triage, seeing doctor, treatment, and etc.	Historical Data from hospital database.
Duration of direct activities per patient.	Observations, shadowing, and interviews and group discussion.
Duration of indirect activities (e.g. admin work and report writing, prepare drug prescription, find a bed in ward).	Observations, shadowing, and interviews and group discussion.
Patient flow: pathways, routing probabilities, conceptual modelling.	Historical Data from hospital database, interviews, and observations.
Human resource and non-human resource capacities: nurses, consultants, doctor and etc.	Interviews and group discussion.
Number of AMAU and ED boarders and review patients.	ED and AMAU electronic logs.

6.3.1 Hospital Data Collection and Analysis

The analysis of empirical data is essential in developing a robust decision-making model that considers all features of the intended system in terms of demand volume and patterns. A thorough analysis of data enables the discovery of different pattern types which are essential to reducing the complexity of the system in terms of patient groupings, patient allocation and routing analysis. Historical patient records have been gathered for the ED

during a 6-month period provided by hospital administration. A total of 20,493 anonymous patient records from the ED, and 1,520 anonymous patient records from the AMAU and SSU have been collected through the hospital's information system, which is used by the staff (e.g., administrators, doctors, and nurses) to record data about each patient through the stages of their care. The quality of patient records is subject to the level of pressures within health care processes, which can significantly affect the accuracy and consistency levels of these records. Therefore, prior to extracting knowledge from these records, data mining procedures are needed to validate the records.

6.3.1.1 Patient Arrival Pattern

Regarding the patient arrival patterns, different analysis scales have been used to analyse the daily arrival patterns of the patients to the ED. The demand is fluctuating during the day, and there is a significant difference between the arrival rates throughout the day. Peak times of arrival rates were between 11 a.m. and 2 p.m. and then decays slowly afterwards to its lowest levels during the night time (Figure 6.3). These arrival patterns give an overview regarding the demand for services in the ED and different scales for the patient arrival characteristics.

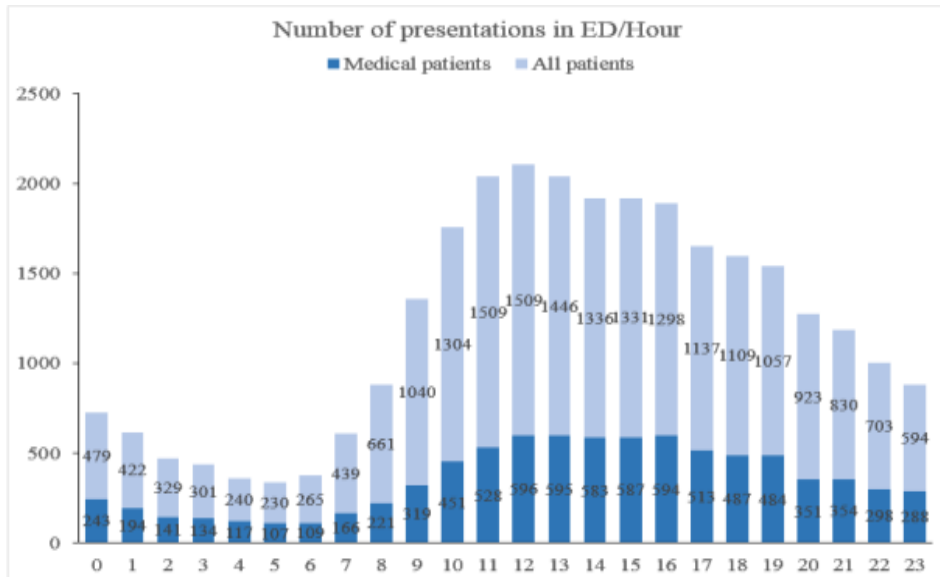


Figure 6.3: Daily Arrival of Patients to the ED

6.3.1.2 Patient Groupings

The mode of arrival for each group is then extracted from the dataset (Figure 6.4). This is essential in determining the distribution of walk-in patients and those who arrive by ambulance. This will be used to determine the percentage of patients that will go through the registration and triage process. Since, patients arriving by ambulance – usually in a critical condition – are routed directly to the resuscitation area, while patients whose conditions require to be monitored stay in the major assessment area or the AMAU, depending on the clinical condition and time of presentation of the patient.

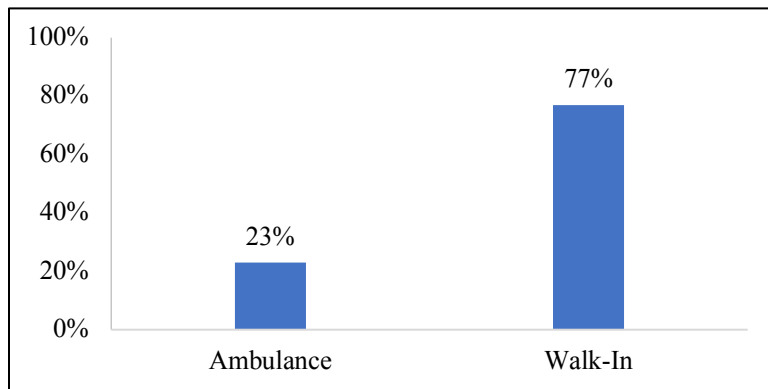


Figure 6.4: Mode of arrival of patients presented to the ED

Depending on their complaints, patients can be assigned to one of five triage categories as per Manchester Triage Categories (MTS) used in the ED. The MTS uses a five-level scale for classifying patients according to their care requirements. As shown in Figure 6.5, urgent patients (triage category 3) represent the largest group of new attendees to the ED annually (51% on average) who are presented to the hospital with a wide range of medical complaints and aging conditions.

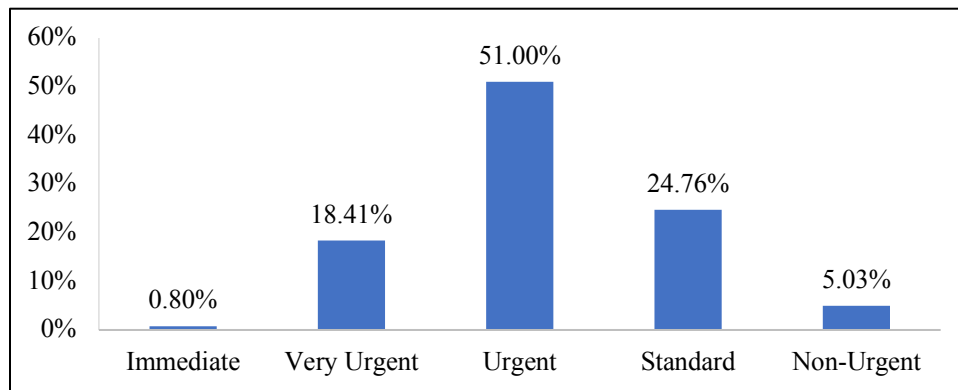


Figure 6.5: Distribution of patients based on their triage category

Upon triage, patients presented to the ED are categorised to different clinical groups based on their complaints. Several clinical groups have been identified from the data for patients presenting to the ED as shown in Figure 6.6. It was evident that most patients belong to the medical clinical group, accounting for 41% of the total number of patients. Therefore, the clinical groups have been classified to either medical or non-medical; the latter would have different sub-categories such as: assault, ENT, trauma, and dental.

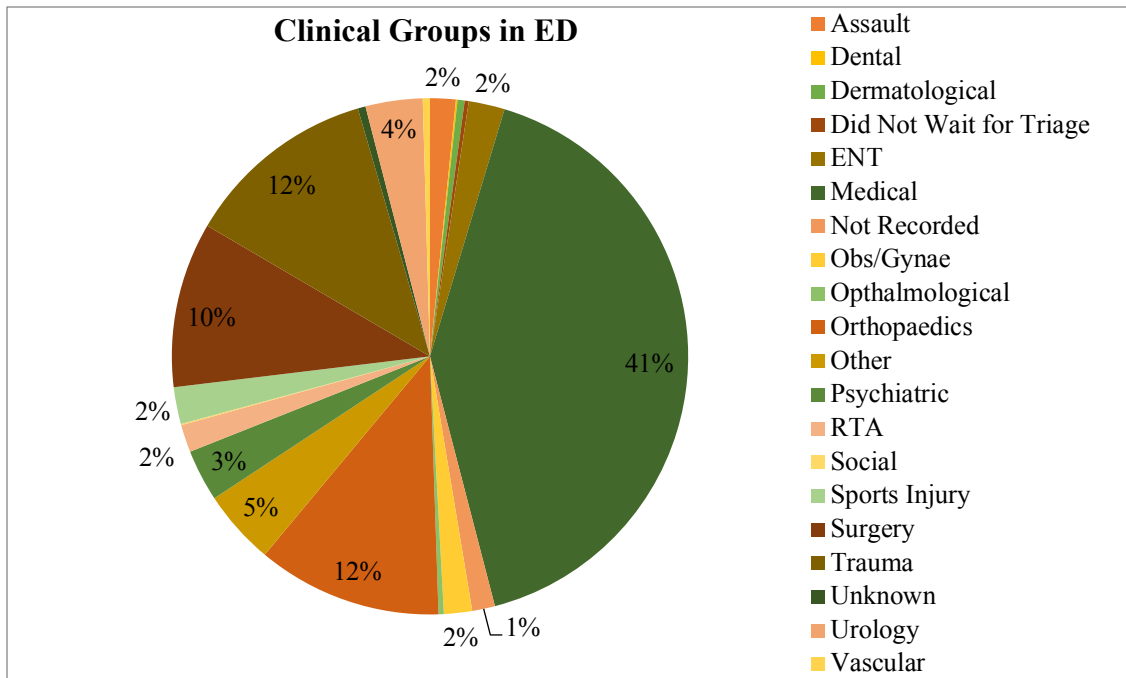


Figure 6.6: Distribution of patients in ED based on their clinical group

6.3.1.3 Patient Allocation, Routing and Time Analysis

Throughout their journey within the ED, patients go through different stages of care depending on the acuity and severity level of their cases. These steps were broken down for patients, from arrival until discharge or admission to the hospital. Figure 6.7 shows the average Length of Stay (LOS) for a sample of these stages of care in both units (ED and AMAU). Comparing the LOS of medical patients in the ED with their equivalent in the AMAU, patients in the ED spend a significant amount of their time waiting to be moved into the department or waiting to be discharged or admitted. Also, it is evident that a considerable number of patients who should be routed to the AMAU get misallocated in the ED, leading to an increase in their LOS.

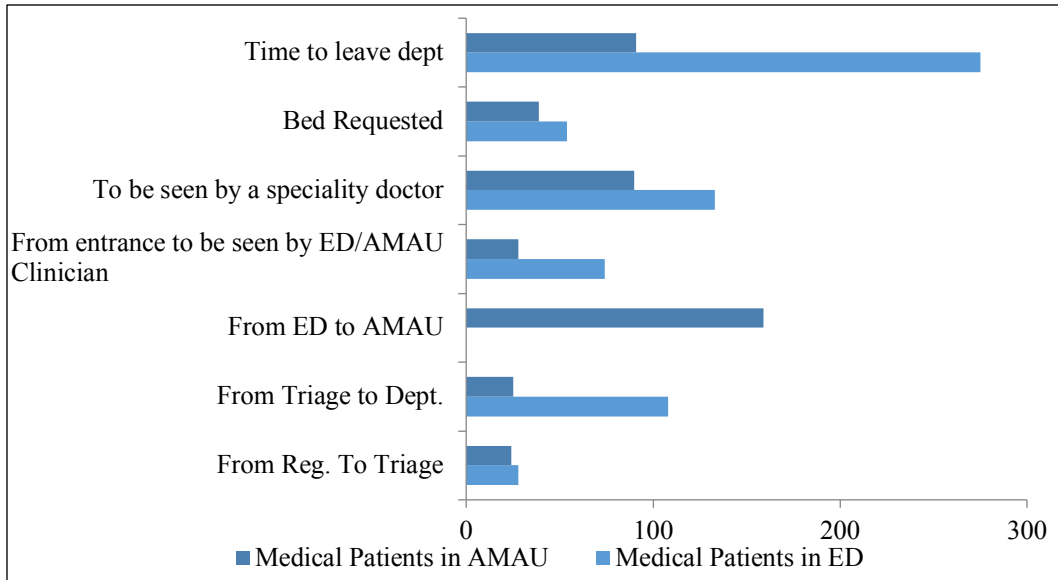


Figure 6.7: Average LOS of patients in ED & AMAU for different care stages.

The time analysis showed that patients spend around 6-7 hours in the ED compared to 2-3 hours for patients in the AMAU. Figure 6.8, and Figure 6.9 show the distribution of patients for different LOS in ED and AMAU respectively.

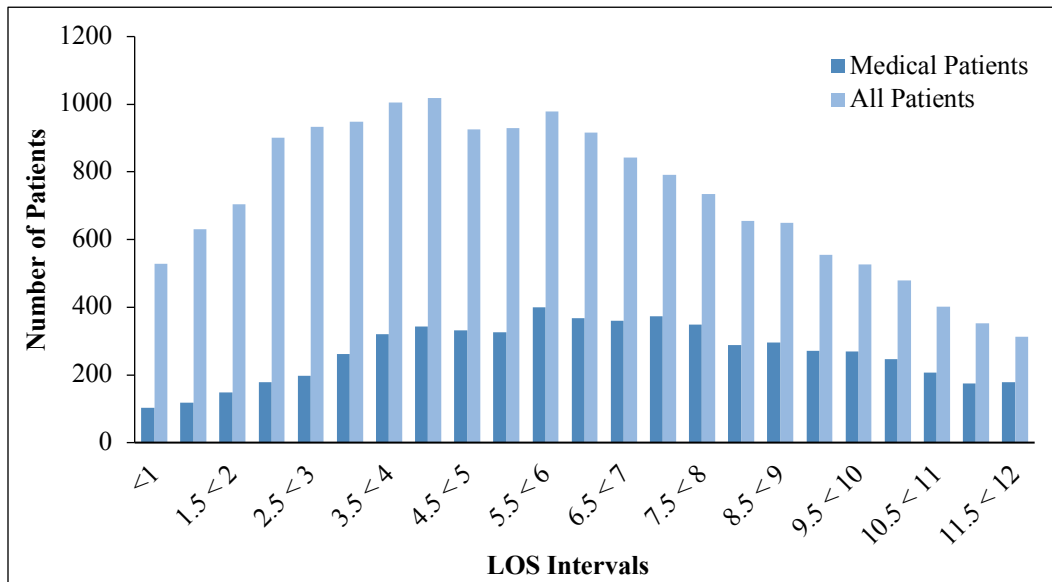


Figure 6.8: LOS breakdown for patients in ED

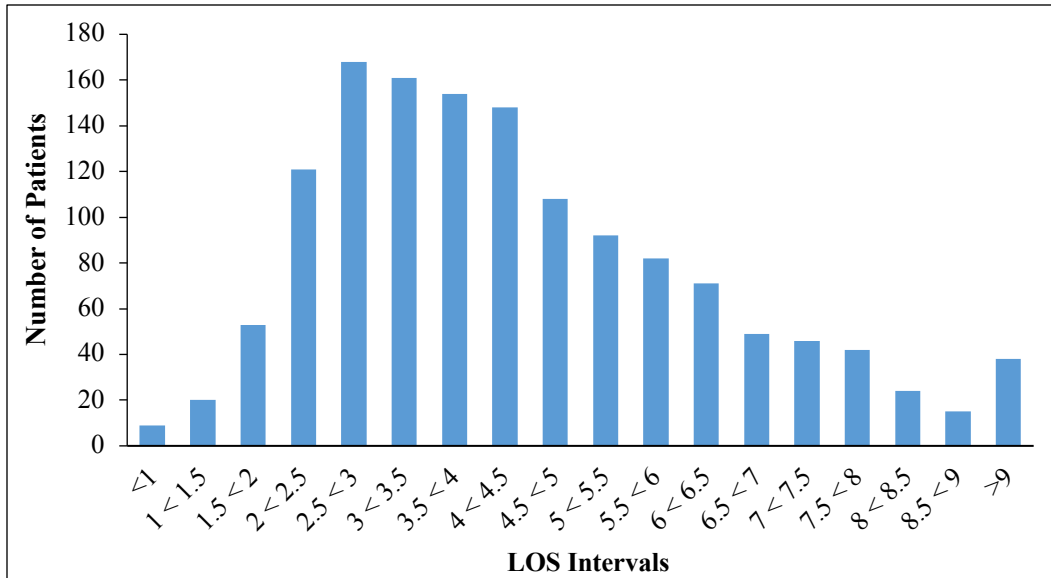


Figure 6.9: LOS breakdown for patients in AMAU

Following each stage of care, there are different routing possibilities for patients, which is subject to their conditions and the requirements for their treatment. For example, after being referred for opinion a patient can be discharged, referred to admission or admitted directly to the hospital. This routing information was then validated with the ED staff in order to have robust and reliable routing information. Figure 6.10 shows the different discharge destinations for patients from the ED.

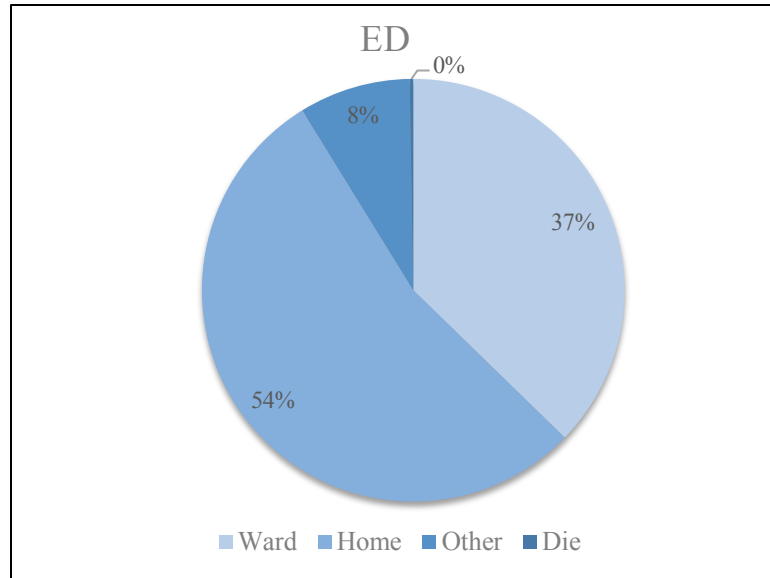


Figure 6.10: Discharge Destinations Distribution

6.3.1.4 Patient Age Analysis

Elderly patients represent a large proportion of the patients in the hospital. However, the ED and AMAU do not deal with the same percentage of those patients. Figure 6.11, and Figure 6.12 show the distribution of patients for different age groups in the ED and AMAU respectively. It is clear that the AMAU deal with more elderly patients, as those patients are characterised to be fragile and need of extra care.

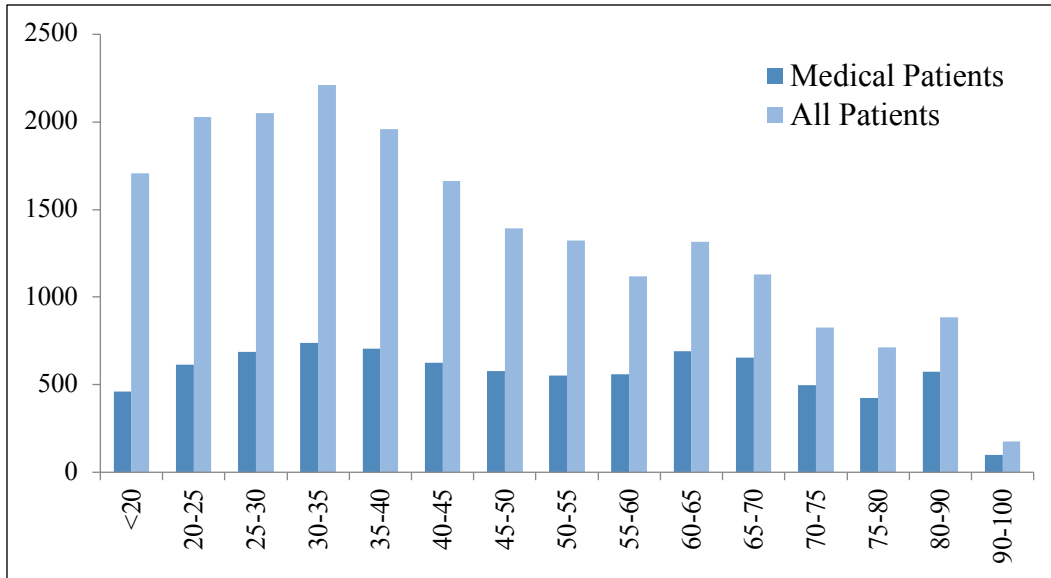


Figure 6.11: Age Distribution of patients in ED

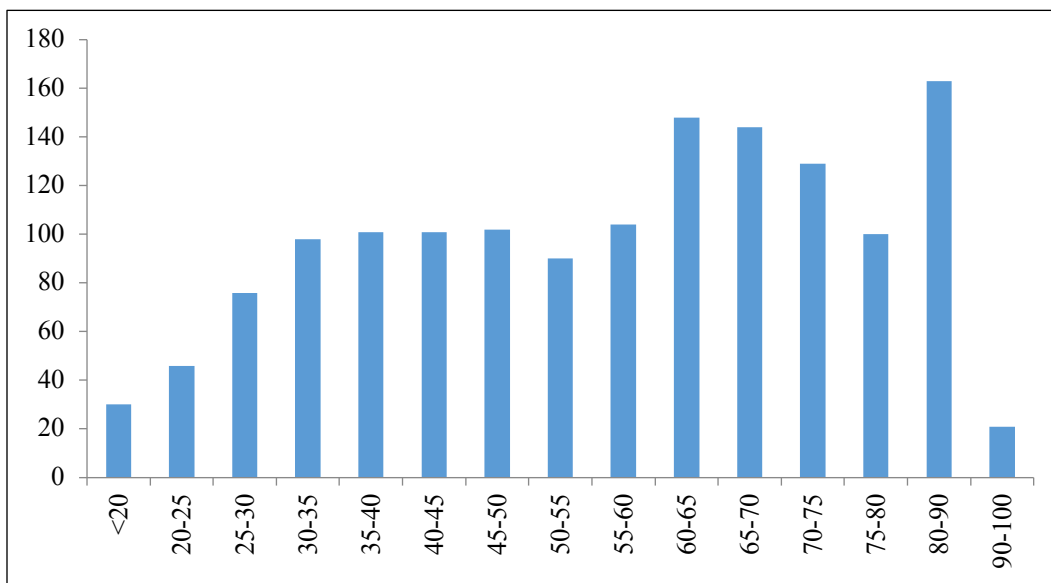


Figure 6.12: Age Distribution of patients in AMAU

6.3.2 Patient Experience Questionnaire

The findings of the hospital data collection and analysis have highlighted many characteristics regarding the patient population. Following discussion with the hospital’s management and the department consultancy team, it was agreed to target a group of

patients for the next stage of research, i.e. experience questionnaire. The target group of patients for the questionnaire phase will be medical patients who are triaged as category 2 or 3. This group has been selected because of the several pathways they can take during their hospital visit. Also due to the consideration that they are the patients who spend the most time in the ED. The aim of this phase is to identify the full range of problems that are important to patients, covering the entire journey of care from admission to discharge.

6.3.2.1 Questionnaire Administration and Sampling

The questionnaire for this study was administered using face-to-face interviews based on a structured survey. Medical patients attending the emergency department and triaged as category 2 or 3, who are over 16 years old and were given discharge/admission orders during the survey period were eligible to participate. The sample size for those eligible patients was determined based on Slovin's Formula. Using an average of 1100 medical patients per month and with 90% confidence interval the calculated sample size was calculated to be $n = 90$ patients. Patients were initially approached by someone from the medical or nursing team for their initial consent to participate. Once they approved, the researcher approached them by requesting their formal consent and explaining the subject of the survey. Patients who refused to participate were not interviewed, and questionnaires of patients who felt unwell during the interview were excluded also. Patients refused because they had visitors, were in pain or did not feel like it. A total of 58 questionnaires were completed, leading to a response rate of 63%. The distribution of responses for each question was examined in the questionnaire in order to identify potentially confusing or unnecessary questions. Questions for which responses showed little variation across patients and all questions with 20% of their responses missing were omitted.

6.3.2.2 *Results of the Experience Questionnaire*

Data was entered in SPSS version 22. Descriptive statistics were used to describe the demographic characteristics of the study samples. Most of the respondents had an undergraduate degree (37.93%) whilst 11 patients had an education level of 8th grade or less (18.97%). Most patients were Irish (96%) while the rest were Eastern European and accounted for 4% of the sample. The majority of respondents were above 65 years old (36.2%) with the fewest respondents between 18 and 24 years old. This was due to the nature of the hospital catchment area which is mostly elderly people. Most of the respondents (32.76%) had stayed in the hospital for less than a week, and almost half of them (43.1%) had no previous hospital visits in the past year. There was no predominance of male or female respondents, and that shows that the sample not bias towards gender. Table 6.3 summarises the descriptive statistics of the respondents.

The questionnaire included 21 questions as patient rating to measures of different dimensions of patient experience. The questions employ a 5-point Likert scale, ranging from *'never'* to *'always'*. Three more questions at the end of the survey were added to ask patients to rate their overall satisfaction level with the care provided, and if they were willing to return and recommend the hospital for their family and friends.

Table 6.3: Profile of the respondents (N = 58)

Gender	Frequency	Percentage
Female	29	50%
Male	29	50%
Age Group		
18-24	5	9%
25-34	6	10%
35-50	10	17%
51-65	16	28%
>65	21	36%
Educational Level		
Primary	11	19%
Secondary	21	37%
Third level	22	38%
Blank	4	6%
Number of visits		
None	25	43%
1 - 2	17	29%
3 - 4	3	5%
5 - 10	4	7%
More than 10	9	16%
Length of visit		
Couple of hours	17	29%
1 - 2 days	10	17%
2 - 4 days	10	17%
4 - 7 days	19	33%
More than 7 days	2	4%

Out of the 58 respondents, 21% rated their satisfaction with the hospital visit as excellent, and another 35% rated it very good. Hence about 56% of the patients rated their satisfaction as above average, as shown in Table 6.4. Whereas, 22% rated the service to be fair, and the remaining 19% rated their experience as below average. Also, from the 58 patients who responded to the satisfaction questionnaire, 35 of them were admitted to the hospital after their ED visit and only 23 patients were either discharged from the ED or transferred to another health care service. Comparing the overall satisfaction level of the admitted patients to the non-admitted ones, it shows that admitted patients are more satisfied with

their ED experience, with 66% of them recording an above average satisfaction level compared to 39% of non-admitted patients. Results could be explained as the hospital is dealing mainly with elderly patients who would present to the hospital with non-emergency conditions but due to their case, they would require prompt attention. To those patients, extended waiting times can be perceived as neglect creating an impression that the patient suffering is insufficient to warrant the attendance of a physician.

Table 6.4: Overall Satisfaction Ratings

Satisfaction Level	No. (%) of patients (N = 58)	No. (%) of admitted patients (N = 35)	No. (%) of discharged patients (N = 23)
Excellent	12 (21%)	9 (26%)	3 (13%)
Very Good	20 (35%)	14 (40%)	6 (26%)
Fair	13 (22%)	6 (17%)	7 (30%)
Poor	6 (10%)	2 (6%)	4 (17%)
Very Poor	5 (9%)	3 (8%)	2 (9%)
Did not respond	2 (4%)	1 (3%)	1 (4%)

The results of the survey show that 66% of participants would return to same ED in future, and 67% would recommend it to their family and friends. In addition, this high percentage matches the high level of satisfaction reported in this study. Only 5% of patients did not answer if they would return to the ED or not, and almost 30% would not reuse the same ED in the case of a future event. While 6.2% did not state if they would recommend it, and 27% said they would not have recommended it to their family and friends. Verifying the reliability and validity of measures and constructs, the explanatory and predictive power of the proposed patient experience model is next to be examined using the hypothetical PLS model presented in chapter 5 (Figure 6.13).

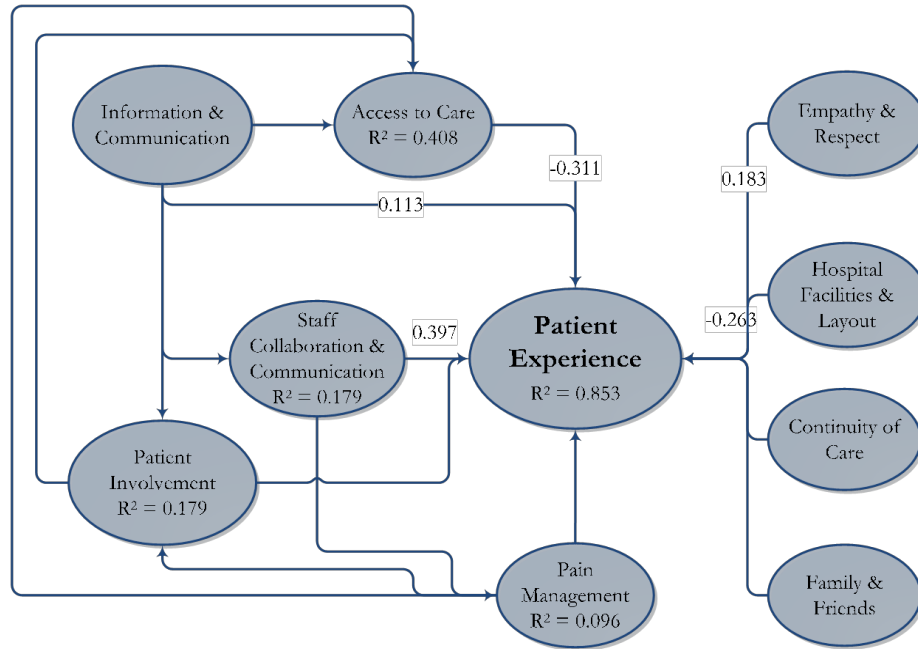


Figure 6.13: PLS model with results

Squared multiple correlations (R^2) of the latent constructs are being evaluated at this stage. The proposed constructs within the patient experience framework are namely: Access to care H1a, Continuity of Care H2, Empathy & Respect H3, Hospital Environment & Layout H4, Family & Friends H5a, Information & Communication H6a, Pain Management H7, Patient Involvement H8a, and Staff Collaboration & Communication H9a explain 85.3% of ‘Patient Experience’ as the endogenous latent variable. Comparing path coefficients reveals that ‘Access to Care’ (H1a: $\beta = -0.311$) is strongly associated with negative patient experience in EDs. The ‘Hospital Facilities & Layout’ (H4: $\beta = 0.263$) construct, is decision makers next priority for improving experience in the ED. Then constructs of ‘Staff Collaboration and Communication’ (H9a: $\beta = 0.397$) ‘Empathy and Respect’ (H8: $\beta = 0.183$) should be considered as further priorities by department managers to achieve

positive experience. Figure 6.14 shows significant factors affecting the measures of the patient experience index, the rest of the PLS results are summarised in Appendix 3.

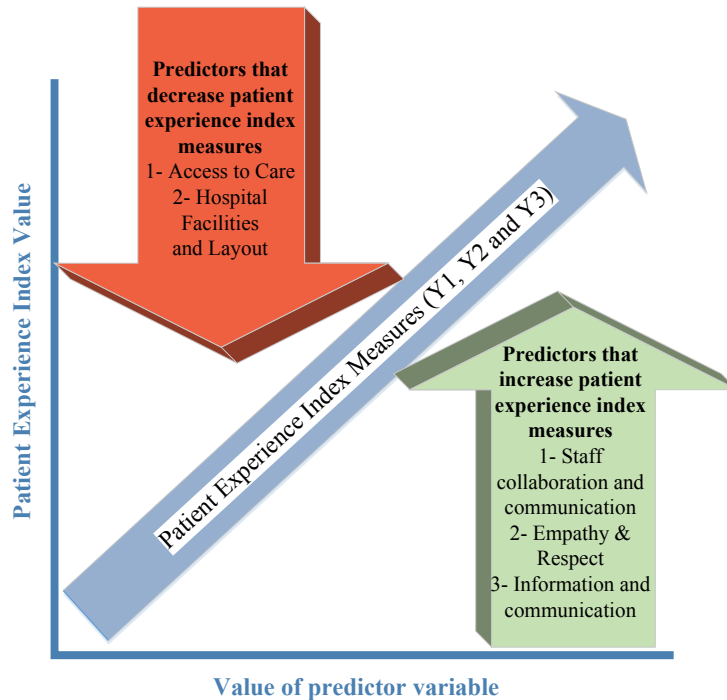


Figure 6.14: Significant predictors of experience

6.4. Emergency Department BSC Dashboard

Results show that issues such as waiting times at different stages of the care process are associated with low responses of experience. The privacy of patients in the registration and triage processes along with waiting room temperature and the availability of car parking are associated with high levels of satisfaction. There is no available data from previous research to compare with these results. Patients dissatisfaction in this study is critically associated with overall long waiting times, an uncomfortable waiting area, no recreation facilities such as TV, magazines, news, and no availability of beds. These results were

matching with many previous works (Muntlin, Gunningberg, and Carlson 2006; Nairn et al. 2004), where the waiting room was criticised for being uncomfortable and frightening. Especially when it is crowded and having people perceived to be drunk. In addition, this large tertiary hospital has high levels of occupancy and in some conditions, ED visitors who need admission have to wait to find an unoccupied bed. The results from the previous two steps were presented to the unit's team through a BSC dashboard to decide on the next phase of research which was to model the entire system to address patient's issues such as long waiting times. A Discrete Event Simulation (DES) approach is chosen to provide insights and understand the dynamics of the department. Several improvement strategies are proposed by the management team to improve patient's throughput, such as: increasing internal capacity of the ED, increasing downstream capacities, opening certain areas in the ED for 24 hours or hiring more staff to serve more patients. A design of experiments is developed with 66 design points to examine different combinations of proposed factors. Results and the development of the simulation model are discussed in following sections.

6.5. Conceptual ED Model

Building on the analysis of patient data extracted from the electronic ED logs, a detailed flowchart was constructed to highlight the main processes and decision points involved in the care of patients within the ED. Upon arrival at the ED and registration, walk-in patients (self-referral or GP referral) remain in the waiting area to be triaged. When a patient's name is called, depending on triage staff availability, the patient is assessed by a triage nurse. Based on their condition and triage assessment, each patient is assigned a clinical priority (triage category) according to the MTS that is widely used in UK, Europe, and Australia

(Cronin 2003). Based on the triage category, clinical group, and intensity of their care requirements, each patient is directed to a specified zone in the ED if a bed is available, otherwise they may be sent back to the waiting area until a bed or trolley is available. Only medical patients are eligible to the AMAU path, if they arrive between 9 a.m. and 6 p.m. (i.e. the unit’s admission hours) and if they’re triaged either a category 2 or 3. Once these requirements are met, the triage nurse calls the AMAU’s consultant to check the availability of a bed for the patient, if a bed is not available then the patient goes back to the ED path (Figure 6.15).

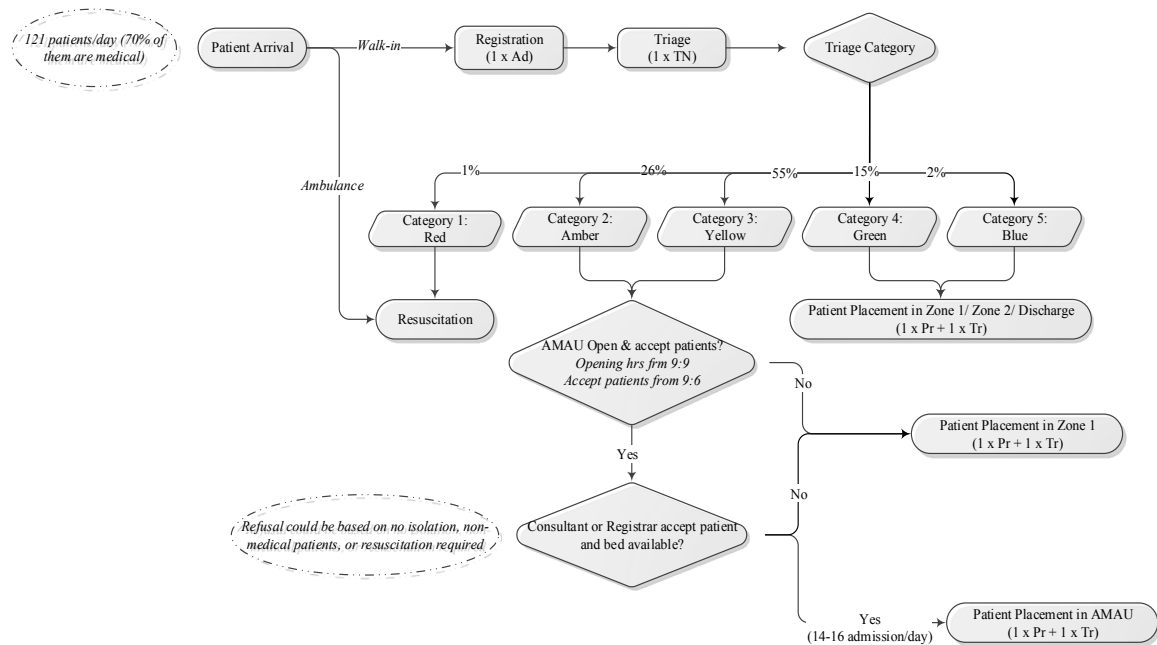


Figure 6.15: Patient arrival and triage flowchart

The patients waiting time depends on the triage category of patient and the availability of both medical staff (i.e. ED physician or Adult Nurse Practitioner (ANP)) and empty trolleys, which are a prerequisite for a complete and accurate assessment. Following the patient’s assessment by an ED clinician, a decision is made: either the patient is to be discharged or admitted to the hospital. These are the primary care stages which are relevant for all patients, whether they are

discharged from or admitted to the hospital. Secondary patient stages are those steps involved in the care of some but not all patients such as diagnostics (e.g. X-Ray and blood test), and second patient assessment by an ED doctor. Consultation may be requested by ED staff from a medical/surgical specialty doctor to confirm that a patient should be admitted or to obtain advice on the best possible treatment for the patient who is to be discharged. Figure 6.16 shows a detailed flowchart for patient journey through the ED.

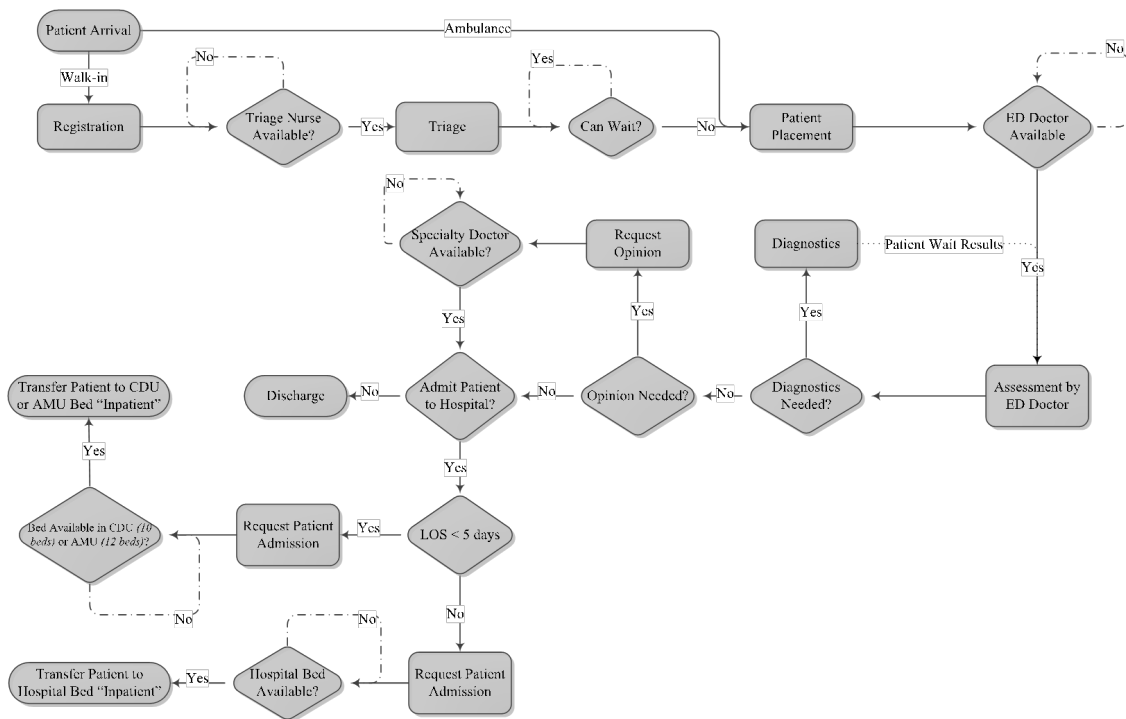


Figure 6.16: Patient's Flow in ED

Following the triage process, a patient who is directed to AMAU will be registered in the AMAU's system, interviewed by a nurse where his/her blood pressure and vitals are measured, then they would wait for a doctor to assess them. Next, the AMAU doctor will discuss the case with the unit's consultant who would then either ask for more tests, or request an opinion, or decide whether the patient needs to be admitted or discharged. Opinion may be requested by AMAU's consultant from a medical/surgical speciality

doctor to confirm that a patient should be admitted or to obtain advice on the best possible treatment for the patient who is to be discharged. These are the primary care stages which are relevant for all AMAU's patients, whether they are discharged from or admitted to hospital. Secondary patient stages are those steps involved in the care of some but not all patients such as diagnostics (e.g. MRIs and CTs). The flowchart of the steps of the AMAU processes is shown in Figure 6.17.

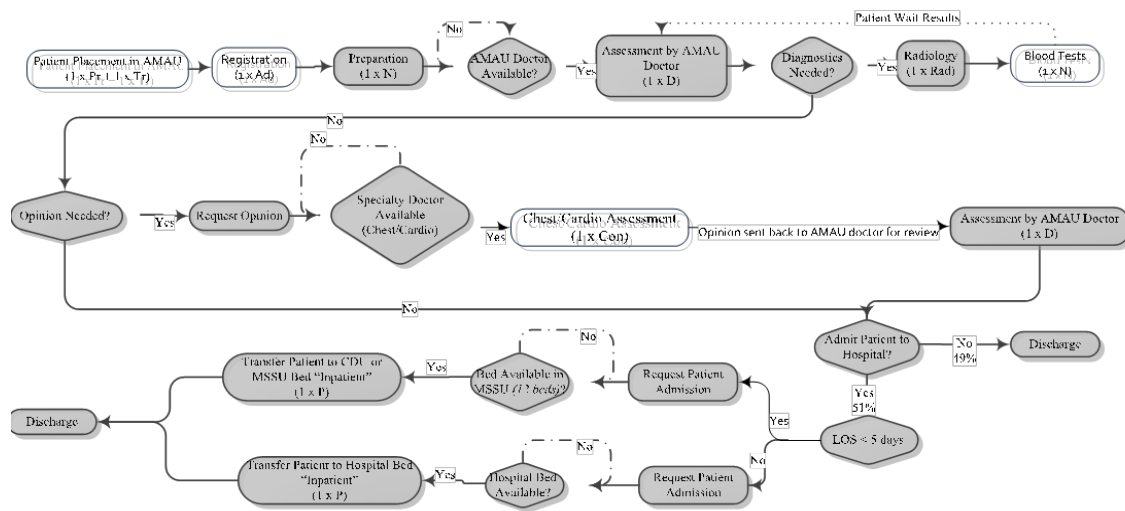


Figure 6.17: Patient's Flow in AMAU

6.6. Simulation Model

Based on the conceptual model and empirical data analysis outlined in the previous section, a comprehensive discrete-event simulation model was constructed using the ExtendSim simulation package, with an input/output Excel spreadsheet as a user-friendly interface. Simulation model modules were connected in the same way to the conceptual flow chart,

which eased the model construction phase. The main entities for the simulation are patients coming into the ED, each of which is assigned a set of attributes reflecting a mix of characteristics (such as their degree of complexity and age group). The model was tested to ensure that the actual system length of stay times was mirrored by the simulation model. The model was run for twelve weeks with a warm up period of two months. Three months were chosen for the stability of AMAU staffing levels after this period, according to the AMAU managers. Due to the stochastic nature of the results obtained from the simulation it is important therefore to ensure that the results are a true reflection, and accurately represent the AMAU. In doing so, the model was run for five times on each of the scenarios tested, ensuring that each run has a different random number seed. The results from running the model with different random number seeds are then added together. The average of the results was then used in the discussion of the results. It was observed that when the model was run for more than five times on each of the scenarios tested, the average was not significantly different from running it five times.

Validation and verification of the model were carried out all the way through the development phases to reduce modelling time and to increase confidence in the results. Verifying the model is a process of comparing the actual patient flow with the on-screen patient flow. Once the model had been built, it was verified by observing how the model was running and checking to see that the distributions of times generated by the model matched the empirical data collected from the AMAU. The logic behind the flow of patients from one task to the other was checked with the unit's consultant to ensure there were no flaws. Patients generated were tracked to ensure that they were following the correct route, going to the right places, and treated by the appropriate personnel in the

proper order through the model, and these were done by a combination of tag checking and observation of the visual display. It was observed that the LOS from the simulation matched the patient LOS in the AMAU. The model was tested to ensure that the actual system length of stay times was mirrored by the simulation model. The final results have been validated using face validation and comparison testing.

6.6.1 Measures of Performance

The performance of the AMAU can be measured along many dimensions. For example, the average LOS of patients; the utilisation of beds, doctors and nurses; and the average wait in queues. Almost all of these are able to be derived from the simulation model, also different scenarios are tested to aid in improving AMAU performance and patient care.

1. Length of Stay (LOS): From running the simulation with current stream of ED with varying arrival rates and resource levels. It can be seen from Table 6.5 that the average LOS for patients in AMAU is 4.11 hours with a standard deviation of 1.66 hours. While the LOS for patients in ED is 9.06 hours with a standard deviation of 5.74 hours which is an indication of patients staying longer in the ED than desired.

Table 6.5: Simulated Results for ED and AMAU

LOS	ED	AMAU
Average (hrs)	9.06	4.11
St. Dev. (hrs)	5.74	1.66

2. Beds: With the current level of 11 AMAU beds, a total of 667 patients are admitted at the end of the 3-months simulation run. It is important to stress that beds are assigned before patients arrive at the AMAU reception. Patients requiring beds are referred from the ED’s hospital, until a bed becomes available in the AMAU, these

patients cannot be physically brought in to the unit. Thus, they have to wait in the ED until a bed is available at either the ED or the AMAU. Once a patient gets to the AMAU, the bed availability is decreased by 1 and it is only released when a patient is transferred or discharged. In most of the systems the bottleneck is associated with the resource with high utilisation, but in systems with multiple patient types and numerous pathways, utilisation is not a good indicator. The bottleneck can be identified as a resource constraint that hinders the patient flow; i.e., the resource that generates the highest waiting time for patients.

Following repeated visits to the ED and interviewing the senior management team, the unit's consultant has identified two main key performance areas: 1- patient throughput and 2- AMAU's efficiency. The measured Key Performance Indicators (KPIs) were saved onto a database after each simulation run, and then exported in tabular form for further analysis and validation. The performance measures for patient throughput are:

- The average waiting time: the average time spent by AMAU's patients waiting for services and admission to the hospital.
- The average LOS: the total time spent by patients in ED and AMAU.

While for the unit's efficiency they are:

- AMAU productivity: the number of patients discharged and admitted compared to the total number of patients served by the AMAU.
- Resource utilisation: the utilisation of beds, consultants, registrars, SHOs and nurses of the AMAU.

6.6.2 Design of Experiments

Clinicians and executives were interested to identify the most significant factors affecting the overall performance of the AMAU. Therefore, a design of experiment on the results of the simulation model was conducted. The DOE is a useful tool in the practice of simulation, with many theoretical developments and practical applications in various fields. DOEs allow focusing on the analysis to improve performance and avoid losses. Following the analysis of simulation output, two sets of factors were brought to the attention of the hospital’s management; controllable and uncontrollable factors (Table 6.6). Controllable variables are directly observable, such as the number of beds. Whereas, uncontrollable ones require statistical inference, such as patient arrival rates. The identification of those variables will help identify the most significant factors affecting the overall performance of the AMAU using multivariate factor analysis.

Table 6.6: DOE controllable and uncontrollable factors

Type	Factors/Predictors Description	Levels
<i>Uncontrollable</i>	p_1 : Patients’ misallocation.	2L: 0 or 1
	p_2 : Opening Hours (12 hrs, 18 hrs, 24 hrs.)	3L: -1, 0 and +1
	p_3 : Service time change	3L: -10%, 0, 10%
	p_4 : Inter-arrival time at night in minutes	3L: 27, 30 and 33
	p_5 : Inter-arrival time evening in minutes	3L: 11, 12 and 13
	p_6 : Inter-arrival time morning in minutes	3L: 7, 8 and 9
	p_7 : Average number of ED boarders	8L: 0,1,2...7
<i>Controllable</i>	x_1 : Number of AMAU beds	8 L: 9, 10... 16
	x_2 : Number of SSU beds	16L: 9, 10... 24
	x_3 : Number of ward beds	66L: 470 to 570
	x_4 : Number of Nurses	3L: 2, 3, and 4
	x_5 : Number of Registrars	3L: 1, 2, and 3
	x_6 : Number of SHOs	3L: 1, 1, and 1
	x_7 : Number of Consultants	2L: 1 and 2

Five response criteria are selected to measure the performance of the design points. The performance indicators measured are the same as discussed earlier: patient experience

times in the AMAU, patient’s waiting time, the number of patients accessing the AMAU, the number of lost patients due to unavailable beds, and the boarded patients in the AMAU due to unavailable downstream beds (wards and SSU) (Table 6.7). To examine the effect of the 14 different selected factors on the unit’s KPIs, a Near-Orthogonal Latin Hypercube (NOLH) response matrix is evaluated using the simulation model for each experiment.

Table 6.7: DOE responses variables

Response Variables
y_1 : Average LOS in AMAU
y_2 : Average patient’s waiting time in AMAU
y_3 : AMAU accessibility; average number of daily patients accessing AMAU
y_4 : AMAU blocking; average number of lost patients daily due to bed unavailability.
y_5 : AMAU Boarders; average number of boarded patients daily in AMAU due to unavailability of downstream resources (i.e. SSU and ward beds)

Latin hypercube (LH) is introduced by Mckay, Beckman, Conover (1979) for computer experiments. LH sampling is a flexible way to build efficient designs for quantitative factors because it has some space-filling properties of factorial designs with fine-grid with less sampling (Sanchez 2005). LH design is represented by a matrix $X_{(n \times p)}$, where n is number of scenarios (experiments) and p is number of factors (input and parameter variables) that are uniformly spaced (Cioppa and Lucas 2007). Input variables and parameters are distinguished but, both are called factors. Input variables are directly observables variables such as number of beds, whereas parameters require statistical inference such as patients arrival rate (Kleijnen and Sargent 2000). LH is called orthogonal LH (OLH) when each pair in $X_{(n \times p)}$ has zero correlation, $Cor(x_i, x_j)=0, \forall i, j$ and $i \neq j$, and near-orthogonal LH (NOLH) if each pair in $D_{(n \times k)}$ has near to zero correlation, $Cor(x_i,$

$x_j) \in (-\epsilon, \epsilon), \forall i, j$ and $i \neq j$ and $\mp \epsilon$ is an insignificant correlation interval. NOLH designs have good space-filling and orthogonality properties for small to medium p (Cioppa and Lucas 2007). This design is represented by a matrix $M_{n \times p}$ where n is the number of scenarios (experiments) and p is the number of factors (controllable and uncontrollable variables) that are uniformly spaced (summarised in Appendix 6). Standard multiple regression was performed between each response variable separately as a dependent variable and with the factors as the independent variables (Yeo and Johnson 2000).

6.6.3 Multivariate Factor Analysis

A regression model is used to analyse the relationships between the factors and system responses. From a practical perspective, regression models are somewhat efficient because they reveal the strongest predictors of response measures (Brown et al. 2005). However, the transformation of the predictor and response variables is required prior to analysis, because the predictors have different scales and some predictors are skewed. Initial results of the evaluation of assumptions led to the transformation of the variables to reduce skewness, lessen the number of outliers, and improve the normality, and linearity of residuals. The most common and straightforward transformation is to center and scale the predictors. centring the data can be obtained by subtracting the sample mean from all the values, and scaling the data requires each value of a variable to be divided by its sample standard deviation. In addition to centring and scaling, removal the distributional skewness is an important step to improve the numerical stability of the calculations. The skewness of the variables is fixed using Yeo-Johnson Power Transformations (2000).

The variables were examined separately for the 66 design points. The transformed factor and response matrix is x^* and y^* respectively. Standard multiple regression was performed

between each response variable separately as a dependent variable and x^* as the independent variables. Table 6.8 displays the standardised/transformed regression coefficients, intercept, significance, standard error and the R^2 . R^2 for all regression models are significantly different from zero, with $p < 0.001$.

Table 6.8: Regression Analysis Results

Analysis of Deviance Table (Type II tests)					
Factors	Responses				
	LOS in AMAU y_1	Waiting Time y_2	AMAU Access y_3	Blocked Patients y_4	Internal Boarders y_5
	Estimate (Std. Error)	Estimate (Std. Error)	Estimate (Std. Error)	Estimate (Std. Error)	Estimate (Std. Error)
Intercept	-1.28 (0.12)***	-1.22 (0.15)***	-1.19 (0.12)***	1.18 (0.11)***	0.44 (0.21)*
p_1 : Misallocation	0.59 (0.12)***	0.39 (0.15)*	0.35 (0.12)**	-0.37 (0.11)**	0.41 (0.20)^
p_2 : Opening Hrs	0.99 (0.08)***	1.03 (0.10)***	1.02 (0.08)***	-0.99 (0.08)***	-0.64 (0.14)***
p_3 : Service Time	0.18 (0.06)**	-0.11 (0.07)	0.04 (0.06)	-0.03 (0.05)	0.01 (0.10)
p_4 : IA time1	0.03 (0.06)	-0.01 (0.08)	-0.01 (0.06)	-0.07 (0.06)	0.03 (0.10)
p_5 : IA time2	-0.07 (0.06)	0.04 (0.07)	-0.10 (0.06)	-0.14 (0.05)*	-0.04 (0.10)
p_6 : IA time3	0.07 (0.06)	-0.01 (0.07)	-0.01 (0.06)^	-0.37 (0.06)***	0.01 (0.10)
p_7 : ED Boarders	-0.23 (0.06)***	-0.18 (0.07)*	-0.19 (0.06)**	0.19 (0.05)***	-0.17 (0.10)^
x_1 : AMAU Beds	0.05 (0.06)	-0.08 (0.07)	0.06 (0.06)	-0.05 (0.06)	0.11 (0.10)
x_2 : SSU Beds	-0.22 (0.06)***	-0.31 (0.07)***	0.15 (0.06)*	-0.15 (0.05)**	-0.20 (0.10)*
x_3 : Ward Beds	-0.08 (0.06)	-0.19 (0.07)*	0.40 (0.06)***	-0.3554 (0.0542)***	-0.36 (0.10)***
x_4 : Nurses	0.06 (0.06)	0.07 (0.07)	-0.05 (0.06)	0.05 (0.06)	-0.01 (0.10)
x_5 : Registrar	-0.27 (0.06)***	-0.17 (0.07)*	0.02 (0.06)	-0.02 (0.05)	-0.025 (0.10)
x_6 : SHO	-0.17 (0.06)**	-0.13 (0.08)	0.07 (0.06)	-0.05 (0.06)	0.03 (0.10)
x_7 : Consultant	-0.33 (0.06)***	-0.12 (0.07)	0.01 (0.06)	-0.01 (0.06)	-0.05 (0.10)

Significance. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Results from the analysis show the most significant factors affecting each performance measure, for instance eight variables had a significant impact on the AMAU's LOS (y_1). Altogether they explain 84.26% (79.99% adjusted) of the variability in that response variable. Below is a detailed analysis for the impact on each system response based on the various levels of factors.

Length of Stay - Eight variables $p_1, p_2, p_3, p_7, x_2, x_5, x_6$ and x_7 contributed significantly to LOS in AMAU (y_1) with $p < 0.001$. Altogether, 84.26% (79.99% adjusted) of the variability in AMAU's LOS was predicted by knowing information on these eight variables. Misallocation p_1 , opening hours p_2 and service time p_3 are positively associated with this response. It is evident that increasing the demand and service time of the unit would lead to an increase in the time experienced by the patient. On the other hand, y_1 is negatively associated with increasing the staff capacity x_5, x_6 and x_7 , and the downstream bed capacity (SSU bed; x_2). Also, increasing the number of ED boarders has a negative impact on the AMAU's LOS because the boarded patients block the admission to the unit which indirectly reduce the average LOS of the admitted patients. Counter-intuitively, the unit bed capacity, x_4 , has an insignificant impact on the LOS, which may explain that the AMAU beds are not a capacity constraint (a bottleneck). The size of the relationship suggests that opening hours and misallocation have the highest positive impact while the number of consultants and registrars has the largest negative impact (Figure 6.18).

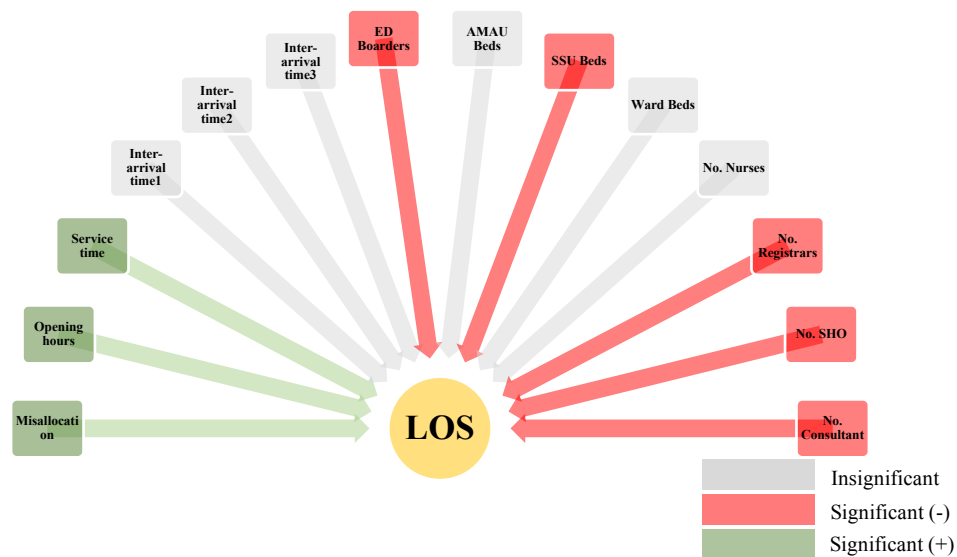


Figure 6.18: Factors affecting patient experience time

Waiting Time - Using multiple regression, the following variables p_1, p_2, p_7, x_2, x_3 and x_5 are identified as having a significant impact on waiting times in AMAU (y_2), $p < 0.001$. The predictors can explain 73.7% (66.7% adjusted) of total variation of the average waiting time. The results reflect a strong positive association between demand factors, x_1 and x_2 , while waiting time on the downstream resources, x_3 and x_5 , number of registrars x_8 and ED boarders p_7 are negatively correlated to average waiting time in AMAU y_2 (Figure 6.19).

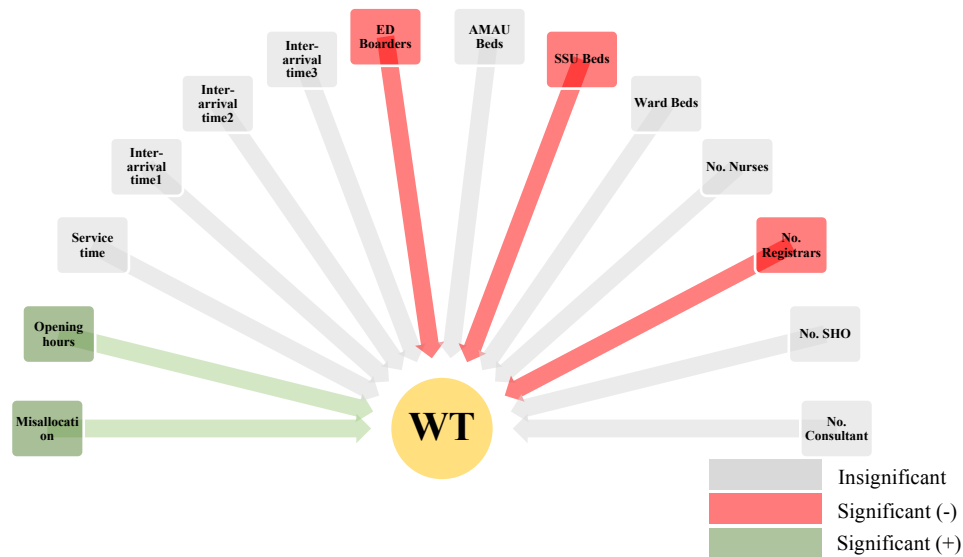


Figure 6.19: Factors affecting waiting time

The AMAU accessibility - Six independent variables, p_1, p_2, p_6, p_7, x_2 and x_3 have a significant impact on the patient’s accessibility to the AMAU unit y_3 with $p < 0.0001$. Those predictors can explain 84% (79% adjusted) of the total variance in the number of patients admitted to the AMAU unit. More available downstream beds, x_2 and x_3 will lead to more admission to the AMAU. Also, increasing the number of patient arriving during the AMAU opening hours, p_6 , and increasing the demand, p_1 and p_2 , are associated with increasing the number of admitted patients to the AMAU (Figure 6.20). Apparently, the ED bordered patients in the AMAU, p_7 have a negative contribution to accept more

patients. Also, the results show that the AMAU bed capacity, x_1 , has no significant effect on the admission as the unit is constrained by the resources in the subsequent stages.

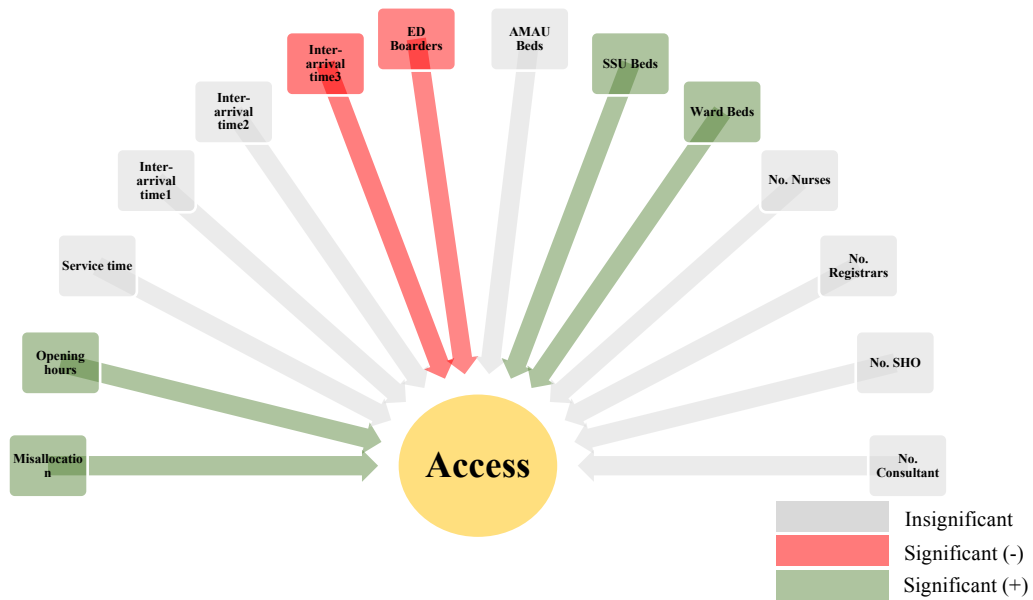


Figure 6.20: Factors affecting blocked patients

Blocked Patients – This response summarises the number of blocked patients due to opening hours, misallocation, bed unavailability, boarding and renegeing. Seven predictors are defined that have a significant effect on this response; p_1 , p_2 , p_5 , p_6 , p_7 , x_2 and x_3 . The first six variables showed a negative relationship with the number of blocked patients in the unit. Also, the number of boarders from the ED shows a positive relationship with the number of blocked patients (Figure 6.21). Hence, a control on how many patients are allowed to board the unit’s beds will lead to an improvement in this figure.

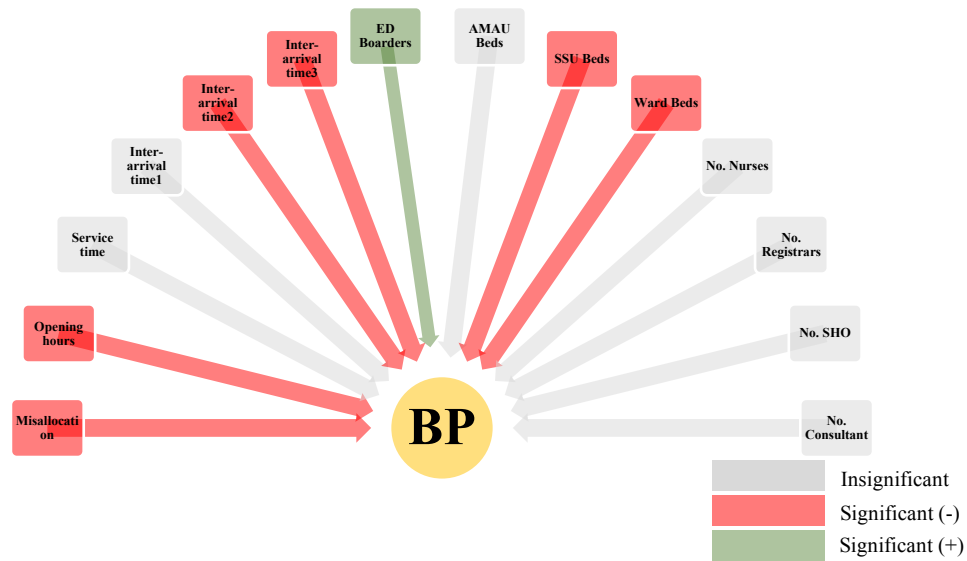


Figure 6.21: Factors affecting blocked patients

AMAU Boarding - The multiple linear regression analysis is calculated to predict the AMAU bordered patients, y_6 , based on all factor variables. A significant relationship is identified ($p < 0.0001$), with R^2 of 51.1% (38% adjusted). Five variables, p_1 , p_2 , p_7 , x_2 and x_3 , have a significant contribution to predict the numbers of boarded patients in the AMAU. The patients bordered due to the unavailability of beds in SSU or ward are negatively correlated with the number of internal boarders in the AMAU (Figure 6.22). As a conclusion, the AMAU’s bed capacity does not have a significant impact on any of the performance variables, which shows that this factor should not be presented as a bottleneck.

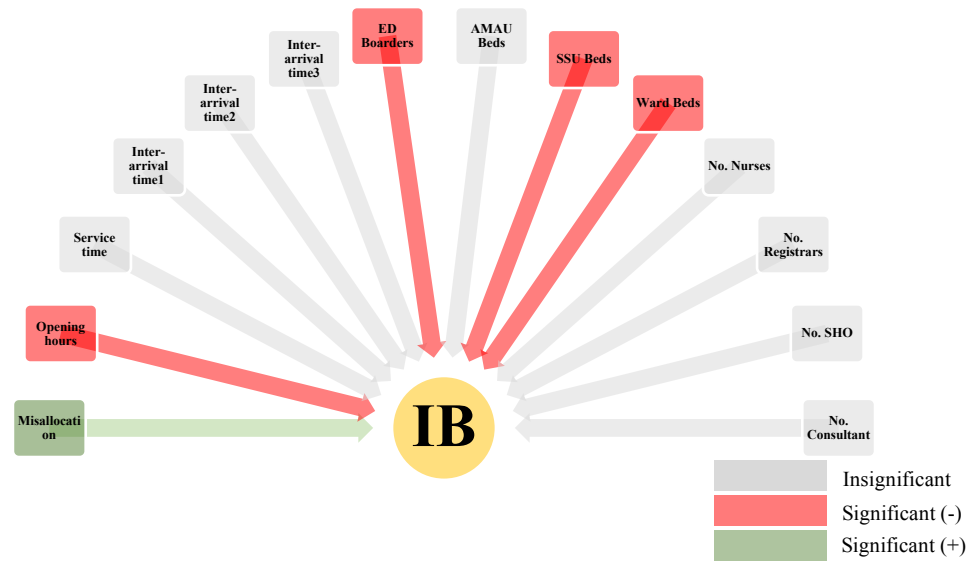


Figure 6.22: Factors affecting internal boarders

6.6.4 Multi-Objective Optimisation

Focusing only on the strongest predictors of response measures from the regression analysis may not always be the most efficient when planning for improvement strategies. The ultimate objective of this stage is to find the optimal configuration of key unit’s resources such to optimise multiple objectives simultaneously subject to a set of capacity constraints. The mathematical formulation of the problem (*P*) is:

$$\begin{aligned}
 \text{Min } Y &= \{f_1(x), f_2(x), -f_3(x), f_4(x), f_5(x)\} \\
 \text{s.t} & \\
 \mathbf{l} \leq \mathbf{x} \leq \mathbf{u} & \text{ and } \mathbf{x} \in \text{Integer set.}
 \end{aligned}
 \tag{P}$$

The decision maker’s objectives are to minimise the average LOS in AMAU; $f_1(x)$, average waiting time; $f_2(x)$, average number of blocked patients; $f_4(x)$ and the average number of boarded patients; $f_5(x)$, all while maximizing the average access to the unit; $f_3(x)$. The vectors *l* and *u* are the lower and upper capacity levels of the decision variables *x* based on the decision maker’s recommendations. This problem is a multi-objective discrete

optimisation problem and the closed analytical form of those objectives do not exist; they should be evaluated using the simulation model. A stochastic simulation-based optimisation is used to obtain an estimation $y_i(x)$ of each objective function $f_i(x)$ using the simulation. Then a desirability function approach is introduced by Harrington (1965) to optimise multiple simultaneous objectives by transforming the estimated response $y_i(x)$ into a unified scale $[0, 1]$, called a desirability index, denoted by $d_i(y_i(x))$. The highest desirable solution has a value of 1 while a highly undesirable solution has a value of 0. The desirability function for minimization and maximization-type response functions are given by equations (1) and (2) respectively:

$$d_i^{min}(y_i(\mathbf{X})) = \begin{cases} 0 & \text{if } y_i(\mathbf{X}) > Y_i^{max} \\ \left(\frac{y_i(\mathbf{X}) - Y_i^{min}}{Y_i^{max} - Y_i^{min}}\right)^{\delta_i} & \text{if } Y_i^{min} \leq y_i(\mathbf{X}) \leq Y_i^{max} \\ 1 & \text{if } y_i(\mathbf{X}) < Y_i^{min} \end{cases} \quad (1)$$

$$d_i^{max}(y_i(\mathbf{X})) = \begin{cases} 0 & \text{if } y_i(\mathbf{X}) < Y_i^{min} \\ \left(\frac{y_i(\mathbf{X}) - Y_i^{max}}{Y_i^{min} - Y_i^{max}}\right)^{\delta_i} & \text{if } Y_i^{min} \leq y_i(\mathbf{X}) \leq Y_i^{max} \\ 1 & \text{if } y_i(\mathbf{X}) > Y_i^{max} \end{cases} \quad (2)$$

Y_i^{min} and Y_i^{max} are the lower and upper bound of the response y_i respectively, and δ_i is the shape parameter of the desirability function $d_i(y_i(x))$. The desirability function is linear if $\delta_i = 1$ and convex (concave) if $\delta_i > 1$ ($\delta_i < 1$). The shape parameter is chosen such that the desirability is easier or more difficult to achieve. Y_i^{min} and Y_i^{max} are calculated using the quantile ranks. These parameters are then chosen by the modeller in coordination with the unit's decision makers.

A composite or overall desirability (D) of a solution (system configuration) combines all the individual desirability values $d_i(y_i(x))$ using the geometric mean. Derringer (1994)

proposed a weighted geometric mean, which is given by $D = \prod_i^p d_i(y_i)$. Replacing the multiple objectives with the composite desirability function D obtains a new single-objective to be used to find a set of efficient solutions. Gradient-based search methods are not suitable for this problem since the various prediction models are not smooth and have many discontinuities (e.g. MARS and Cubist). A direct search method is applied to obtain a near-optimal configuration: Simulated Annealing (SA) (Suman and Kumar 2006). SA is a global search technique that attempts to avoid the possibility of being trapped in local optima through accepting poor solutions. The acceptance/rejection of worse solutions is controlled by a probability function that depends on a temperature parameter to trade off exploration and exploitation.

The search is repeated several times using different starting points to overcome being stuck in local optima, and also to generate a set of solutions from which the best can be selected. A total of 15 starting points are chosen from the DOE dataset; the first starting point of the 15 is sampled randomly, and the rest are chosen using the maximum dissimilarity sampling method. All constraints are handled using the penalty function. Table 6.9 presents the results obtained from the SA method; it is divided into four sections: values of decision variables, the corresponding responses, the responses' desirability, and the composite desirability of the solution. The first row shows the current solution; each following row presents a different solution obtained from the 15 starting points. Out of the 15 starting points, only seven trails succeeded in reaching a feasible solution.

Table 6.9: A set of efficient solutions obtained from SA method with multiple starts.

Solution	Decision variables							Responses					Individual Desirability					Overall
	x_1	x_2	x_3	x_4	x_5	x_6	x_7	y_1	y_2	y_3	y_4	y_5	d_1	d_2	d_3	d_4	d_5	D
Current	11	12	520	3	2	2	1	4.125	1.541	20.790	1.358	1.849	0.884	0.812	0.807	1.0	0.744	0.845
Solution 1	16	16	510	2	2	2	2	3.460	0.830	21.686	1.226	1.210	1.00	1.000	0.835	1.000	0.942	0.953
Solution 2	10	15	498	3	1	2	2	3.872	1.151	17.163	3.998	2.225	0.95	0.946	0.650	0.993	0.634	0.819
Solution 3	11	15	544	2	2	3	2	3.235	0.619	23.134	0.068	0.922	1.00	1.000	0.874	1.000	1.000	0.973
Solution 4	11	16	519	2	3	2	2	3.110	0.533	23.142	1.352	0.154	1.00	1.000	0.874	1.000	1.000	0.973
Solution 5	11	14	496	3	2	3	2	3.425	1.079	15.970	4.272	3.024	1.00	0.970	0.558	0.975	0.422	0.741
Solution 6	11	11	491	2	1	3	1	4.697	2.115	14.754	5.890	5.110	0.719	0.580	0.347	0.868	0.034	0.335
Solution 7	13	15	530	2	3	1	2	3.337	0.571	22.479	1.149	0.184	1.00	1.000	0.857	1.000	1.000	0.970

Note: The rejected (dominated) solutions are struck-through.

The current solution is strongly dominated by solutions 1, 3 and 7. Also, solutions 5 and 6 are local optima points regarding the value of their composite desirability D since all other solutions dominate them; therefore, they can be safely excluded. Solutions 1 and 2 can also be excluded since they are strongly dominated by solution 3. The non-dominated solution set is formed from solutions 3, 4 and 7; comparing their desirability values, solution 3 and 4 weakly dominate solution 7. Also, comparing the input/output levels of each non-dominated solution reveals that solution 4 is the best configuration. This configuration improves the patient-related indicators significantly with the minimum extra resources. This solution suggests the need to increase the bottleneck resources that limit the patient flow.

The results of comparing the current AMAU settings and the best (near optimal) setting, solution 4, (Figure 6.23) show some improvement in all the response variables. The horizontal line represents the current performance (as 100%), and the bar chart shows the response variables of the best setting as a percentage of the current setting. The average LOS, average waiting time and number of AMAU boarders are dramatically decreased – by 25% and 65% respectively. The AMAU boarders are nearly eliminated, while AMAU

accessibility (patient flow) has increased by around 11%. It is likely that the expected performance improvements in the optimal scenario would be subject to the implementation challenges.

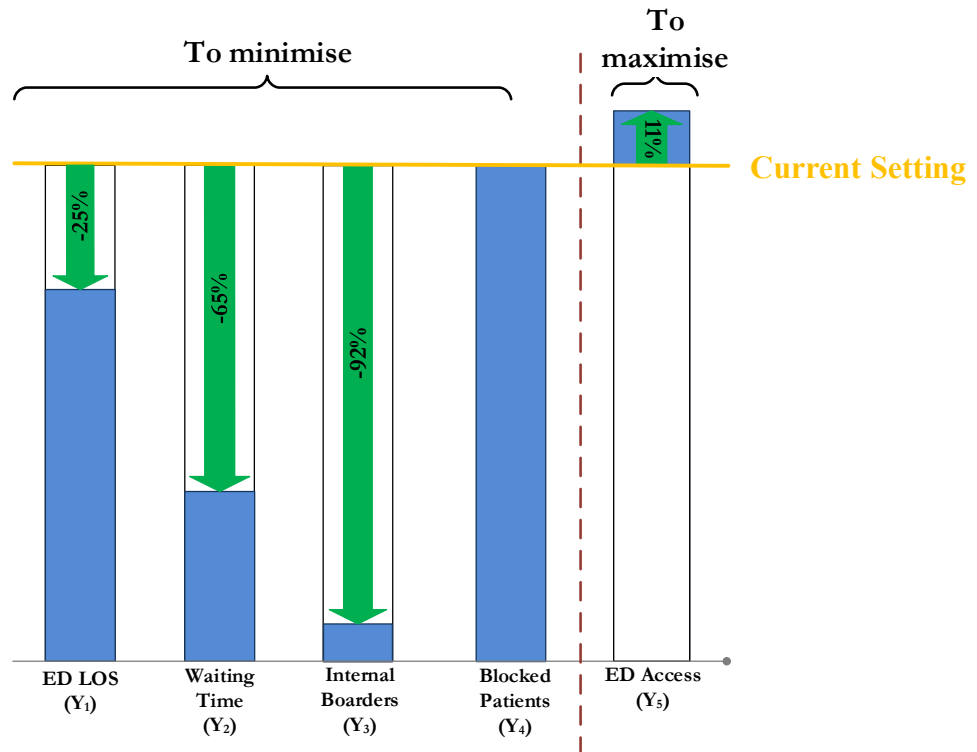


Figure 6.23: Comparison between current and the best scenario setting of the AMAU.

6.7. Concluding Remarks

With the increasing demand for emergency services, EDs are starved of support. Hospitals desiring to improve patient experience have to implement facilitative interventions. The Acute Medicine Programme (AMP) provides a framework to deliver acute medical services aimed at substantially improving patient care, reducing waiting times in emergency units, and alleviating the decision-making process in a safe way. AMP offers specialised units known as Acute Medical Assessment Units (AMAUs) in order to work in a parallel path with EDs to alleviate the pressure caused by high demand. The main

contribution of this study is to simulate the current system of an AMAU and ED in the hospital in order to provide managers with useful insights on the system, address uncertainties in the system and their impact, and optimise the capacities to improve patient throughputs.

A Discrete Event Simulation (DES) model was initially developed to provide insights and understand the dynamics of the selected units in the hospital. Several experiments proposed by the management team were studied before the model was used to examine the impact of different strategies on the AMAU's performance. Several factors were identified from this study as being significant to the response variables suggested by the unit's management. These factors and patient-related responses were then used to perform a multivariate factor analysis to identify the performance determinants for each response variable.

Results from the factor analysis showed that downstream capacities had significant impacts on all performance variables. Therefore, their exact values needed to be optimised to help alleviate the pressure on the unit in a cost-effective manner. Similarly, patient misallocation, ED boarded patients and the unit's opening hours considerably affected all the unit responses. However, in the individual setting of the AMAU under study, and at variance with common clinician perceptions, the AMAU's bed capacity did not have a major impact on any of the performance variables, indicating that increasing bed capacity will not alleviate pressure on the unit. Finally, the integrated model proposed provides real-time strategies for AMAUs to improve patient care, by introducing a multi-objective optimisation approach that aims to compromise among various objectives. The suggested

solutions show that developing downstream capacity along with increasing the unit's human resources would lead to a 25% decrease in LOS and significantly improve other response variables, allowing the AMAU to meet the unpredictable increase in demand better.

CHAPTER 7: CONCLUSION

7.1. Introduction

Providing the best level of care for patients, especially at a time of financial contraction, should be the forefront of planning and strategies for health care services. With the increasing awareness of patients regarding their rights and with several health care institutions shifting their focus to be more patient-orientated, a dire need arises to include data collected from different channels of patient feedback into the decision-making process. In an Irish context, the Health Services Executive (HSE) claims that a considerable focus is placed to ensure that the patients are incorporated in their care processes. However, while budgets are being cut across all services, it is a challenge to maximise system efficiencies while ensuring the incorporation of patients in the service provided to them. Accordingly, more systematic and sophisticated approaches are needed to integrate patients with their care and to support decision makers by providing them with informed decisions and strategies for delivering a safe and effective service. The focus of this research has been on the patient experience in Emergency Departments (EDs) and the use of the collected data to inform quality improvements. Thus, the main purpose is to introduce a framework for collecting and monitoring patient experience in an ED. Then analysing the collected data using various analysis techniques (regression, simulation and optimisation) and provide the hospital managers with areas of improvements to enhance the experience of their patients. Those two phases of the research will then inform the customer/patient perspective in a balance scorecard of the entire hospital, allowing the data collected from the patients to be used strategically to inform policies. By serving this purpose, the framework answers the main research question of this study and achieves its

ultimate objective of developing an integrated patient experience framework that informs quality improvement strategies in a hospital. This chapter concludes the thesis by summarising the main contributions of this study to address the gaps in the existing knowledge. Moreover, research limitations are highlighted and directions for future work initiatives are discussed to conclude this research.

7.2. Research Contributions

The work carried out in this thesis has contributed to both the knowledge and application in the research area of patient experience.

Extensive literature review to serve as a roadmap for patient experience in health care

- This contribution adds to the knowledge domain by looking at the first research question: “*What are the current practices of gathering and monitoring patient experience (e.g. factors, measures, methods...etc.)?*” The review provides a comprehensive understanding of frameworks, dimensions and analysis techniques used in the research area of patient experience. Reviewing over 2500 peer-reviewed articles results in the identification of five key frameworks for patient experience including; UK Picker Institute Principles and US H-CAHPS. The frameworks have enabled the identification of a potential range of patient experience dimensions and helped in grouping them into nine categories.
- The study provides a roadmap for future research in the patient experience domain that require further attention from researchers.

Designing and conducting an exploratory study to compare between staff and patient's perceptions of service quality

- This contribution adds value to both the knowledge domain by addressing a part of the first research question and adding to the application field while targeting the third question of research: *“What indicators are used to represent the patient experience in hospitals?”*
- Inspired by the nine dimensions of care identified from the literature to be the most significant factors on patient experience, an interview guide is developed. Data is collected from 26 senior members of staff recruited and 51 patients through in-depth interviews. The outcomes of the exploratory study have contributed to the design and engineering of a patient experience questionnaire.
- The findings of the study are important to understand staff perceptions of patient experience and incorporate their views in the future design of improvement strategies.
- Five important dimensions are highlighted from patient responses such as: staff communication and being treated with respect. While dimensions such as: continuity of care and involving family members are identified to be less important for patients. While staff in this study perceive dimensions such as quicker access to care and informing the patient to be more significant in shaping the patient experience.

Development of a patient experience survey to study trends and relationships
between different dimensions and overall experience

- This contribution addresses the knowledge and application domain by targeting the second research question: *“How is patient experience data being analysed to help with the decision-making process of a hospital?”*
- The questions of the survey are informed by two of the widely-used frameworks in the area of patient experience, namely: the UK Picker Principles and the US HCAHPS, and are refined based on the results of the exploratory study.
- A novel patient experience index is introduced in this study based on patient responses on three different questions to represent their experience. Namely, patients are asked to 1- rate their satisfaction with the service provided, 2- state if they are willing to return and, 3- if they are willing to recommend the hospital for their family and friends
- The responses of the survey are analysed using a Partial Least Squares (PLS) model that is rarely used in the area of patient experience. However, it has the merit of predicting latent dimensions of patient experience as linear combinations of the observed measures and their subsequent constructs.

Develop an integrated and applied framework to collect and monitor patient experience framework in hospitals

- This contribution is believed to add to the application domain by addressing the last research question: *“How useful would a developed patient experience framework be for decision-making in emergency departments and to what extent can it be applied?”*
- The developed integrated framework has included patients, practitioners, and management’s views and perceptions which certainly add value to the solution and increase opportunities for the framework implementation.
- A multi-method approach is used to consider the complexity and dynamism of factors affecting the patient experience. Data Analytics, Simulation, and Optimisation techniques have contributed in providing the framework with flexibility and accuracy. Some of the techniques are used to predict the impact of dimensions of care on patient experience (i.e. Multivariate Regression) while others are there to answer questions (i.e. Simulation and Optimisation)
- The implementation of such a patient experience framework is expected not to be easy with resistance to change and confidence in solutions. Simulation and Optimisation have played a significant role to alleviate this challenge. A partnership with a leading university hospital in Dublin contributed to the validation of the framework. Validation took place in their ED, one of the busiest in Ireland. Results have provided insights to the management team and has initiated perception changes regarding system bottlenecks and constraints.

7.3. Research Limitations and Future Work

While the outcomes of this study make important contributions to the field of patient experience, their implications are limited to the findings of a single case study. Future work should thus incorporate further implementation studies of proposed framework in different EDs in several hospitals. The multiplicity of case studies will help to learn more about implementation challenges and would provide guidance to future researchers.

7.4. Conclusion

Patients need to be educated regarding the importance of their feedback and its effect on the overall health care performance. Systematic tools are crucial to collect and monitor their feedback to allow for benchmarking and potential comparison with other institutions. This research includes practitioner and patient views of experience dimensions and their value in shaping the overall experience. It also integrates different analytical tools to deepen decision makers understanding of their system and factors affecting their patients. Therefore, the developed integrated framework advocates the importance of collecting patient experience feedback and uses it as an informant for improvement strategies.

REFERENCES

- Abo-hamad, Waleed, and Amr Arisha. 2013. "Towards Operations Excellence: Optimising Staff Scheduling For New Emergency Department." In *Proceedings of the 20th International Annual EurOMA Conference*, 9–12.
- Adams, and JD Schvaneveldt. 1991. *Understanding Research Methods*. Second Ed. Longman.
- Ahmed, Faraz, Jenni Burt, and Martin Roland. 2014. "Measuring Patient Experience: Concepts and Methods." *The Patient* 7 (3). New Zealand: 235–41.
- Aiken, Linda H, Walter Sermeus, Koen Van den Heede, Douglas M Sloane, Reinhard Busse, Martin McKee, Luk Bruyneel, et al. 2012. "Patient Safety, Satisfaction, and Quality of Hospital Care: Cross Sectional Surveys of Nurses and Patients in 12 Countries in Europe and the United States." *BMJ (Clinical Research Ed.)* 344. England: e1717.
- Amaratunga, Dilanthi, David Baldry, Marjan Sarshar, and Rita Newton. 2002. "Quantitative and Qualitative Research in the Built Environment: Application of 'Mixed' Research Approach." *Work Study* 51 (1): 17–31.
- Anhang Price, Rebecca, Marc N Elliott, Alan M Zaslavsky, Ron D Hays, William G Lehrman, Lise Rybowski, Susan Edgman-Levitan, and Paul D Cleary. 2014. "Examining the Role of Patient Experience Surveys in Measuring Health Care Quality." *Medical Care Research and Review*, 1–33.
- Asprey, Anthea, John L. Campbell, Jenny Newbould, Simon Cohn, Mary Carter, Antoinette Davey, and Martin Roland. 2013. "Challenges to the Credibility of Patient Feedback in Primary Healthcare Settings: A Qualitative Study." *British Journal of General Practice* 63 (608): 200–208.
- Bakar, Coskun, H Seval Akgün, A F Al Assaf, and a F Al Assaf. 2008. "The Role of Expectations in Patients' Hospital Assessments: A Turkish University Hospital Example." *International Journal of Health Care Quality Assurance* 21 (5). Emerald: 503–16.
- Balci, O. 1997. "Verification, Validaiton and Accreditation of Simulation Models." In *Proceedings of the 1997 Winter Simulation Conference*, 135–41. Piscataway, New Jersey: Institute of Electrical and Electronics Engineers, Inc.
- Bauer, Amy M, Margarita Alegria, and Margarita Alegría. 2010. "Impact of Patient Language Proficiency and Interpreter Service Use on the Quality of Psychiatric Care: A Systematic Review." *Psychiatric Services (Washington, D.C.)* 61 (8). United States: 765–73.
-

-
- Becker, Jörg, and Björn Niehaves. 2007. "Epistemological Perspectives on IS Research: A Framework for Analysing and Systemizing Epistemological Assumptions." *Information Systems Journal* 17 (2): 197–214.
- Bick, D, T Murrells, a Weaver, V Rose, J Wray, and S Beake. 2012. "Revising Acute Care Systems and Processes to Improve Breastfeeding and Maternal Postnatal Health: A Pre and Post Intervention Study in One English Maternity Unit."
- Bikker, Annemieke P., and Andrew G H Thompson. 2006. "Predicting and Comparing Patient Satisfaction in Four Different Modes of Health Care across a Nation." *Social Science and Medicine* 63 (6): 1671–83.
- Bjertnaes, Oyvind a, Ingeborg Strømseng Sjetne, and Hilde Hestad Iversen. 2012. "Overall Patient Satisfaction with Hospitals: Effects of Patient-Reported Experiences and Fulfilment of Expectations." *BMJ Quality & Safety* 21 (1): 39–46.
- Bleich, Sara N., Emre Ozaltin, and Christopher J L K L Murray. 2009. "How Does Satisfaction with the Health-Care System Relate to Patient Experience?" *Bulletin of the World Health Organization* 87 (4). Switzerland: 271–78.
- Boiko, Olga, John L. Campbell, Natasha Elmore, Antoinette F. Davey, Martin Roland, and Jenni Burt. 2014. "The Role of Patient Experience Surveys in Quality Assurance and Improvement: A Focus Group Study in English General Practice." *Health Expectations* 18 (6): 1982–94.
- Bollen, and R. Lennox. 1991. "Conventional Wisdom on Measurement: A Structural Equation Perspective." *Psychological Bulletin* 110 (2): 305–14.
- Bollen, and J. Scott Long. 1993. *Testing Structural Equation Models*. First Ed. Sage Publications.
- Boudreaux, Edwin D., Roy D. Ary, Cris V. Mandry, and Bhrett McCabe. 2000. "Determinants of Patient Satisfaction in a Large, Municipal ED: The Role of Demographic Variables, Visit Characteristics, and Patient Perceptions." *American Journal of Emergency Medicine* 18 (4): 394–400.
- Braun, V., and V. Clarke. 2006. "Using Thematic Analysis in Psychology." *Qualitative Research in Psychology* 3 (May 2015): 77–101.
- Brown, Adalsteinn D., Guillermo A. Sandoval, Carey Levinton, and Paula Blackstien-Hirsch. 2005. "Developing an Efficient Model to Select Emergency Department Patient Satisfaction Improvement Strategies." *Annals of Emergency Medicine* 46 (1): 3–10.
- Burgess, C, L Cowie, and M Gulliford. 2012. "Patients' Perceptions of Error in Long-Term Illness Care: Qualitative Study." *Journal of Health Services Research and Policy* 17 (3): 181–87.
-

-
- Burnard, Philip. 1991. "A Method of Analysing Interview Transcripts in Qualitative Research." *Nurse Education Today* 11 (6): 461–66.
- Burrell, Gibson, and Gareth Morgan. 1979. "Sociological Paradigms and Organisational Analysis - Elements of the Sociology of Corporate Life." *Sociological Paradigms and Organisational Analysis*, 448.
- Burton, Laura J., and Stephanie M. Mazerolle. 2011. "Survey Instrument Validity Part I: Principles of Survey Instrument Development and Validation in Athletic Training Education Research." *Athletic Training Education Journal* 6 (1): 27–35.
- Čagalj, Mario, Toni Perković, Marin Bugarić, and Shujun Li. 2015. "Fortune Cookies and Smartphones: Weakly Unreliable Channels to Counter Relay Attacks." *Pervasive and Mobile Computing* 20. Elsevier B.V.: 65–81.
- Cahill, William, and Marta Render. 1999. "Dynamic Simulation Modeling of ICU Bed Availability." In *Proceedings of the 1999 Winter Simulation Conference*, 1573–76.
- Centers for Medicare and Medicaid Services. n.d. "HCAHPS Quality Assurance Guidelines." <http://www.hcahpsonline.org/qaguidelines.aspx>.
- Chin, Wynne W, and P. R. Newsted. 1999. "Structural Equation Modeling Analysis With Small Samples Using Partial Least Squares." In *Statistical Strategies for Small Sample Research*, edited by Rick Hoyle, 307–41. Sage Publications.
- Cioppa, T., and T. Lucas. 2007. "Efficient Nearly Orthogonal and Space-Filling Latin Hypercubes." *Technometrics* 49 (1): 45–55.
- Cleary, P. D., S. Edgman-Levitan, M. Roberts, T. W. Moloney, W. McMullen, J. D. Walker, and T. L. Delbanco. 1991. "Patients Evaluate Their Hospital Care: A National Survey." *Health Affairs* 10 (4): 254–67.
- Collis, Jill, and Roger Hussey. 2009. *Business Research: A Practical Guide for Undergraduate and Postgraduate Students*. 3rd Ed. Palgrave Macmillan.
- Cornwell, Jocelyn. 2015. "Reframing the Work on Patient Experience Improvement." *Patient Experience Journal* 2 (1): 11–14.
- Coulter, Angela, Louise Locock, Sue Ziebland, and Joseph D Calabrese. 2014. "Collecting Data on Patient Experience Is Not Enough : They Must Be Used to Improve Care." *BMJ* 2225 (March).
- Cramm, Jane Murray, and Anna Petra Nieboer. 2012. "Self-Management Abilities, Physical Health and Depressive Symptoms among Patients with Cardiovascular Diseases, Chronic Obstructive Pulmonary Disease, and Diabetes." *Patient Education and Counseling* 87 (3). Elsevier Ireland Ltd: 411–15.
-

- Creswell, John. 2012. *Qualitative Inquiry and Research Design: Choosing among Five Approaches*. Third Ed. Sage Publications.
- Creswell, John, and Vicki Plano Clark. 2011. *Designing and Conducting Mixed Methods Research*. Second Ed. Sage Publications.
- Crocker, L, and J Algina. 1986. *Introduction to Classical and Modern Test Theory*. Holt, Reinhart and Winston, New York, NY.
- Cronin, J. G. 2003. "The Introduction of the Manchester Triage Scale to an Emergency Department in the Republic of Ireland." *Accident and Emergency Nursing* 11 (2): 121–25.
- Darke, Peta, Graeme Shanks, and Marianne Broadbent. 1998. "Successfully Completing Case Study Research : Combining Rigour , Relevance and Pragmatism." *Information Systems Journal* 8 (4): 273–89.
- Davies, Elizabeth, Dale Shaller, Susan Edgman-Levitan, Dana G Safran, Gary Oftedahl, John Sakowski, and Paul D Cleary. 2008. "Evaluating the Use of a Modified CAHPS Survey to Support Improvements in Patient-Centred Care: Lessons from a Quality Improvement Collaborative." *Health Expectations : An International Journal of Public Participation in Health Care and Health Policy* 11 (2). England: 160–76.
- DeCourcy, Anna, Elizabeth West, and David Barron. 2012. "The National Adult Inpatient Survey Conducted in the English National Health Service from 2002 to 2009: How Have the Data Been Used and What Do We Know as a Result?" *BMC Health Services Research* 12 (1). BioMed Central Ltd: 71.
- Delnoij, Diana M J. 2009. "Measuring Patient Experiences in Europe: What Can We Learn from the Experiences in the USA and England?" *European Journal of Public Health* 19 (4): 354–56.
- Derringer, G. 1994. "A Balancing Act : Optimizing a Product's Properties." *Quality Progress* 27 (6): 51–58.
- Doyle, Cathal, Laura Lennox, and Derek Bell. 2013. "A Systematic Review of Evidence on the Links between Patient Experience and Clinical Safety and Effectiveness." *BMJ Open Accessible Medical Research* 3 (1). England: 1–19.
- Doyle, Cathal, Julie Reed, Tom Woodcock, and Derek Bell. 2010. "Understanding What Matters to Patients - Identifying Key Patients' Perceptions of Quality." *JRSM Short Reports* 1 (1). England: 3.
- Easterby-Smith, Mark, Richard Thorpe, and Paul Jackson. 2011. *Management Research*. 4th Ed. Sage Publications.
- EHCI. 2016. "Euro Health Consumer Index 2016."

-
- Eisenhardt, K. M. 1989. "Building Theories from Case Research." *The Academy of Management Review* 14 (4): 532–50.
- Eldabi, Zahir Irani, and Ray Paul. 2002. "A Proposed Approach for Modelling Health-Care Systems for Understanding." *Journal of Management in Medicine* 16 (2): 170–87.
- Eldabi, R J Paul, and T Young. 2006. "Simulation Modelling in Healthcare: Reviewing Legacies and Investigating Futures." *Journal of the Operational Research Society* 58 (2): 262–70.
- Elder, Nancy C., and Kelley Barney. 2012. "But What Does It Mean for Me? Primary Care Patients' Communication Preferences for Test Results Notification." *Joint Commission Journal on Quality and Patient Safety* 38 (4).
- Eriksson, Ulrika, and Marianne Svedlund. 2007. "Struggling for Confirmation--Patients' Experiences of Dissatisfaction with Hospital Care." *Journal of Clinical Nursing* 16 (3). England: 438–46.
- Eton, David T., Jennifer L. Ridgeway, Mark Linzer, Deborah H. Boehm, Elizabeth A. Rogers, Kathleen J. Yost, Lila J. Finney Rutten, Jennifer L. St Sauver, Sara Poplau, and Roger T. Anderson. 2017. "Healthcare Provider Relational Quality Is Associated with Better Self-Management and Less Treatment Burden in People with Multiple Chronic Conditions." *Patient Preference and Adherence* 11: 1635–46.
- Fan, Xitao, Bruce Thompson, and Lin Wang. 1999. "Effects of Sample Size, Estimation Methods, and Model Specification on Structural Equation Modeling Fit Indexes." *Structural Equation Modeling: A Multidisciplinary Journal* 6 (1): 56--83.
- Farrington, Conor, Jenni Burt, Olga Boiko, John Campbell, and Martin Roland. 2016. "Doctors' Engagements with Patient Experience Surveys in Primary and Secondary Care: A Qualitative Study." *Health Expectations*, 1–10.
- Ferrand, Yann, Michael Magazine, and Uday Rao. 2010. "Comparing Two Operating-Room-Allocation Policies for Elective and Emergency Surgeries." In *Proceedings of the 2010 Winter Simulation Conference*.
- Forbat, Liz, Sandi Cayless, Kate Knighting, Jocelyn Cornwell, and Nora Kearney. 2009. "Engaging Patients in Health Care: An Empirical Study of the Role of Engagement on Attitudes and Action." *Patient Education and Counseling* 74 (1): 84–90.
- Gagliardi, Anna R., Louise Lemieux-Charles, Adalsteinn D. Brown, Terrence Sullivan, and Vivek Goel. 2008. "Barriers to Patient Involvement in Health Service Planning and Evaluation: An Exploratory Study." *Patient Education and Counseling* 70 (2): 234–41.
- Galen, Louise S van, Mikkel Brabrand, Tim Cooksley, Peter M van de Ven, Hanneke Merten, Ralph KL So, Loes van Hooff, et al. 2017. "Patients' and Providers'
-

-
- Perceptions of the Preventability of Hospital Readmission: A Prospective, Observational Study in Four European Countries.” *BMJ Quality & Safety*, no. June: 1–12.
- Gerteis, Margaret, Susan Edgman-Levitan, Jennifer Daley, and Thomas L. Delbanco. 1993. *Through the Patient’s Eyes: Understanding and Promoting Patient-Centered Care*. 1st Ed. Jossey-Bass.
- Ghosh, Manimay. 2014. “Measuring Patient Satisfaction: An Empirical Study in India.” *Leadership in Health Services* 27 (3). Emerald: 240–54.
- Gibbons, E., C. Casañas I Comabella, and R. Fitzpatrick. 2013. “A Structured Review of Patient-Reported Outcome Measures for Patients with Skin Cancer.” *British Journal of Dermatology* 168 (6): 1176–86.
- Giddings, Lynne S., and Barbara M. Grant. 2007. “A Trojan Horse for Positivism? A Critique of Mixed Methods Research.” *Advances in Nursing Science* 30 (1): 52–60.
- Glickman, Seth W., William Boulding, Matthew Manary, Richard Staelin, Matthew T. Roe, Robert J. Wolosin, E. Magnus Ohman, Eric D. Peterson, and Kevin a. Schulman. 2010. “Patient Satisfaction and Its Relationship with Clinical Quality and Inpatient Mortality in Acute Myocardial Infarction.” *Circulation: Cardiovascular Quality and Outcomes* 3 (2): 188–95.
- Gordon, Jane, Lorraine a Sheppard, and Sophie Anaf. 2010. “The Patient Experience in the Emergency Department: A Systematic Synthesis of Qualitative Research.” *International Emergency Nursing* 18 (2). Elsevier Ltd: 80–88.
- Greaves, Felix, Antony A Laverty, Daniel Ramirez Cano, Karo Moilanen, Stephen Pulman, Ara Darzi, and Christopher Millett. 2014. “Tweets about Hospital Quality: A Mixed Methods Study.” *BMJ Quality & Safety* 23 (10). England: 838–46.
- Greaves, Felix, Daniel Ramirez-Cano, Christopher Millett, Ara Darzi, and Liam Donaldson. 2013. “Harnessing the Cloud of Patient Experience: Using Social Media to Detect Poor Quality Healthcare.” *BMJ Quality & Safety* 22 (3): 251–55.
- Greene, Jennifer C, Valerie J Caracelli, and Wendy F Graham. 1989. “Toward a Conceptual Framework for Mixed-Method Evaluation Designs.” *Educational Evaluation and Policy Analysis* 11 (3): 255–74.
- Greenhalgh, Trisha. 2009. “Chronic Illness: Beyond the Expert Patient.” *Bmj* 338 (march): 629–31.
- Groene, Oliver, Onyebuchi A Arah, Niek S Klazinga, Cordula Wagner, Paul D Bartels, Solvejg Kristensen, Florence Saillour, et al. 2015. “Patient Experience Shows Little Relationship with Hospital Quality Management Strategies.” Edited by Delphine Sophie Courvoisier. *PLOS ONE* 10 (7). United States: e0131805.
-

-
- Guba, E. G., and Y. S Lincoln. 1994. "Competing Paradigms in Qualitative Research." In *Handbook of Qualitative Research*, edited by Norman K. Denzin and Yvonna S. Lincoln, 105–17. Sage Publications.
- Hargreaves, Dougal S, Felix Greaves, Charlotta Levay, Imogen Mitchell, Ursula Koch, Tobias Esch, Simon Denny, Jan C Frich, Jeroen Struijs, and Aziz Sheikh. 2015. "Comparison of Health Care Experience and Access Between Young and Older Adults in 11 High-Income Countries." *Journal of Adolescent Health*, July.
- Harper, Paul R. 2002. "A Framework for Operational Modelling of Hospital Resources." *Health Care Management Science* 5 (3): 165–73.
- Harper, Paul R, and H Gamlin. 2003. "Reduced Outpatient Waiting Times with Improved Appointment Scheduling: A Simulation Modelling Approach." *OR Spectrum* 25 (2): 207–22.
- Harrington, E. C. 1965. "The Desirability Function." *Industrial Quality Control* 21 (10): 494–98.
- Harrison, Gill, A Shafer, and M Mackay. 2005. "Modelling Variability in Hospital Bed Occupancy." *Health Care Management Science* 8 (4): 325–34.
- Holden, Mary T., and Patrick Lynch. 2004. "Choosing the Appropriate Methodology: Understanding Research Philosophy." *The Marketing Review* 4 (4): 397–409.
- Holzer, Barbara M, and Christoph E Minder. 2011. "A Simple Approach to Fairer Hospital Benchmarking Using Patient Experience Data." *International Journal for Quality in Health Care* 23 (5). England: 524–30.
- Howe, K. R. 1988. "Against the Quantitative-Qualitative Incompatibility Thesis or Dogmas Die Hard." *Educational Researcher* 17 (8): 10–16.
- Hoyle. 1995. *SEM: Concepts, Issues, and Applications*. Sage Publications, Thousand Oaks, California, USA.
- HSE. 2014. "Health Service National Service Plan 2014." <http://www.hse.ie/eng/services/publications/corporate/serviceplan2014/>.
- . 2016a. "Health Service National Service Plan 2016." <http://www.hse.ie/eng/services/publications/serviceplans/nsp16.pdf>.
- . 2016b. "Performance Report August / September 2016." <http://www.hse.ie/eng/services/publications/performance-reports/august-september-2016-performance-report-.pdf>.
- Hueston, William J., and Stephen M. Carek. 2011. "Patients' Preference for Physician Attire: A Survey of Patients in Family Medicine Training Practices." *Family Medicine*
-

43 (9): 643–47.

Institute of Medicine. 2001. *Crossing the Quality Chasm: A New Health System for the 21st Century*. Washington DC: National Academy Press.

Irish Society for Quality in Healthcare. 2010. “Measuring the Patient’s Experience of Hospital Services.”

Jackson, J.L., Judith Chamberlin, and Kurt Kroenke. 2001. “Predictors of Patient Satisfaction.” *Social Science & Medicine* 52: 609–620.

Jacobson, Sheldon H., Shane N. Hall, and James R. Swisher. 2006. “Discrete-Event Simulation of Health Care Systems.” In *International Series in Operations Research and Management Science* *International Series in Operations Research and Management Science*, 212–52. Springer New York LLC.

Jenkinson, C, A Coulter, S Bruster, N Richards, and T Chandola. 2002. “Patients’ Experiences and Satisfaction with Health Care: Results of a Questionnaire Study of Specific Aspects of Care.” *Quality and Safety in Health Care* 11 (4): 335–39.

Jha, Ashish K, E John Orav, Jie Zheng, and Arnold M Epstein. 2008. “Patients’ Perception of Hospital Care in the United States.” *The New England Journal of Medicine* 359 (18): 1921–31.

Johnson, R. Burke, and Anthony J. Onwuegbuzie. 2004. “Mixed Methods Research: A Research Paradigm Whose Time Has Come.” *Educational Researcher* 33 (7): 14–26.

Jun, J.B., S.H. Jacobson, and J.R. Swisher. 1999. “Application of Discrete-Event Simulation in Health Care Clinics: A Survey.” *Journal of the Operational Research Society* 50 (2).

Kaboli, Peter J, Justin M Glasgow, C Komal Jaipaul, William a Barry, Jill R Strayer, Barbara Mutnick, and Gary E Rosenthal. 2010. “Identifying Medication Misadventures: Poor Agreement among Medical Record, Physician, Nurse, and Patient Reports.” *Pharmacotherapy* 30 (5): 529–38.

Kaplan, Robert, and David Norton. 1992. *The Balanced Score Card: Translating Strategy into Action*. 1st Ed. Harvard Business Review Press.

Kenten, Charlotte, Ann Bowling, Nigel Lambert, Amanda Howe, and Gene Rowe. 2010. “A Study of Patient Expectations in a Norfolk General Practice.” *Health Expectations: An International Journal of Public Participation in Health Care and Health Policy* 13 (3). England: 273–84.

Kleijnen, Jack. 2008. “Response Surface Methodology for Constrained Simulation Optimization: An Overview.” *Simulation Modelling Practice and Theory* 16 (1): 50–64.

- Kleijnen, Jack, and R. Sargent. 2000. "A Methodology for Fitting and Validating Metamodels in Simulation." *European Journal of Operational Research* 120: 14–29.
- Kondracki, Nancy L., Nancy S. Wellman, and Daniel R. Amundson. 2002. "Content Analysis: Review of Methods and Their Applications in Nutrition Education." *Journal of Nutrition Education and Behavior* 34 (4): 224–30.
- Kothari, Chakravanti Rajagopalachari. 2004. *Research Methodology: Methods and Techniques*. New Age International.
- Lantz, Paula M., Nancy K. Janz, Angela Fagerlin, Kendra Schwartz, Lihua Liu, Indu Lakhani, Barbara Salem, and Steven J. Katz. 2005. "Satisfaction with Surgery Outcomes and the Decision Process in a Population-Based Sample of Women with Breast Cancer." *Health Services Research* 40 (3): 745–67.
- Lavela, Sherri L, and Andrew S. Gallan. 2014. "Evaluation and Measurement of Patient Experience." *Patient Experience Journal* 1 (1).
- Law, Averill M., and W. David Kelton. 1991. *Simulation Modeling and Analysis*. Second Ed. McGraw-Hill College.
- Lee, Allen S. 1989. "Case Studies as Natural Experiments." *Human Relations* 42 (2): 117–38.
- Livote, Elayne. 2009. "Introduction to Structural Equation Modeling." *Structural Equation Modeling: A Multidisciplinary Journal* 16 (3): 556–60.
- Lorant, Vincent, and Raj Bhopal. 2011. "Comparing Policies to Tackle Ethnic Inequalities in Health: Belgium 1 Scotland 4." *European Journal of Public Health* 21 (2): 235–40.
- Luxford, Karen, Dana Gelb Safran, and Tom Delbanco. 2011. "Promoting Patient-Centered Care: A Qualitative Study of Facilitators and Barriers in Healthcare Organizations with a Reputation for Improving the Patient Experience." *International Journal for Quality in Health Care* 23 (5): 510–15.
- Lyratzopoulos, G., M. Elliott, J. M. Barbieri, a. Henderson, L. Staetsky, C. Paddison, J. Campbell, and M. Roland. 2012. "Understanding Ethnic and Other Socio-Demographic Differences in Patient Experience of Primary Care: Evidence from the English General Practice Patient Survey." *BMJ Quality & Safety* 21 (1). England: 21–29.
- Manary, Matthew, William Boulding, Richard Staelin, and Seth W. Glickman. 2013. "The Patient Experience and Health Outcomes." *The New England Journal of Medicine* 368 (3): 199–201.
- Maslow, Abraham. 1943. "A Theory of Human Motivation." *Psychological Review* 50 (4):
-

370–96.

- McEvoy, Patrick, and Derek Richards. 2006. “A Critical Realist Rationale for Using a Combination of Quantitative and Qualitative Method.” *Journal Of Research In Nursing* 11 (1): 66–78.
- Mckay, M D, R J Beckman, and W J Conover. 1979. “A Comparison of Three Methods for Selecting Values of Input Variables in the Analysis of Output from a Computer Code.” *Technometrics* 21 (2): 239–45.
- McKee, Rebecca. 2013. “Ethical Issues in Using Social Media for Health and Health Care Research.” *Health Policy* 110 (2–3). Elsevier Ireland Ltd: 298–301.
- Mertens. 2009. *Transformative Research And Evaluations*. Guilford Press: New York.
- Mira, J J, J Vitaller, M Guilabert, and J Aranaz-Andres. 2011. “Quality of Information on Adverse Events Provided by the Surgical Patients.” *Revista de Calidad Asistencial* 27 (3): 175–80.
- Mirza, H., M. Ismail, Z.I. Sheikh, and H. Rasheed. 2016. “A Statistical Survey Report to Assess Patient Satisfaction with Performance of Hospital for Service Quality Improvement.” *Pakistan Journal of Medical and Health Sciences* 10 (4): 1399–1402.
- Morgan, Gareth, and Linda Smircich. 1980. “The Case for Qualitative Research Reproduced with Permission of the Copyright Owner . Further Reproduction Prohibited without Permission .” *Academy of Management Review* 5: 491–500.
- Muntlin, Asa, Lena Gunningberg, and Mark Carlson. 2006. “Patients’ Perceptions of Quality of Care at an Emergency Department and Identification of Areas for Quality Improvement.” *Journal of Clinical Nursing* 15 (8): 1045–56.
- Murrells, Trevor, Glenn Robert, Mary Adams, Elizabeth Morrow, and Jill Maben. 2013. “Measuring Relational Aspects of Hospital Care in England with the ‘Patient Evaluation of Emotional Care during Hospitalisation’ (PEECH) Survey Questionnaire.” *BMJ Open Accessible Medical Research* 3 (1). England.
- Myers, Michael. 1997. “Qualitative Research in Information Systems.” *MIS Quarterly* 21 (2): 241–42.
- Naidu, Aditi. 2009. “Factors Affecting Patient Satisfaction and Healthcare Quality.” *International Journal of Health Care Quality Assurance* 22 (4). Emerald: 366–81.
- Nairn, Stuart, Elaine Whotton, Christine Marshal, Mark Roberts, and Garry Swann. 2004. “The Patient Experience in Emergency Departments: A Review of the Literature.” *Accident and Emergency Nursing* 12 (3): 159–65.
- NHS. 2012. “National Quality Board Patient Experience Framework.”
-

- http://www.institute.nhs.uk/patient_experience/guide/the_policy_framework.html.
- NHS Choices. 2014. "The NHS Friends and Family Test." Accessed February 28. <http://www.nhs.uk/NHSEngland/AboutNHSServices/Pages/nhs-friends-and-family-test.aspx>.
- NICE, and National Clinical Guideline Centre. 2012. "Patient Experience in Adult NHS Services: Improving the Experience of Care for People Using Adult NHS Services." NHS.
- Onwuegbuzie, A, R Johnson, and K Collins. 2009. "Call for Mixed Analysis: A Philosophical Framework for Combining Qualitative and Quantitative Approaches." *International Journal of Multiple Research Approaches* 3 (2): 114–39.
- Otani, Koichiro, Brian Waterman, Kelly M Faulkner, Sarah Boslaugh, Thomas E Burroughs, and W Claiborne Dunagan. 2009. "Patient Satisfaction: Focusing On 'excellent'." *Journal of Healthcare Management / American College of Healthcare Executives* 54 (2). United States: 93.
- Parra Hidalgo, Pedro, Rosa María Bermejo Alegría, Adelia Más Castillo, Maria Dolores María Dolores Hidalgo Montesinos, Rafael Gomis Cebrián, José Eduardo Jose Eduardo Calle Urrea, Rosa Maria Bermejo Alegria, et al. 2014. "[Factors related to patient satisfaction with hospital emergency services]." *Gaceta sanitaria / S.E.S.P.A.S* 26 (2). Spain: 159–65.
- Parry, Julianne, and Udul Hewage. 2009. "Investigating Complaints to Improve Practice and Develop Policy." *International Journal of Health Care Quality Assurance* 22 (7): 663–69.
- Pietroni, P., and H. D. Chase. 1993. "Partners or Partisans? Patient Participation at Marylebone Health Centre." *British Journal of General Practice* 43 (373): 341–44.
- Pines, Jesse M., Sanjay Iyer, Maureen Disbot, Judd E. Hollander, Frances S. Shofer, and Elizabeth M. Datner. 2008. "The Effect of Emergency Department Crowding on Patient Satisfaction for Admitted Patients." *Academic Emergency Medicine* 15 (9): 825–31.
- Rahmqvist, Mikael, and Ana-Claudia Bara. 2010. "Patient Characteristics and Quality Dimensions Related to Patient Satisfaction." *International Journal for Quality in Health Care* 22 (2): 86–92.
- Ramirez, Adrian, John Fowler, and Theresa Wu. 2009. "Analysis of Ambulance Diversion Policies for a Large-Size Hospital." In *Proceedings of the 2009 Winter Simulation Conference*.
- Reeves, R, E West, D Barron, Reeves R., West E., and Barron D. 2013. "Facilitated Patient Experience Feedback Can Improve Nursing Care: A Pilot Study for a Phase III Cluster
-

- Randomised Controlled Trial.” *BMC Health Services Research* 13. R. Reeves, School of Health and Social Care, University of Greenwich, London SE9 2UG, UK.: 259.
- Remenyi, Dan, Brian Williams, Arthur Money, and Ethne Swartz. 1998. *Doing Research in Business and Management*. Sage Publications.
- Ridgeway, J L, J S Egginton, K Tiedje, M Linzer, D Boehm, S Poplau, D R de Oliveira, L Odell, V M Montori, and D T Eton. 2014. “Factors That Lessen the Burden of Treatment in Complex Patients with Chronic Conditions: A Qualitative Study.” *Patient Prefer Adherence* 8: 339–51.
- Robert, Glenn, and Jocelyn Cornwell. 2013. “Rethinking Policy Approaches to Measuring and Improving Patient Experience.” *Journal of Health Services Research & Policy* 18 (2): 67–69.
- Robert, Glenn, Jocelyn Cornwell, Sally Brearley, Catherine Foot, Joanna Goodrich, Nikki Joule, Ros Levenson, et al. 2011. “What Matters to Patients? - Developing the Evidence Base for Measuring and Improving Patient Experience.” [http://www.wales.nhs.uk/sites3/documents/420/Final Project Report pdf doc january 2012 \(2\).pdf](http://www.wales.nhs.uk/sites3/documents/420/Final%20Project%20Report%20pdf%20doc%20january%202012%20(2).pdf).
- Robinson, Stewart. 2008. “Conceptual Modelling for Simulation Part II: A Framework for Conceptual Modelling.” *Journal of the Operational Research Society* 59 (3): 291–304.
- Robson, Colin. 1993. *Real World Research: A Resource for Social Scientists and Practitioners-Researchers*. Massachusetts: Blackwell Publishers.
- Roland, Martin, Marc Elliott, Georgios Lyratzopoulos, Josephine Barbieri, Richard a Parker, Patten Smith, Peter Bower, and John Campbell. 2009. “Reliability of Patient Responses in Pay for Performance Schemes: Analysis of National General Practitioner Patient Survey Data in England.” *BMJ (Clinical Research Ed.)* 339 (March): b3851.
- Rozenblum, Ronen, and David W Bates. 2013. “Patient-Centred Healthcare, Social Media and the Internet: The Perfect Storm?” *BMJ Quality & Safety* 22 (3): 183–86.
- Rozenblum, Ronen, Marianne Lisby, Peter M Hockey, Osnat Levtzion-Korach, Claudia a Salzberg, Nechama Efrati, Stuart Lipsitz, and David W Bates. 2013. “The Patient Satisfaction Chasm: The Gap between Hospital Management and Frontline Clinicians.” *BMJ Quality & Safety* 22 (3): 242–50.
- Sanchez, S. M. 2005. “Guidelines for Designing Simulation Experiments.”
- Sanderson, Hugh. 2000. “Information Requirements for Clinical Governance.” *British Journal of Clinical Governance* 5 (1). MCB UP Ltd: 52–57.
-

- Sandoval, G.A. A., C. Levinton, P. Blackstien-Hirsch, and A.D. Adalsteinn D. Brown. 2006. "Selecting Predictors of Cancer Patients' Overall Perceptions of the Quality of Care Received." *Annals of Oncology* 17 (1). England: 151–56.
- Saunders, Mark, Philip Lewis, and Adrian Thornhill. 2009. *Research Methods for Business Students*. 5th Ed. Prentice Hall.
- Schnitzer, Susanne, Adelheid Kuhlmeier, Holger Adolph, Julie Holzhausen, and Liane Schenk. 2012. "Complaints as Indicators of Health Care Shortcomings: Which Groups of Patients Are Affected?" *International Journal for Quality in Health Care* 24 (5): 476–82.
- Schoenfelder, Tonio, Joerg Klewer, and Joachim Kugler. 2011. "Determinants of Patient Satisfaction: A Study among 39 Hospitals in an in-Patient Setting in Germany." *International Journal for Quality in Health Care* 23 (5). England: 503–9.
- Schwappach, David L B, Annette Blandszun, Dieter Conen, Heinz Ebner, Klaus Eichler, and Marc Anton Hochreutener. 2003. "'Emerge': Benchmarking of Clinical Performance and Patients' Experiences with Emergency Care in Switzerland." *International Journal for Quality in Health Care* 15 (6): 473–85.
- Scott, J., P. Dawson, and D. Jones. 2012. "Do Older Patients' Perceptions of Safety Highlight Barriers That Could Make Their Care Safer during Organisational Care Transfers?" *BMJ Quality & Safety* 21 (2): 112–17.
- Secanell, Mariona, Oliver Groene, Onyebuchi Arah, Maria Andrée Andree Lopez, Basia Kutryba, Holger Pfaff, Niek Klazinga, et al. 2014. "Deepening Our Understanding of Quality Improvement in Europe (DUQuE): Overview of a Study of Hospital Quality Management in Seven Countries." *International Journal for Quality in Health Care : Journal of the International Society for Quality in Health Care / ISQua* 26 Suppl 1 (March). England: 5–15.
- Seghieri, Guillermo A. Sandoval, Adalsteinn D. Brown, and Sabina Nuti. 2009. "Where to Focus Efforts to Improve Overall Ratings of Care and Willingness to Return: The Case of Tuscan Emergency Departments." *Academic Emergency Medicine* 16 (2): 136–44.
- Shadmi, Efrat. 2013. "Quality of Hospital to Community Care Transitions: The Experience of Minority Patients." *International Journal for Quality in Health Care* 25 (3). England: 255–60.
- Shaller, Dale, and Shaller Consulting. 2007. "Patient-Centered Care: What Does It Take?" *Commonwealth Fund*. www.commonwealthfund.org.
- Sheard, Laura, Claire Marsh, Jane O'Hara, Gerry Armitage, John Wright, and Rebecca Lawton. 2017. "The Patient Feedback Response Framework ??? Understanding Why UK Hospital Staff Find It Difficult to Make Improvements Based on Patient
-

- Feedback: A Qualitative Study.” *Social Science and Medicine* 178. Elsevier Ltd: 19–27.
- Silva, Debra De. 2013. “Measuring the Patient Experience.” *The Health Foundation*. England. <http://www.ncbi.nlm.nih.gov/pubmed/22433268>.
- Sitzia, John. 1999. “How Valid and Reliable Are Patient Satisfaction Data? An Analysis of 195 Studies.” *International Journal for Quality in Health Care* 11 (4): 319–28.
- Smirnova, Alina, Kiki M J M H Lombarts, Onyebuchi A. Arah, and Cees P M van der Vleuten. 2017. “Closing the Patient Experience Chasm: A Two-Level Validation of the Consumer Quality Index Inpatient Hospital Care.” *Health Expectations*, no. January: 1–8.
- Soleimanpour, Hassan, Changiz Gholipouri, Shaker Salarilak, Payam Raoufi, Reza Vahidi, Amirhossein Rouhi, Rouzbeh Ghafouri, and Maryam Soleimanpour. 2011. “Emergency Department Patient Satisfaction Survey in Imam Reza Hospital, Tabriz, Iran.” *International Journal of Emergency Medicine* 4 (1). England: 2.
- Soremekun, Olanrewaju a., James K. Takayesu, and Stephen J. Bohan. 2011. “Framework for Analyzing Wait Times and Other Factors That Impact Patient Satisfaction in the Emergency Department.” *The Journal of Emergency Medicine* 41 (6). Elsevier Inc.: 686–92.
- Squire, Sarah, Michael Greco, Bridget O’Hagan, Kathy Dickinson, and Debbie Wall. 2006. “Being Patient-Centred: Creating Health Care for Our Grandchildren.” *Clinical Governance: An International Journal* 11 (1): 8–16.
- Staniszewska, Sophie, and Laila Ahmed. 1999. “The Concepts of Expectation and Satisfaction: Do They Capture the Way Patients Evaluate Their Care?” *Journal of Advanced Nursing* 29 (2): 364–72.
- Staniszewska, Sophie, Felicity Boardman, Lee Gunn, Julie Roberts, Diane Clay, Kate Seers, Jo Brett, Liz Avital, Ian Bullock, and Norma O’Flynn. 2014. “The Warwick Patient Experiences Framework: Patient-Based Evidence in Clinical Guidelines.” *International Journal for Quality in Health Care* 26 (2): 151–57.
- Stein, Spencer M, Michael Day, Raj Karia, Lorraine Hutzler, and J. A. Bosco. 2015. “Patients’ Perceptions of Care Are Associated With Quality of Hospital Care: A Survey of 4605 Hospitals.” *American Journal of Medical Quality* 30 (4). United States: 382–88.
- Street, Richard L., Gregory Makoul, Neeraj K. Arora, and Ronald M. Epstein. 2009. “How Does Communication Heal? Pathways Linking Clinician-Patient Communication to Health Outcomes.” *Patient Education and Counseling* 74 (3): 295–301.
- Suman, B, and P Kumar. 2006. “A Survey of Simulated Annealing as a Tool for Single

-
- and Multiobjective Optimization.” *Journal of the Operational Research Society* 57 (10): 1143–60.
- Sun, Benjamin C, James Adams, E J Orav, Donald W Rucker, Troyen a Brennan, Helen R Burstin, J D MD, Helen R Burstin, and M P H MD. 2000. “Determinants of Patient Satisfaction and Willingness to Return with Emergency Care.” *Annals of Emergency Medicine* 35 (5): 426–34.
- Tashakkori, Abbas, and Charles Teddlie. 1998. *Mixed Methodology*. 1st Ed. Sage Publications.
- Thackeray, R, Brad L Neiger, Amanda K Smith, and Sarah B Van Wagenen. 2012. “Adoption and Use of Social Media among Public Health Departments.” *BMC Public Health* 12 (1). BioMed Central Ltd: 242.
- Thorwarth, Michael, Wael Rashwan, and Amr Arisha. 2015. “An Analytical Representation of Flexible Resource Allocation in Hospitals.” *Flexible Services and Manufacturing Journal* 26 (93): 1989–2014.
- Tsianakas, Vicki, Jill Maben, Theresa Wiseman, Glenn Robert, Alison Richardson, Peter Madden, Mairead Griffin, and Elizabeth A Davies. 2012. “Using Patients’ Experiences to Identify Priorities for Quality Improvement in Breast Cancer Care: Patient Narratives, Surveys or Both?” *BMC Health Services Research* 12 (1). England: 271.
- Verhoef, Lise M, Tom H Van de Belt, Lucien J LPG Engelen, Lisette Schoonhoven, and Rudolf B Kool. 2014. “Social Media and Rating Sites as Tools to Understanding Quality of Care: A Scoping Review.” *Journal of Medical Internet Research* 16 (2). Canada.
- Vieth, Teri L, and Karin V Rhodes. 2006. “The Effect of Crowding on Access and Quality in an Academic ED.” *The American Journal of Emergency Medicine* 24 (7). United States: 787–94.
- Welch, S. J. 2010. “Twenty Years of Patient Satisfaction Research Applied to the Emergency Department: A Qualitative Review.” *American Journal of Medical Quality* 25 (1): 64–72.
- Welty, Elisabeth, Valerie A Yeager, Claude Ouimet, and Nir Menachemi. 2012. “Patient Satisfaction Among Spanish-Speaking Patients in a Public Health Setting.” *Journal for Healthcare Quality* 34 (5). United States: 31–38.
- Williams, Carrie. 2007. “Research Methods.” *Journal of Business & Economic Research* 5 (3): 65–72.
- Wong, Eliza, Angela Coulter, Annie W L Cheung, Carrie H K Yam, E K Yeoh, and Sian M Griffiths. 2012. “Patient Experiences with Public Hospital Care: First Benchmark
-

- Survey in Hong Kong.” *Hong Kong Medical Journal* 18 (5). China: 371–80.
- Wong, Eliza, Angela Coulter, Annie WL Cheung, Carrie HK Yam, Eng-Kiong Yeoh, and Sian Griffiths. 2013. “Item Generation in the Development of an Inpatient Experience Questionnaire: A Qualitative Study.” *BMC Health Services Research* 13 (1). England: 265.
- Wong, Eliza, Angela Coulter, Paul Hewitson, Annie W L Cheung, Carrie H K Yam, Siu Fai Lui, Wilson W S Tam, and Eng-Kiong Yeoh. 2015. “Patient Experience and Satisfaction with Inpatient Service: Development of Short Form Survey Instrument Measuring the Core Aspect of Inpatient Experience.” *PloS One* 10 (4). United States: e0122299.
- Yeo, In-Kwon I.K., and Richard A. Johnson. 2000. “A New Family of Power Transformations to Improve Normality or Symmetry” 87 (4): 954–59.
- Yin, Robert K. 2011. *Applications of Case Study Research*. Sage Publications.
- . 2014. *Case Study Research: Design and Methods*. Edited by Sage Publications.
- Young, Staci, Marie Wolf, Paula Lucey, and Cheryl A. Maurna. 2004. “The Milwaukee General Assistance Medical Program: Patient Perspectives on Primary Care in an Urban Safety Net.” *Wisconsin Medical Journal* 103 (7): 56–60.

APPENDIX 1: INTERVIEW QUESTIONS**Patient Interview**

- 1) Gender: Male Female
 - 2) Age Group: 18-24 years 25-34 years
 35-49 years 50-64 years 65 years or above
 - 3) How long were you in the hospital? _____
 - 4) How many hospital's visits have you had in the last 12 months?
 - Describe your current hospital's visit so far. Elaborate why is it good. Give me an example on why it is so good.
 - (If more than 1) What has improved from your last experience?
 - (If more than 1) What should have changed to improve your hospital's experience?
 - 5) Describe your experience with the nursing staff
 - Courtesy and respect
 - Listen carefully
 - Explain things in a way you can understand
 - Respond immediately
 - 6) Describe your experience with the doctors
 - Courtesy and respect
 - Listen carefully
 - Explain things in a way you can understand
 - Respond immediately
 - 7) What do you think of the cleanliness of the ward, toilets and bathrooms?
 - 8) How often did the doctors explain the risks and benefits of the procedures in a way you can understand?
 - 9) Are you happy with the level of involvement that you have in relation to your care during your stay? (How much involvement did you have in relation to your care during your stay?)
 - 10) Has anyone from your family or friends been given enough opportunity to talk to a doctor if they wanted to?
 - 11) Have you been given privacy while being examined or treated in the hospital?
 - 12) Overall, how does that visit make you feel? How do you feel you were treated on a personal level? (Respect and dignity)
 - 13) What do you feel about the communication and information provided to you?
-

- With initial results?
 - With subsequent results?
 - Verbal/written communication?
- 14) Sometimes in a hospital, doctors/nurses will say one thing and another will say something quite different.
- Did this happen to you?
 - How often?
 - Can you give me an example?
- 15) Have you ever been in pain while in the hospital?
1. Describe how the doctors and nurses managed and controlled your pain
 - Did doctors/nurses explain the amount of pain to expect in your hospital experience
- 16) Are you happy about the information you received about your condition? Do you feel it was enough to allow you to make informative decisions? [Asking questions – Challenging staff]
- 17) Did you receive written/verbal information about how to manage your condition and recovery at home?
1. Was there something that you didn't understand about your condition and treatment and you felt unable to ask for more explanation from the medical staff?
 2. Have you been aware about the danger signals regarding your condition and treatment to watch for after you went home?
- 18) How was your discharge process from the hospital, and how long did you have to wait to be discharged?
- 19) Have you been admitted to the hospital previously?
- Describe your admission process
 - How long did you have to wait for a bed?
 - Were the admission staff helpful?
 - Have you been provided with enough information about your stay?
- 20) What is the factor that had a major impact on your experience?
- 21) In an ideal world, can you describe the perfect hospital experience?

Nurse Interviews

a) Organizational Support Subscale (Responses should be scored as follows: 1 = Strongly Disagree, 2 = Somewhat Disagree, 3 = Neutral, 4= Somewhat Agree, 5 =Strongly Agree)

- 1- Physicians and nurses have good working relationships.
- 2- Much teamwork between nurses and doctors.
- 3- Nurses control their own practice.
- 4- Enough time and opportunity to discuss patient care problems with other nurses/doctors.
- 5- Enough registered nurses to provide a good quality patient care.
- 6- Freedom to make important patient care and work decisions.
- 7- Often placed in a position of having to do things that are against your nursing judgment.
- 8- Patient assignments improve continuity of care (i.e. the same nurse cares for the patient from one day to the next).
- 9- Adequate support services allow you to spend time with your patients.

b) Thematic questions

- 1- How is the CNM work different from other nurses?
- 2- In what way do medical staff affect experiences of patients?
- 3- Which elements of your daily practice influence patient experience?
- 4- Do you think that high levels of occupancy in the unit affect the experience of patients?
- 5- Do you feel that patients from this unit go home with a positive experience rather than patients from other units?
- 6- In your opinion, what current factors of the unit are considered constraining and which are considered facilitating to improve the patient experience?

Doctors Interview

- 1- Role: Intern SHO Registrar
 Consultant
- 2- How long have you been with the unit?
- 3- Do you believe that the experience of patients is affected by medical staff rostered on the day?
- 4- In what ways, do medical staff affect the experience of patients?
- 5- In your opinion, what other factors do affect the experience of patients?
- 6- Do you think that patients from your unit go home with a more positive experience than patients in other similar units?
- 7- What elements does this unit have that can be considered facilitators to improve the patient experience?
- 8- In an ideal world, what elements you'd love to have in the unit to help improve the experience?
- 9- In some studies, in the UK, there was a mention that the presence of family and friends of the patient with them is very important and the possibility of them asking questions and that their concerns are being answered. Would you agree with that?
- 10- Do you try to involve your patient in all decisions regarding his/her condition or do you prefer to inform him about it and have the communication channels open for him to ask questions?
- 11- Do you think it's important for patients to be involved in the decision-making process about their condition?
- 12- In your opinion, is it important for patients that they have a plan for how to manage their conditions and be aware of what they need to look at home after being discharged or they're more interested to have their condition stable now and that their pain is under control?
-

APPENDIX 2: PATIENT EXPERIENCE SURVEY

Patient Experience Survey

Instructions for the survey:

This survey is about your overall experience in the hospital. It asks for **your opinion** about your most recent visit/stay in the hospital only. Information from the survey will be used to help the hospital improve services to patients.

- Not everybody receives all services. If you did **not** use a particular service while in hospital just mark “**Does not apply**” box.
- There are no right or wrong answers. It is your opinion that is important
- Your opinions are important
- **The survey is completely confidential.** No information that will identify you will be given to anyone at the hospital

Thank you for your valuable feedback

I. Demographics

1. What is your gender?
 - Male
 - Female
2. To which age group do you belong?
 - 18 – 24 years
 - 25 – 34 years
 - 35 – 49 years
 - 50 – 64 years
 - 65 years or older
3. What is your education level?
 - Primary
 - Secondary
 - Third Level
4. How long were you in the hospital?
 - Less than 1 day

- 1 – 2 days
 - 2- 4 days
 - 4 – 8 days
 - 8 – 12 days
 - More than 12 days
5. How many hospital visits have you had in the past year?
- None
 - 1 – 2 visits
 - 2 - 4 visits
 - 5 – 10 visits
 - More than 10 visits 2 visits

Patient Experience Survey

		Most	Half	Seldom	Never	Does not apply
I. Access to Care	Always	of the	of the			
		time	time			
1. Did you have to be admitted to a bed?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2. Did you have to wait to undergo your tests?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
II. Continuity of Care	Always	Most of the	Half of the	Seldom	Never	Does not apply
		time	time			
1. How often did you receive verbal/written information about how to manage your condition and recovery at home?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
III. Empathy and Respect	Always	Most of the	Half of the	Seldom	Never	Does not apply
		time	time			
1. Overall, how often were you treated with respect and dignity while in the hospital?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2. How often were you given privacy while being examined or treated?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
IV. Hospital Environment & Layout	Always	Most of the	Half of the	Seldom	Never	Does not apply
		time	time			
1. Was the hospital wards and toilets kept clean?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2. Did the doctors and nurses wash or clean their hands before touching you?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

	Always	Most of the time	Half of the time	Seldom	Never	Does not apply
V. Family and Friends						
1. How often did staff members have enough time to answer your family's questions and concerns?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
VI. Information and Communication						
1. How often did you receive enough information about your condition?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2. How often did you receive information about your test results?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3. How often did members of staff communicate with you the reasons of tests and procedures?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
VII. Pain Management						
1. How often was your pain well controlled?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2. Did doctors/nurses explain the amount of pain to expect?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
VIII. Patient Involvement						
1. Did you receive enough information about your condition and treatment?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2. Did staff involve you in decisions about your care and treatment?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

	Always	Most of the time	Half of the time	Seldom	Never	Does not apply
IX. Staff Collaboration and Communication						
1. Did the nurses treat you with courtesy and respect?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2. Did the nurses listen to you carefully?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3. Did the nurses explain things to you in a way you can understand?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4. Did the doctors treat you with courtesy and respect?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5. Did the doctors listen to you carefully?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6. Did the doctors explain things to you in a way you can understand?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7. Did the doctors/nurses say different things?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

X. Rate your overall satisfaction with the hospital

- 1- Very Poor
- 2- Very Good
- 3- Fair
- 4- Very Good
- 5- Excellent

XI. Are you willing to return to the hospital?

- Yes
- No

XII. Are you willing to recommend the hospital to your family and friends?

- Yes
- No

APPENDIX 3: PLS ANALYSIS

Correlations between experience dimensions

	Access	Respect	Hospital	Staff	Info	Continuity	Pain	Family	Involvement	Experience
Access	0.88	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Respect	0.42	0.92	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hospital	0.49	0.50	0.91	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Staff	0.31	0.29	0.24	0.90	0.00	0.00	0.00	0.00	0.00	0.00
Info	0.52	0.46	0.52	0.42	0.79	0.00	0.00	0.00	0.00	0.00
Continuity	0.32	0.24	0.34	0.38	0.40	1.00	0.00	0.00	0.00	0.00
Pain	0.57	0.47	0.57	0.31	0.48	0.26	0.85	0.00	0.00	0.00
Family	0.15	0.11	0.13	0.25	0.18	-0.07	0.22	1.00	0.00	0.00
Involvement	0.36	0.37	0.45	0.23	0.36	0.42	0.53	0.03	0.98	0.00
Experience	0.62	0.53	0.61	0.29	0.53	0.31	0.53	0.12	0.41	0.91

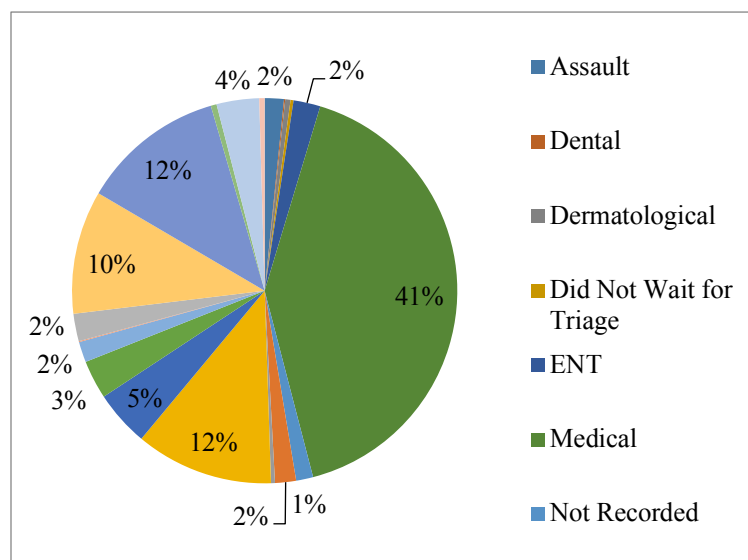
Factor Loadings

	Access	Continuity	Hospital	Family	Info	Involvement	Pain	Respect	Staff
Access1	0.057	0.003	-0.046	-0.110	-0.092	0.011	0.013	0.022	0.032
Access2	0.409	-0.014	0.116	0.095	0.234	0.129	0.177	0.164	0.217
Cont1	0.147	1.000	0.126	0.206	0.183	0.030	0.224	0.111	0.246
Hospital1	0.300	0.071	0.685	0.199	0.427	0.329	0.426	0.347	0.156
Hospital2	0.237	0.101	0.617	0.196	0.309	0.317	0.303	0.301	0.218
Family1	0.195	0.003	0.200	1.000	0.434	0.042	0.195	0.127	0.211
Info1	0.386	0.124	0.402	0.153	0.693	0.245	0.341	0.300	0.179
Info2	0.295	0.124	0.409	0.105	0.544	0.162	0.267	0.334	0.109
Info3	0.382	0.153	0.303	0.463	0.696	0.332	0.347	0.345	0.480
Inv1	0.186	0.045	0.240	0.114	0.160	0.600	0.229	0.232	0.115
Inv2	0.321	0.181	0.324	0.256	0.287	0.792	0.515	0.236	0.183
Pain1	0.613	0.103	0.543	0.211	0.473	0.376	0.839	0.448	0.210
Pain2	0.323	0.255	0.399	0.124	0.297	0.221	0.616	0.286	0.268
Respect1	0.085	-0.085	0.064	0.126	0.077	0.186	0.246	0.329	0.073
Respect2	0.417	0.074	0.460	0.336	0.412	0.320	0.399	0.794	0.186
Staff1	0.107	0.054	0.135	0.047	0.260	-0.005	0.047	0.182	0.227
Staff2	0.402	0.098	0.379	0.241	0.388	0.256	0.417	0.279	0.801
Staff3	0.302	0.032	0.484	0.113	0.326	0.276	0.351	0.165	0.857
Staff4	0.225	0.147	0.250	0.203	0.338	0.363	0.289	0.211	0.591
Staff5	0.033	0.107	0.027	-0.007	0.158	0.269	0.182	0.135	0.360
Staff6	0.170	0.090	0.101	0.110	0.247	-0.003	0.132	0.217	0.482
Staff7	0.284	0.259	0.233	0.306	0.374	0.051	0.204	0.196	0.790
Staff8	0.167	0.050	0.143	0.391	0.131	0.237	0.174	0.111	0.539

APPENDIX 4: STATISTICAL ANALYSIS OF ED DATA

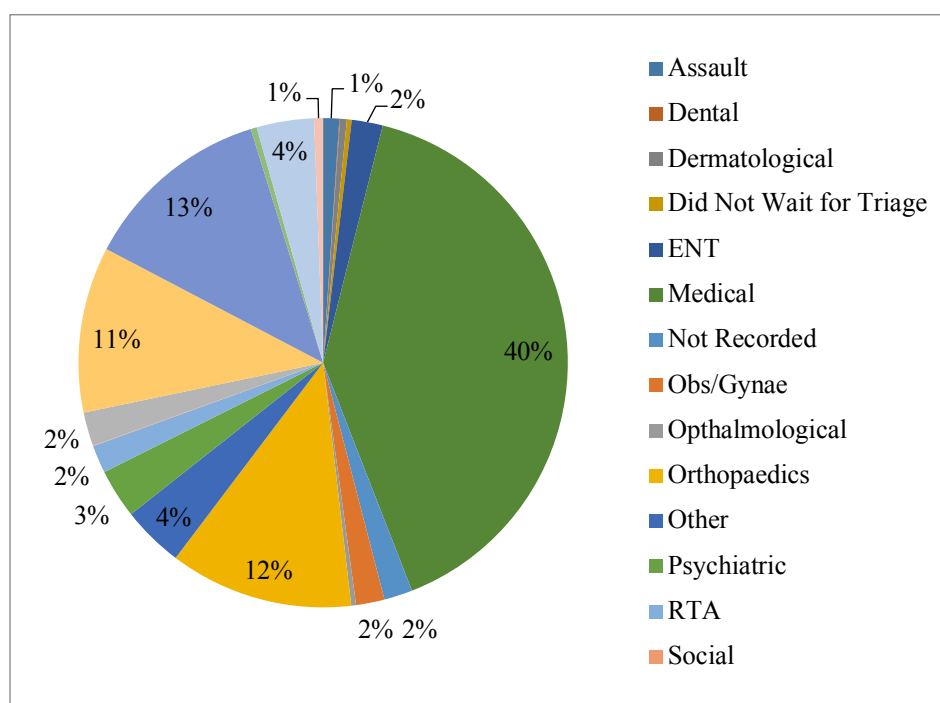
Distribution of ED patients in a 24 hours day

Clinical Group	No.	%	Cat. 0	Cat. 1	Cat. 2	Cat. 3	Cat. 4	Cat. 5	Blank
Assault	329	2%		2	35	177	109	6	
Dental	21	0%				12	6	3	
Dermatological	91	0%			2	29	43	17	
DNW	52	0%	1					51	
ENT	463	2%		1	55	276	120	11	
<i>Medical</i>	<i>8460</i>	<i>41%</i>		<i>122</i>	<i>2184</i>	<i>4693</i>	<i>1283</i>	<i>177</i>	<i>1</i>
Not Recorded	293	1%		1	1	2	1	1	287
Obs/Gynae	361	2%			43	217	93	7	1
Ophthalmological	68	0%		1	15	36	12	4	
Orthopaedics	2373	12%		2	183	973	1061	154	
Other	959	5%		6	44	334	412	163	
Psychiatric	665	3%			322	309	22	12	
RTA	353	2%		5	96	170	79	3	
Social	16	0%				1	5	10	
Sports Injury	473	2%			32	208	218	15	
Surgery	2122	10%		3	219	1229	620	51	
Trauma	2469	12%		29	242	1033	1101	63	1
Unknown	100	0%			28	37	10	25	
Urology	732	4%			136	424	163	9	
Vascular	92	0%			12	37	28	15	
Total	20492	100%	1	172	3649	10197	5386	797	290



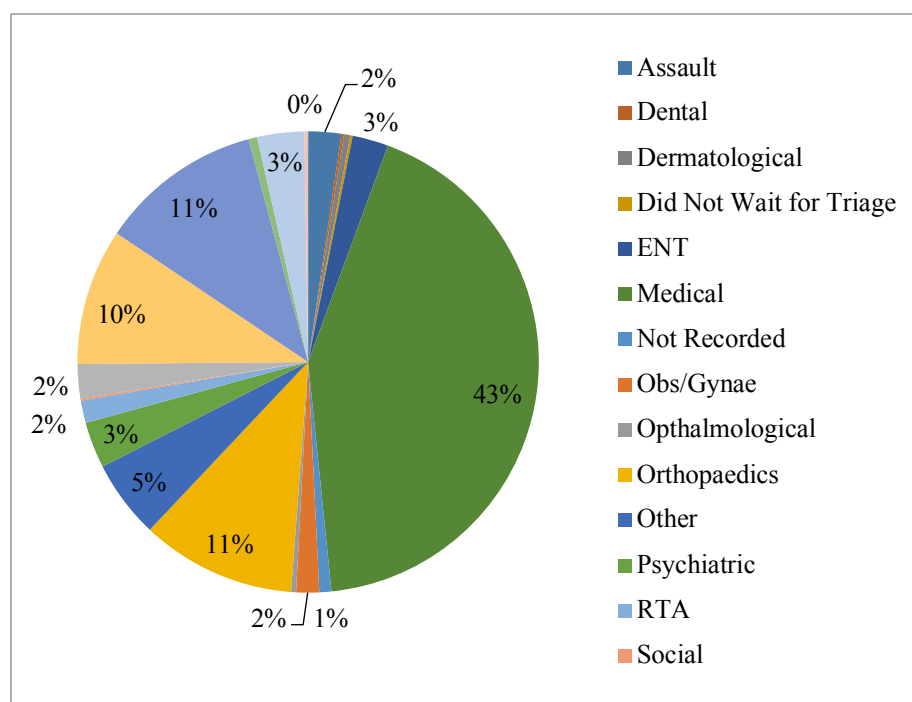
Distribution of ED patients from 9 a.m. to 6 p.m.

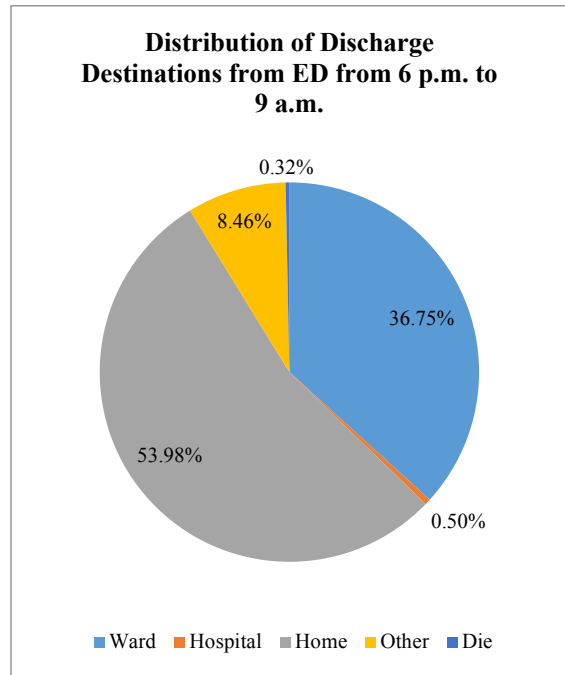
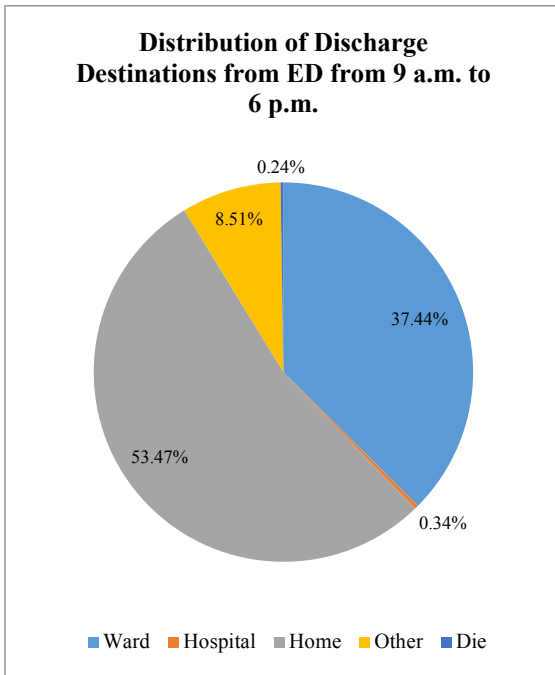
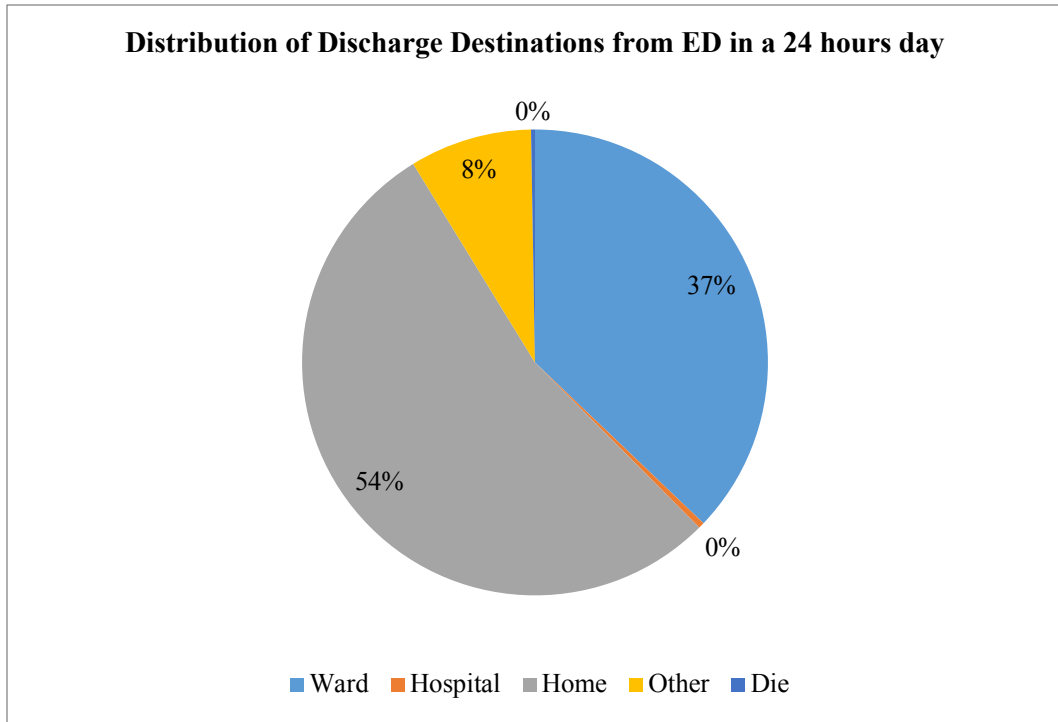
Clinical Group	No.	%	Cat. 0	Cat. 1	Cat. 2	Cat. 3	Cat. 4	Cat. 5	Blank
Assault	123	1%			10	59	52	2	
Dental	5	0%				2	2	1	
Dermatological	52	0%			1	16	21	14	
DNW	37	0%	1					36	
ENT	238	2%			32	135	64	7	
<i>Medical</i>	<i>4656</i>	<i>40%</i>		<i>56</i>	<i>1124</i>	<i>2629</i>	<i>744</i>	<i>102</i>	<i>1</i>
Not Recorded	218	2%		1		1	1	1	214
Obs/Gynae	218	2%			20	131	62	4	1
Ophthalmological	37	0%			8	19	6	4	
Orthopaedics	1407	12%		1	97	535	674	100	
Other	472	4%		2	16	134	220	100	
Psychiatric	377	3%			191	170	9	7	
RTA	213	2%		3	57	105	46	2	
Social	4	0%				1	1	2	
Sports Injury	259	2%			14	105	134	6	
Surgery	1271	11%		1	116	734	398	22	
Trauma	1453	13%		15	132	577	682	46	1
Unknown	46	0%			10	15	4	17	
Urology	439	4%			79	255	99	6	
Vascular	69	1%			10	28	20	11	
Total	11594	100%	1	79	1917	5651	3239	490	217



Distribution of ED patients from 6 p.m. to 9 a.m.

Clinical Group	Total	%	Cat. 0	Cat. 1	Cat. 2	Cat. 3	Cat. 4	Cat. 5	Blank
Assault	206	2%	0	2	25	118	57	4	0
Dental	16	0%	0	0	0	10	4	2	0
Dermatological	39	0%	0	0	1	13	22	3	0
DNW	15	0%	0	0	0	0	0	15	0
ENT	225	3%	0	1	23	141	56	4	0
<i>Medical</i>	<i>3804</i>	<i>43%</i>	<i>0</i>	<i>66</i>	<i>1060</i>	<i>2064</i>	<i>539</i>	<i>75</i>	<i>0</i>
Not Recorded	75	1%	0	0	1	1	0	0	73
Obs/Gynae	143	2%	0	0	23	86	31	3	0
Ophthalmological	31	0%	0	1	7	17	6	0	0
Orthopaedics	966	11%	0	1	86	438	387	54	0
Other	487	5%	0	4	28	200	192	63	0
Psychiatric	288	3%	0	0	131	139	13	5	0
RTA	140	2%	0	2	39	65	33	1	0
Social	12	0%	0	0	0	0	4	8	0
Sports Injury	214	2%	0	0	18	103	84	9	0
Surgery	851	10%	0	2	103	495	222	29	0
Trauma	1016	11%	0	14	110	456	419	17	0
Unknown	54	1%	0	0	18	22	6	8	0
Urology	293	3%	0	0	57	169	64	3	0
Vascular	23	0%	0	0	2	9	8	4	0
<i>Grand Total</i>	<i>8898</i>	<i>100%</i>	<i>0</i>	<i>93</i>	<i>1732</i>	<i>4546</i>	<i>2147</i>	<i>307</i>	<i>73</i>



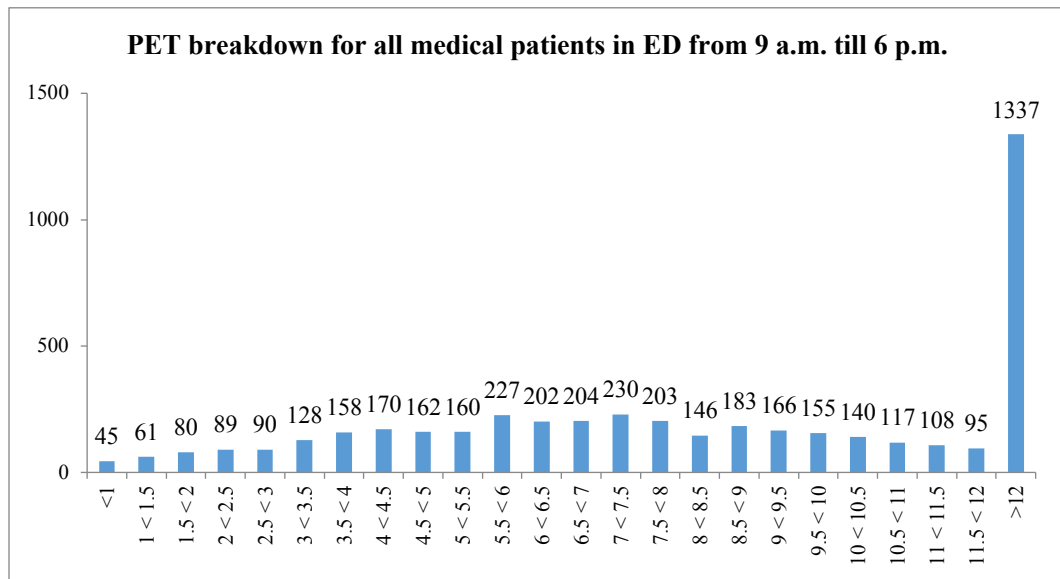
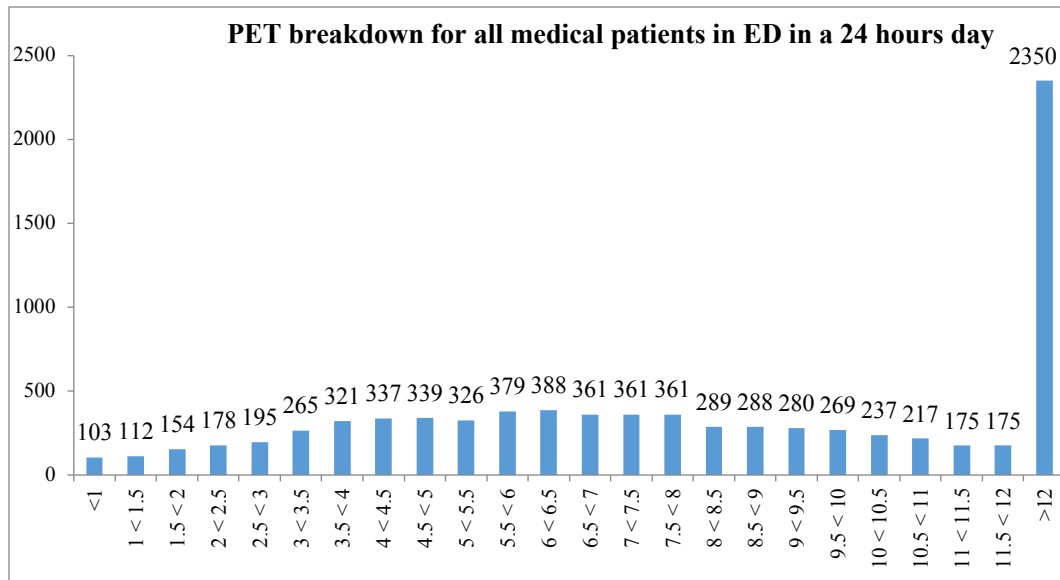


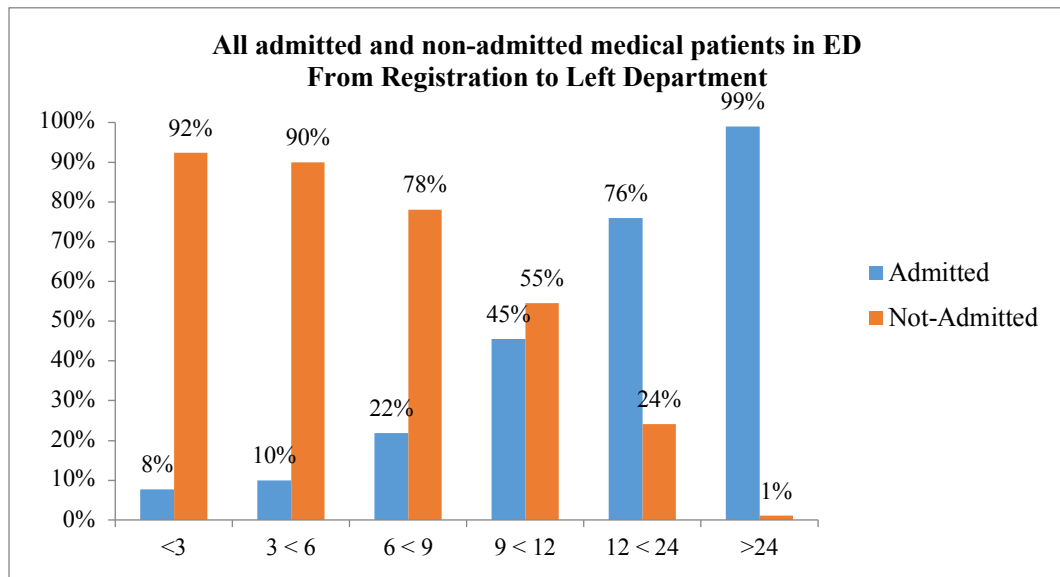
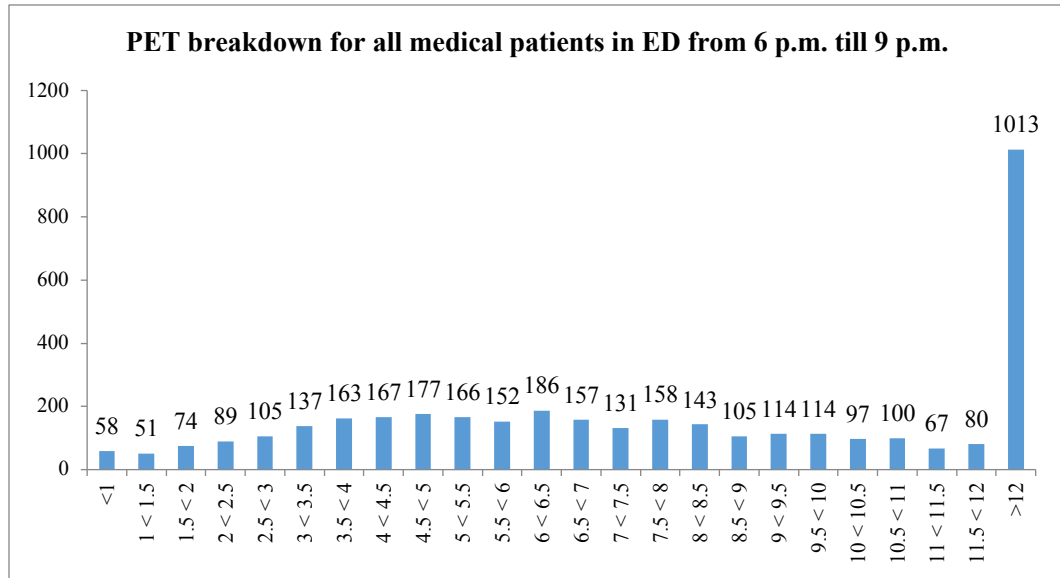
All Patients in ED

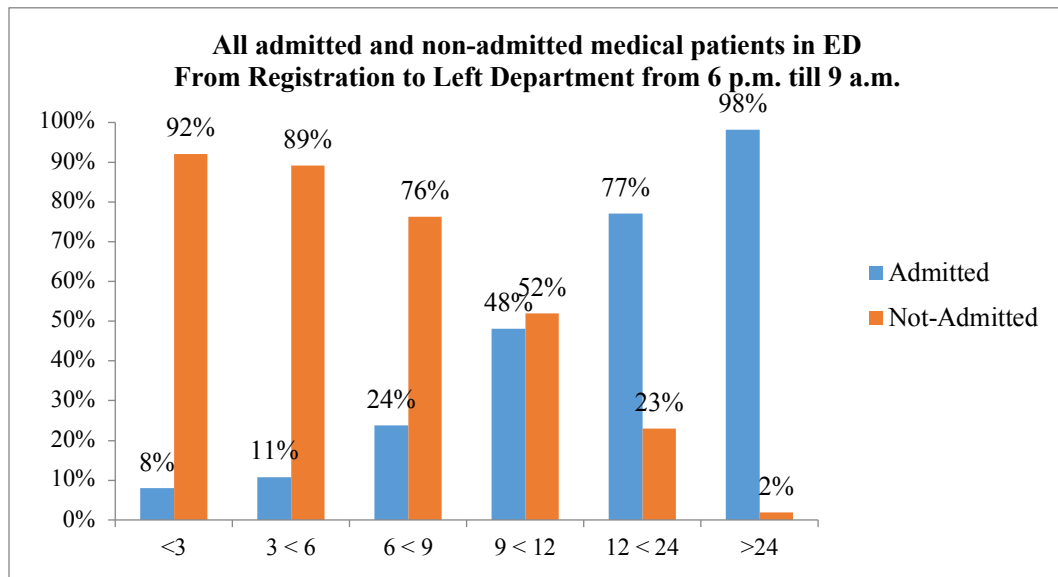
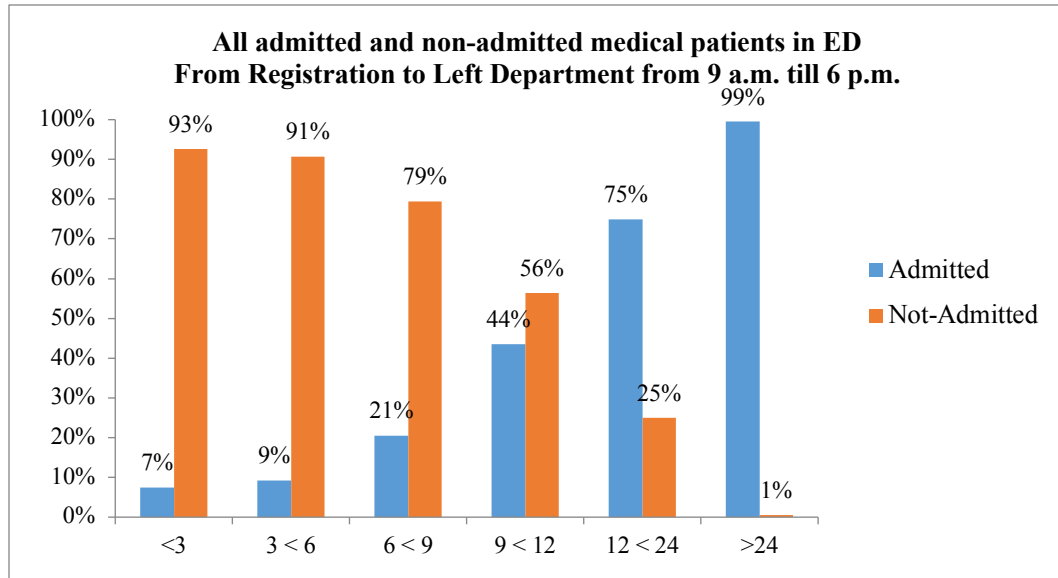
	From Reg. to Triage	From Triage to Dept	From entrance to be seen by ED Clinician	From seen by ED Clinician to be seen by specialty doctor	Time to get a bed Requested	Time to Discharge	Time to Leave Dept	Total Time in Dept (hrs)
Min	0	0	0	0	0	0	0	0
Average	27	105	61	112	38	1	180	8
Max	583	1162	1512	1022	1366	308	14146	469

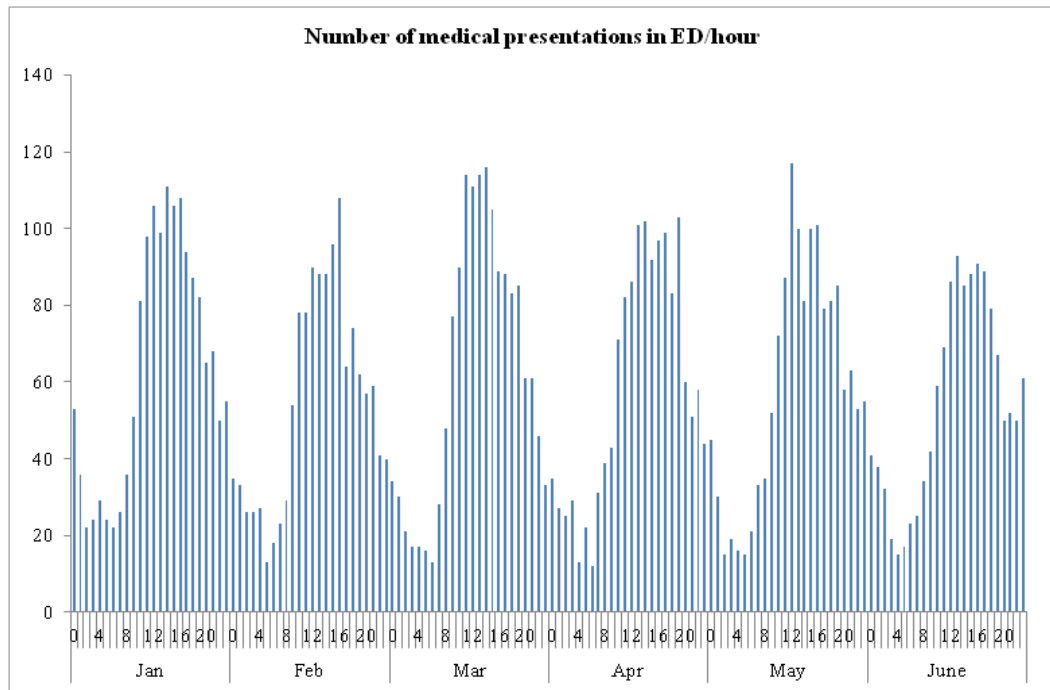
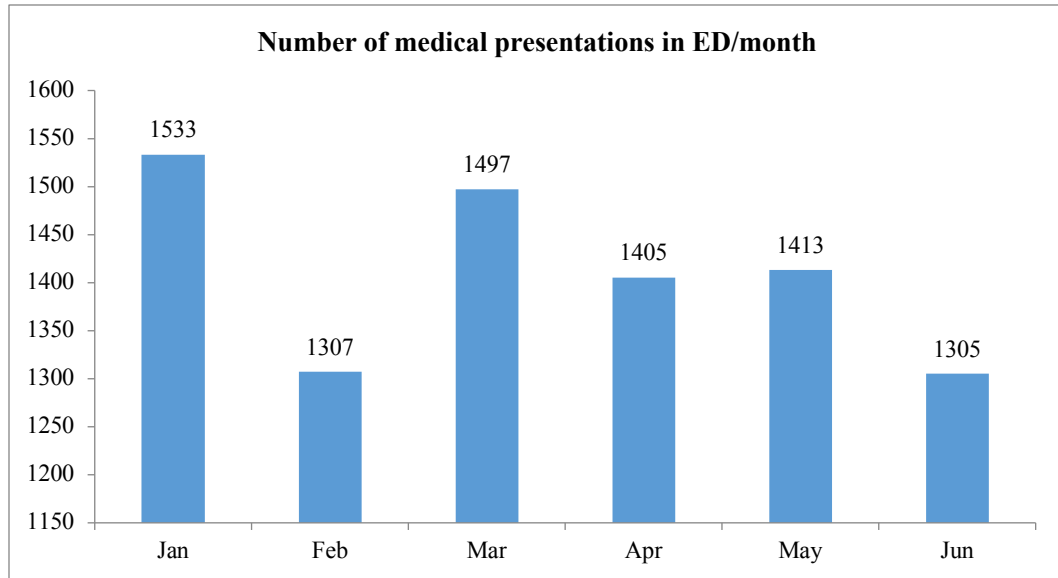
Medical Patients in ED

	From Reg. to Triage	From Triage to Dept	From entrance to be seen by ED Clinician	From seen by ED Clinician to be seen by specialty doctor	Time to get a bed Requested	Time to Discharge	Time to Leave Dept	Total Time in Dept (hrs)
Min	0	0	0	0	0	0	0	0
Average	28	108	74	133	54	1	275	10
Max	505	1162	1512	1012	1358	188	14146	247



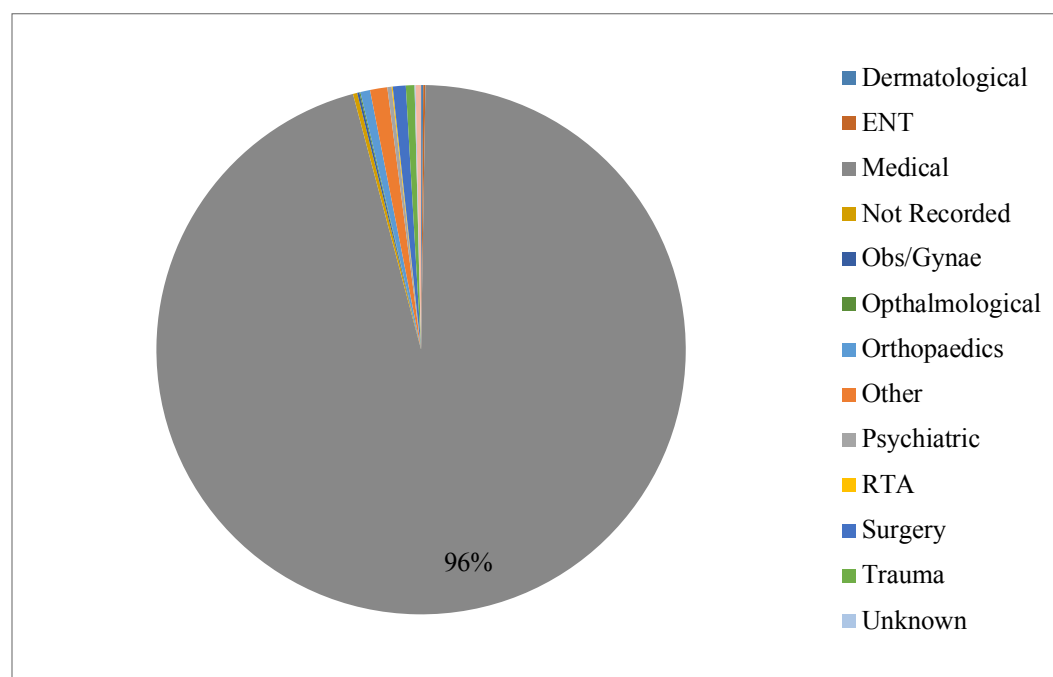


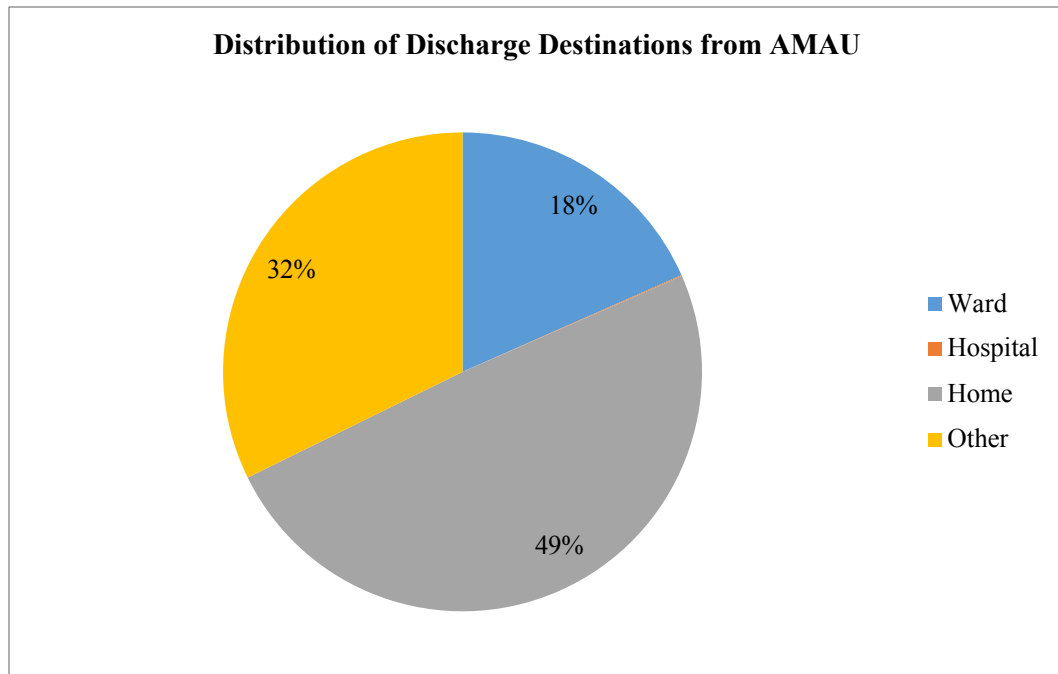




APPENDIX 5: STATISTICAL ANALYSIS OF AMAU DATA

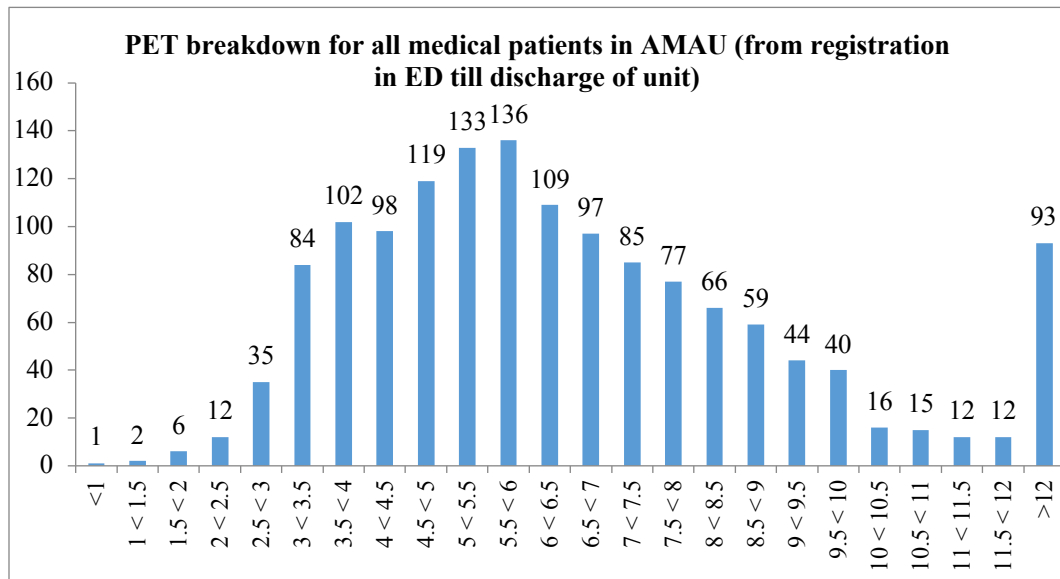
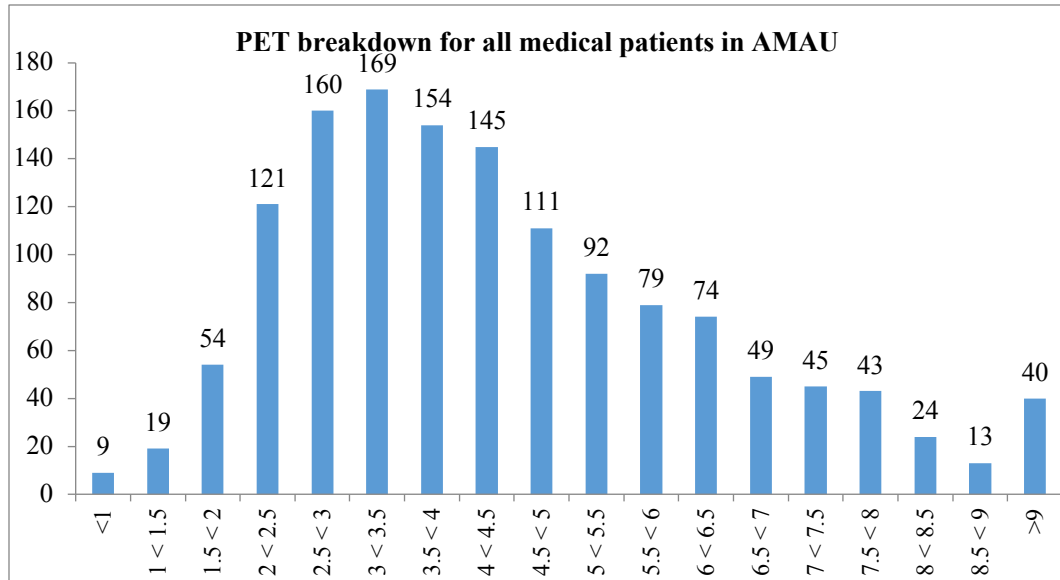
Clinical Group	No.	%	Cat. 1	Cat. 2	Cat. 3	Cat. 4	Cat. 5	Blank
Dermatological	2	0%				1	1	
ENT	2	0%		1	1			
<i>Medical</i>	<i>1453</i>	<i>96%</i>	<i>2</i>	<i>388</i>	<i>996</i>	<i>53</i>	<i>14</i>	
Not Recorded	4	0%		1				3
Obs/Gynae	2	0%		1	1			
Ophthalmological	1	0%				1		
Orthopaedics	9	1%		2	5	2		
Other	16	1%		2	5	6	3	
Psychiatric	4	0%		1	3			
RTA	1	0%		1				
Surgery	12	1%		3	7	2		
Trauma	8	1%			8			
Unknown	1	0%			1			
Urology	5	0%		3	2			
<i>Total</i>	<i>1520</i>	<i>100%</i>	<i>2</i>	<i>403</i>	<i>1029</i>	<i>65</i>	<i>18</i>	<i>3</i>

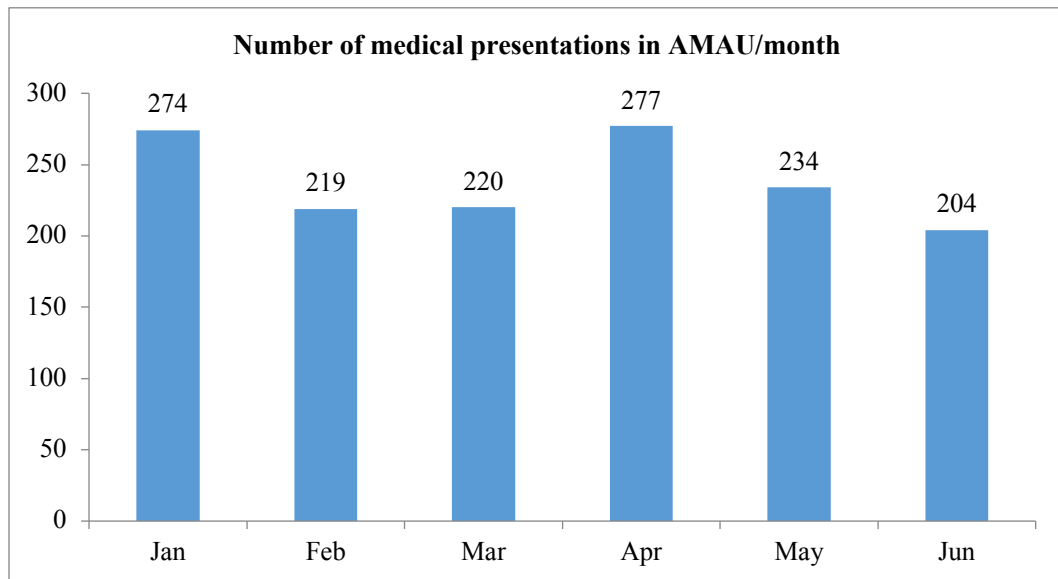
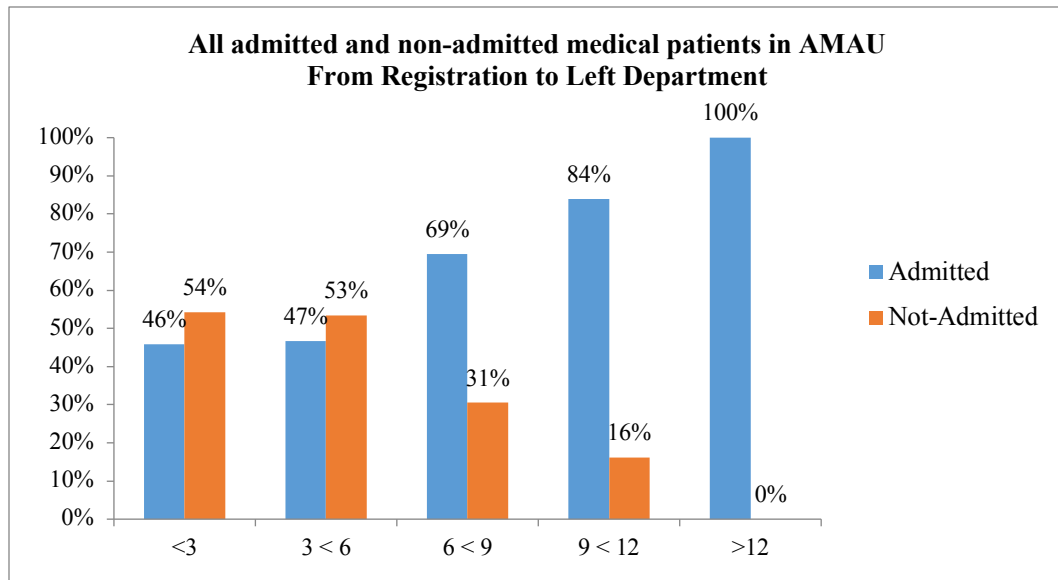


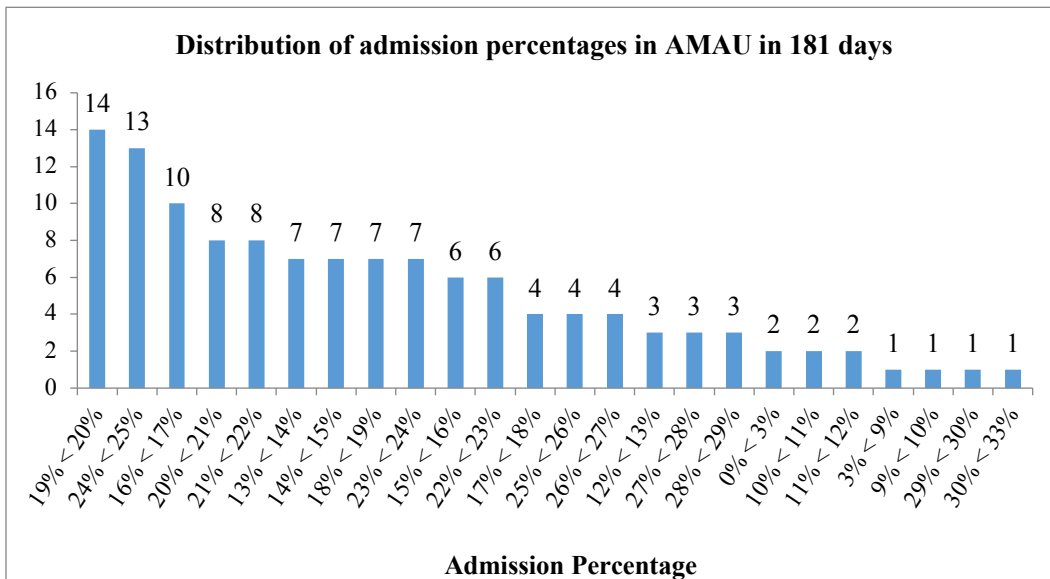
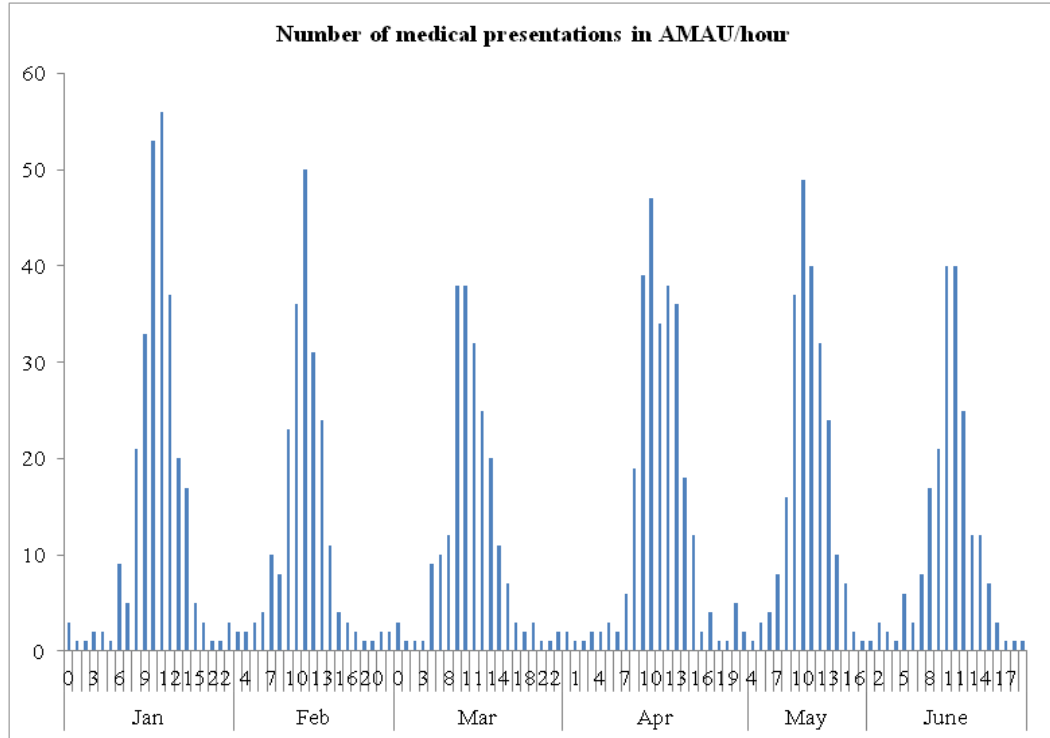


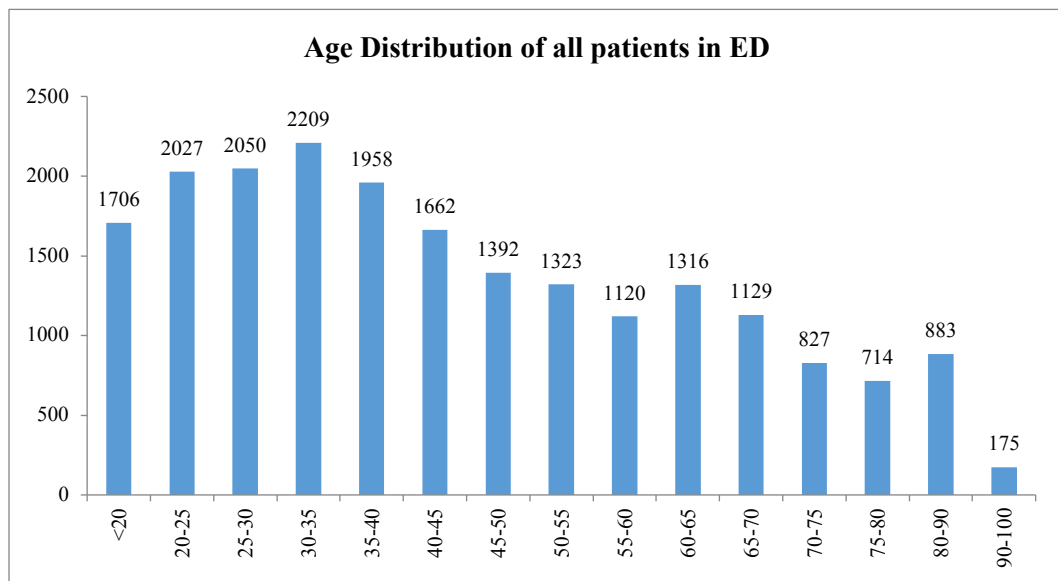
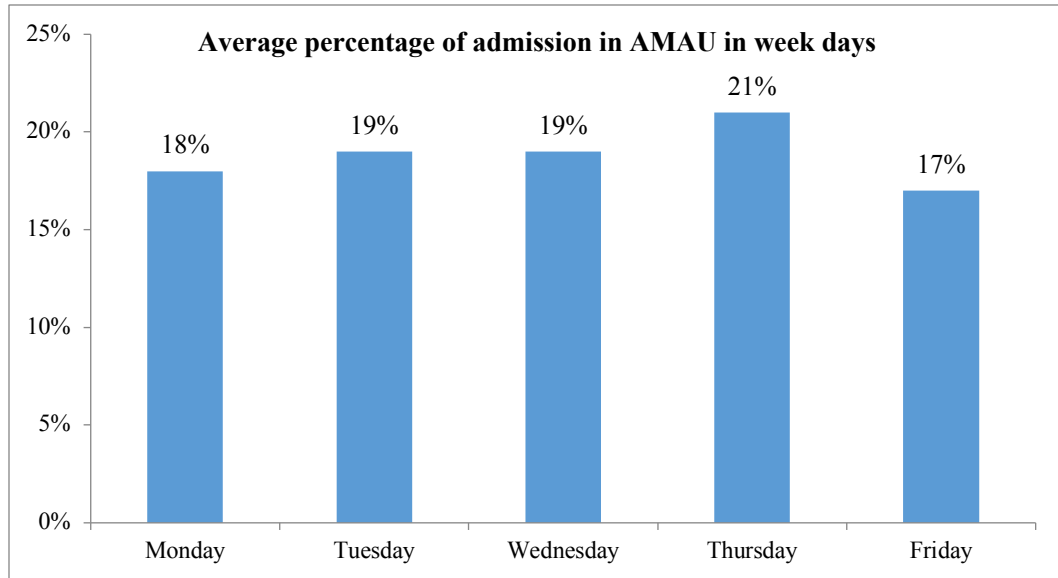
Medical Patients in AMAU

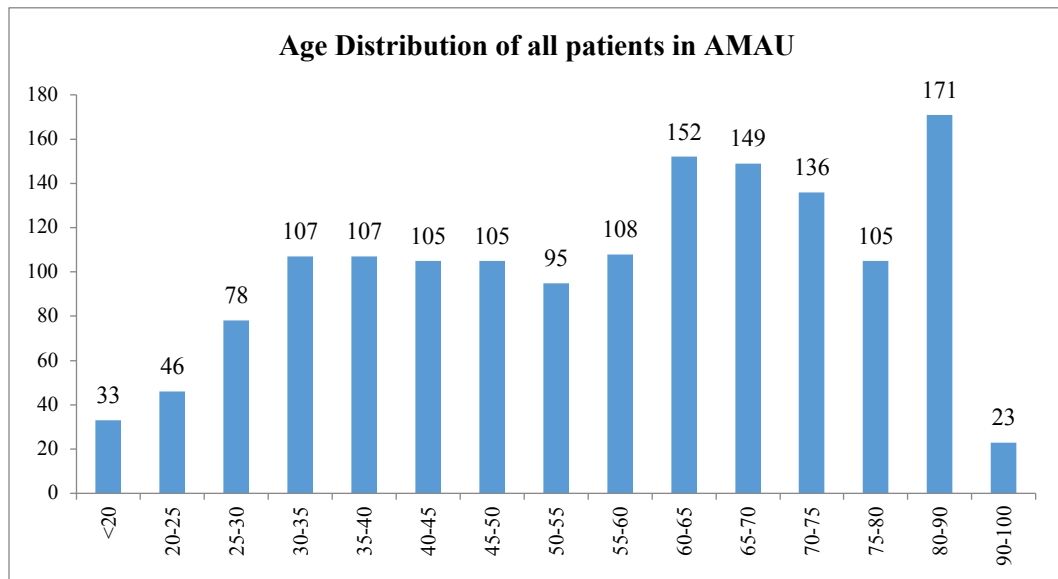
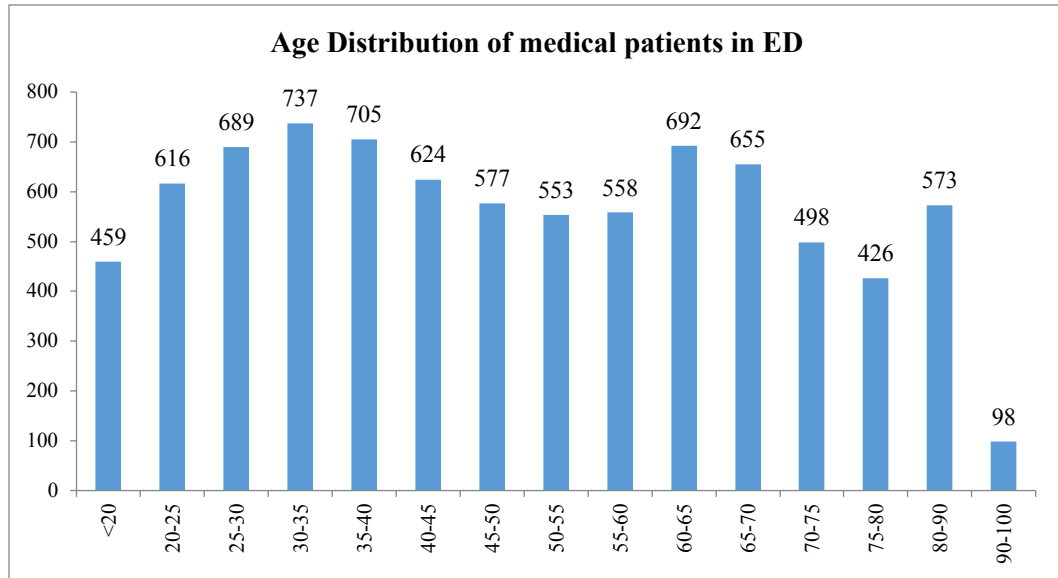
	From Reg. to Triage	From Triage to Dept	From ED to AMAU	To be seen by AMAU Clinician	To be seen by specialty doctor	Bed Requested	Time to Discharge	Time to Leave Dept	Time in Dept (hrs)
Min	1	0	0	0	0	0	0	0	1
Average	24	82	159	28	150	39	1	91	7
Max	511	1060	883	241	655	3919	120	834	27

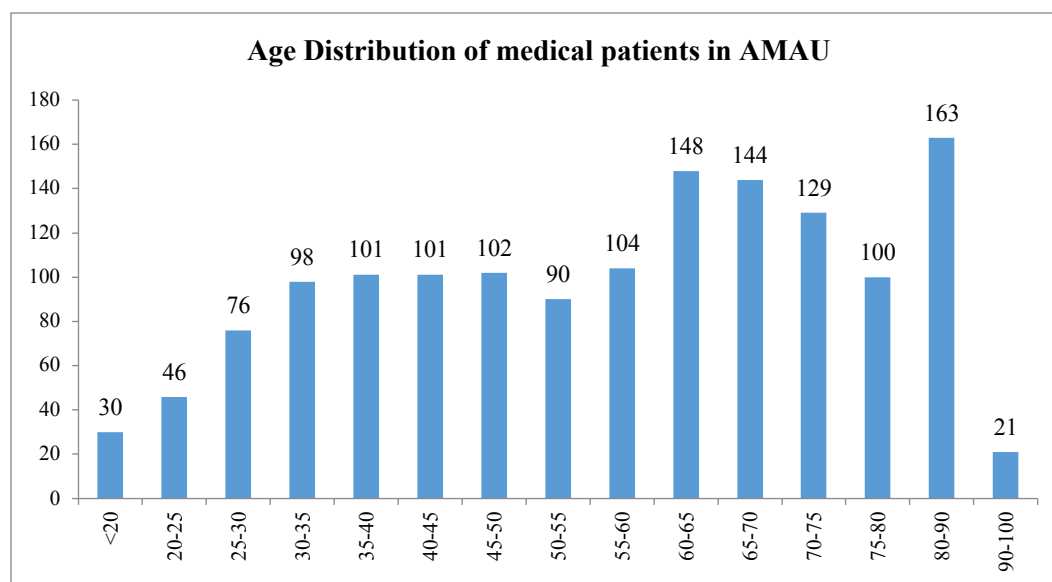












Triangular Time Distribution of each age group in hours

1- Medical Patients presented to the ED in a 24 hours day

Age Group	< 20	20-25	25-30	30-35	35-40	40-45	45-50	50-55	55-60	60-65	65-70	70-75	75-80	80-90	90-100
Min	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1
Most likely	6	4	6	5	7	6	6	6	6	8	8	5	9	8	11
Max	24.8	71	55	44	21.6	99	18.6	73	98	22.8	10.0	16.5	43	57	39

2- Medical Patients presented to the ED from 9 a.m. till 6 p.m.

Age Group	< 20	20-25	25-30	30-35	35-40	40-45	45-50	50-55	55-60	60-65	65-70	70-75	75-80	80-90	90-100
Min	0	0	1	0	0	0	1	0	0	0	0	0	0	1	1
Most likely	6	6	6	5	7	6	6	5	6	8	8	5	9	8	11
Max	24.8	35	52	33	21.6	99	12.3	73	98	48	10.0	16.5	43	46	39

3- Medical Patients presented to the AMAU from registration in ED till exit from unit

Age Group	< 20	20-25	25-30	30-35	35-40	40-45	45-50	50-55	55-60	60-65	65-70	70-75	75-80	80-90	90-100
Min	3	3	3	3	2	3	2	2	2	2	2	3	2	3	5
Most likely	6	5	4	4	5	4	6	6	6	7	6	6	8	6	8
Max	2.3	19	20	22	12	17	24	20	23	19	28	21	16	26	20

4- Medical Patients presented to the AMAU from entering till exit from unit

Age Group	< 20	20 - 25	25 - 30	30 - 35	35 - 40	40 - 45	45 - 50	50 - 55	55 - 60	60 - 65	65 - 70	70 - 75	75 - 80	80 - 90	90-100
Min	3	3	2	2	2	1	1	1	2	2	1	2	2	1	1
Most likely	3	3	3	3	3	4	4	4	3	4	4	4	4	4	5
Max	9	11	12	11	11	16	12	20	11	15	9	16	16	12	9

APPENDIX 6: DOE RESULTS

NOLH design matrix

Sc	DOE Factors Levels													
	p_1	p_2	p_3	x_1	x_2	x_3	x_4	x_5	x_6	x_7	p_4	p_5	p_6	p_7
Base	0	12 hrs	0%	11	12	520	3	2	2	1	30	12	8	3.5
1	0	18 hrs	0%	14	10	506	2	3	3	1	33	12	8	7
2	0	18 hrs	0%	16	20	481	3	2	2	2	30	13	9	3
3	0	12 hrs	0%	15	14	565	3	3	1	1	30	12	9	6
4	0	18 hrs	-10%	13	22	542	2	2	2	1	27	13	9	4
5	1	12 hrs	0%	15	16	489	2	1	2	2	30	12	7	6
6	1	18 hrs	-10%	13	23	493	2	2	1	2	33	11	8	5
7	1	12 hrs	0%	14	12	523	3	2	3	1	27	12	8	6
8	1	18 hrs	-10%	15	20	562	3	3	2	1	30	12	7	4
9	0	24 hrs	-10%	14	9	472	3	2	2	1	33	12	9	3
10	0	24 hrs	10%	16	19	518	2	2	3	1	30	11	8	0
11	0	18 hrs	-10%	13	9	567	2	2	2	2	27	11	8	1
12	0	24 hrs	0%	16	17	539	2	1	2	2	30	12	8	2
13	1	18 hrs	-10%	13	12	503	3	2	1	1	33	13	7	0
14	1	24 hrs	0%	14	17	512	3	3	1	1	30	12	8	2
15	1	24 hrs	0%	13	14	548	3	1	2	2	27	13	7	3
16	1	18 hrs	10%	14	18	525	2	3	3	2	30	13	8	1
17	0	12 hrs	0%	15	16	509	3	3	3	2	30	12	8	2
18	0	18 hrs	-10%	13	22	497	3	2	3	2	30	12	7	0
19	0	18 hrs	10%	14	15	526	4	3	1	1	30	13	8	1
20	0	12 hrs	0%	13	20	556	3	1	2	1	33	13	7	3
21	1	12 hrs	10%	15	12	511	4	2	1	2	30	11	8	1
22	1	12 hrs	-10%	15	21	470	3	2	2	2	27	12	9	2
23	1	18 hrs	0%	16	15	550	4	1	2	1	30	12	8	2
24	1	18 hrs	-10%	13	24	553	3	2	2	1	33	11	8	1
25	0	18 hrs	-10%	13	13	479	4	2	3	1	27	11	8	5
26	0	24 hrs	0%	14	18	486	4	1	2	1	30	12	7	6
27	0	24 hrs	-10%	15	10	545	3	3	2	2	33	12	7	4
28	0	24 hrs	0%	15	22	533	4	2	1	2	30	12	8	7
29	1	18 hrs	0%	16	13	483	3	1	2	1	27	13	9	4
30	1	18 hrs	0%	14	23	504	4	3	2	2	27	13	8	5

Sc	DOE Factors Levels													
	p_1	p_2	p_3	x_1	x_2	x_3	x_4	x_5	x_6	x_7	p_4	p_5	p_6	p_7
31	1	18 hrs	-10%	14	11	540	4	2	3	2	33	13	9	4
32	1	24 hrs	0%	15	19	564	3	2	3	2	30	12	9	5
33	1	18 hrs	0%	13	17	520	3	2	2	2	30	12	8	4
34	1	18 hrs	0%	11	23	534	4	1	1	2	27	12	8	0
35	1	18 hrs	0%	9	13	559	3	3	2	1	30	11	7	4
36	1	24 hrs	0%	10	19	475	3	1	3	2	30	12	7	1
37	1	18 hrs	10%	12	11	498	4	2	2	2	33	11	7	3
38	0	24 hrs	0%	10	17	551	4	3	3	1	30	12	9	1
39	0	18 hrs	10%	12	10	547	4	2	3	1	27	13	8	2
40	0	24 hrs	0%	11	21	517	4	2	1	2	33	12	8	1
41	0	18 hrs	10%	10	13	478	3	1	2	2	33	12	9	3
42	1	12 hrs	10%	11	24	568	3	2	2	2	27	12	7	4
43	1	12 hrs	-10%	9	14	522	4	2	1	2	30	13	8	7
44	1	18 hrs	10%	12	24	473	4	2	2	1	33	13	8	6
45	1	12 hrs	0%	9	16	501	4	3	2	1	30	12	8	5
46	0	18 hrs	10%	12	21	537	3	2	3	2	27	11	9	7
47	0	12 hrs	0%	11	16	528	3	1	3	2	30	12	9	5
48	0	12 hrs	0%	12	19	492	3	3	2	1	33	11	9	4
49	0	18 hrs	-10%	11	15	515	4	1	1	1	30	11	8	6
50	1	24 hrs	0%	10	17	531	3	1	1	1	30	12	8	5
51	1	18 hrs	10%	12	11	543	3	2	1	1	30	12	9	7
52	1	18 hrs	-10%	11	18	514	2	1	3	2	30	11	8	6
53	1	24 hrs	10%	12	13	484	3	3	2	2	27	11	9	4
54	0	24 hrs	-10%	10	21	529	2	2	3	1	30	13	8	6
55	0	24 hrs	10%	10	12	570	3	2	2	1	33	12	7	5
56	0	24 hrs	0%	9	18	490	2	3	2	2	30	12	8	5
57	0	18 hrs	10%	12	9	487	3	2	2	2	27	13	8	6
58	1	18 hrs	10%	12	20	561	2	2	1	2	33	13	8	2
59	1	12 hrs	0%	11	15	554	2	3	2	2	30	12	9	1
60	1	12 hrs	10%	10	23	495	3	1	2	1	27	13	9	3
61	1	12 hrs	0%	10	11	508	2	2	3	1	30	12	8	0
62	0	18 hrs	0%	9	20	558	3	3	2	2	33	11	7	3
63	0	18 hrs	0%	11	10	536	2	1	2	1	33	11	8	2
64	0	18 hrs	10%	11	22	500	2	2	1	1	27	11	7	3
65	0	12 hrs	0%	10	14	476	3	2	1	1	30	12	7	2

KPIs values for each DOE run

Scenari o	KPIs					Scenari o	KPIs				
	y ₁	y ₂	y ₃	y ₄	y ₅		y ₁	y ₂	y ₃	y ₄	y ₅
Baseline	4.1 1	667	31	59	1.44	33	4.5 3	108 2	10 2	213	1.48
1	5.2 4	591	92	234	2.02	34	8.2 1	104 4	33	275	3.63
2	4.2 1	461	30 8	307	1.31	35	5.6 0	865	10 0	512	1.97
3	3.5 5	513	1	51	0.94	36	6.0 8	123 0	0	219 5	10.1 1
4	4.0 8	747	3	8	1.35	37	5.6 4	682	32 7	701	2.59
5	3.9 1	519	92	409	1.38	38	5.8 9	158 3	0	339	5.07
6	4.6 1	638	24 1	740	1.83	39	5.7 9	720	14 6	57	2.35
7	3.9 4	605	35	303	1.38	40	5.7 2	165 1	0	330	5.07
8	5.1 6	119 7	21	133	1.55	41	5.6 7	435	26 2	355	2.29
9	7.3 0	809	0	108 3	15.4 4	42	3.6 7	823	0	94	0.87
10	6.6 4	161 4	0	490	7.04	43	3.9 4	234	1	613	9.80
11	4.9 7	724	31 4	141	2.62	44	7.0 2	339	41 6	936	2.19
12	6.2 2	162 7	0	415	5.25	45	3.8 6	458	66	467	1.55
13	6.2 7	740	33 7	505	4.15	46	3.9 1	727	2	118	0.74
14	6.9 8	157 4	0	169 6	7.61	47	3.6 2	551	1	31	0.98
15	6.5 0	143 7	0	195 7	7.83	48	4.1 7	474	12 8	145	1.54
16	4.6 7	116 2	87	85	1.43	49	6.1 5	741	15	128	2.13
17	3.5 8	540	58	36	1.00	50	6.3 8	152 8	0	174 1	4.14

Scenari o	KPIs					Scenari o	KPIs				
	y ₁	y ₂	y ₃	y ₄	y ₅		y ₁	y ₂	y ₃	y ₄	y ₅
18	4.3 0	737	13 2	97	2.01	51	7.2 4	653	87	622	2.65
19	5.2 3	766	13	6	1.40	52	4.7 6	947	70	407	1.68
20	4.2 5	544	0	15	1.59	53	7.1 8	105 1	0	219 0	10.2 8
21	4.8 8	744	22 5	244	2.05	54	4.5 0	147 5	0	480	2.30
22	3.8 5	328	50 8	581	1.61	55	6.2 3	114 6	0	100 1	5.69
23	7.7 4	970	15 7	344	3.66	56	5.2 0	970	0	106 7	5.56
24	5.5 5	125 2	25	93	1.95	57	4.8 7	504	18 9	249	1.79
25	4.6 3	441	28 6	416	2.04	58	5.4 2	113 5	23	75	1.50
26	6.0 6	934	0	126 1	8.15	59	3.6 9	894	39	21	1.05
27	6.1 1	103 1	0	119 2	10.2 3	60	5.1 6	418	22 2	433	2.24
28	4.6 6	144 0	0	596	2.40	61	5.0 1	684	26 0	230	2.42
29	7.6 0	527	28 6	673	3.75	62	3.5 6	862	0	20	0.74
30	4.1 7	931	96	298	1.29	63	6.3 3	738	20 5	142	3.14
31	4.7 5	875	23 4	344	2.23	64	6.0 2	751	80	115	2.14
32	5.4 7	182 3	0	121 9	3.66	65	4.3 3	289	38 2	281	1.71

APPENDIX 7: PUBLICATIONS

SIMUL 2014 : The Sixth International Conference on Advances in System Simulation

Optimization of Resources to Improve Patient Experience in the New Emergency Department of Mater Hospital Dublin

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Abstract— Healthcare systems globally are facing capacity issues due to the increased demand of health services, the high cost of resources and the level of quality anticipated of service providers. Emergency Departments (ED) are the most pressurized unit in healthcare systems due to uncertainty in demand and limited resources allocated. Mater Hospital (one of leading hospitals) in Dublin has built a new (state-of-the-art) unit for ED yet faced an issue in resourcing the unit to optimize performance. This paper presents an integrated solution to optimize the capacity of the new ED before opening to public and examine improvement interventions in the ED area. This solution provides ED management with a tool that can contribute significantly in enhancing patient experience by reducing the waiting time from 21 hours to 6 hours while achieving utilization below the 80% burn-out threshold. The model is recommended by Health Service Executives to be used national wide.

Keywords—Health-care management; patient experience; discrete-event simulation; emergency department.

I. INTRODUCTION

Healthcare management, globally, is under constant pressures of increasing service costs, public demands, and quality expectations from patients. This drives the strategy into one direction, namely, continual improvement of strategies related to patients experience.

While hospitals represent an important part of healthcare service providers, Emergency Departments (EDs) are considered the front line defense in managing the flow of patients into hospitals. The problem faced by ED managers is related to the fact that number of patients who arrive at ED usually exceed the physical capacity of the waiting rooms [1]. Overcrowding can lead to dramatic consequences that may include higher mortality rates for patients [2]. Crowding involves the patients waiting for ED admission, being monitored in non-treatment areas (corridors) and those waiting to be admitted in the hospital (inpatient). Those patients utilize resources in non-treatment areas and their waiting times exceed reasonable periods [3] and the problem can get worse with higher arrival rate [4].

In an Irish context, the Health Service Executive (HSE) is the government entity responsible for the provision of health and social services. The HSE has always addressed in its strategies the urgency to bring real and sustained reforms to Irish healthcare services. In 2007, a scheme has been presented by HSE to reward hospitals that maintain high

performance levels [5]. To support continual improvement that leads to reduce the pressure on EDs, HSE has set a target of less than 6 hours to overall Patient Experience Time (PET), i.e., length of stay, within the ED that has been adopted ever since [6].

The ED managers in Irish hospitals have developed a need, since then, for innovative solutions and applications to help them to achieve the target set by HSE and reduce the patient experience time in the emergency department to less than 6 hours. These solutions have to be capable of understanding their system dynamics and increase efficiency, while taking resources utilization and process rationalization into consideration. The challenge for these solutions would be in meeting the aforementioned pressures and managing the huge gap between the needs and costs of healthcare.

Simulation is a powerful tool used to capture the complexity and dynamic features of ED processes. Simulation models have been proven to be an excellent and flexible tool for modeling such kinds of complex environment. A simulation model is an effective tool for testing the effect of different resource allocation schemes, which is crucial for efficient utilization of resources within the ED [7]. A simulation model is also a flexible tool that can be used to simulate the effect of different possible ED settings on patient waiting time [8]. Moreover, multi-performance indicators can easily be measured using a simulation model, as stated by [9]. Simulation modeling used to examine staff scheduling impact on overall utilization and burnout issues related to over-utilized staff [10]. A number of studies in the literature used simulation to model the operation of ED using patient's waiting time and throughput time as the main target service quality [11]. The impact of staff scheduling can also be investigated using simulation and modeling [12]. It can also be used to analyze the impact of the enhancements, made to the system after the relocation of the emergency department, on the patients flow [13].

Aforementioned studies show that modeling and simulation is currently seen as a competent tool for EDs performance analysis, which allows the effects of actions and changes to be understood and predicted more easily. Compared to change initiatives, tools such as discrete event simulation provide a low risk, lower cost method to develop improvement strategies, test assumptions, and observe potential outcomes of decisions prior to implementation. Numerous discrete event simulation applications are found in healthcare, but very few demonstrate a pre-/post-intervention comparison [14]. Frequently, healthcare decision makers use

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**AN INTEGRATED APPROACH OF MULTI-OBJECTIVE OPTIMIZATION MODEL FOR
 EVALUATING NEW SUPPORTING PROGRAM IN IRISH HOSPITALS**

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ABSTRACT

Hospitals are witnessing an inexorable growth in emergency admissions, which results in overcrowding and a poorer patient experience. The Acute Medicine Program (AMP) is one of the programs developed by the Irish health authority aimed at improving patient experience. To review the AMP intervention, this study applies a model that integrates three analytical approaches: simulation, multivariate factor analysis and multi-objective optimization. The simulation identified 14 different factors affecting five responses that were used to develop a Design of Experiments (DoE). Multivariate factor analysis used the DoE to determine the factors creating 'bottlenecks', such as downstream resources. The multi-objective optimization model, based on the Simulated Annealing approach, is applied to support management decisions on optimizing key parameters affecting the treatment journey of patients. A Pareto set of solutions found that an increase in downstream capacity and unit staff can lead to a 25% decrease at least in the patient's experience time.

1 INTRODUCTION

Over the past decade, healthcare systems have faced many challenges in their attempts to improve system performance. Rapidly increasing costs along with the growing demand on Emergency Departments (EDs) have put healthcare decision-makers under constant pressure to manage and control their system in a more efficient and effective way. Overcrowding in EDs, which has reached crisis proportions internationally, negatively affects patient safety, quality of care, and patient experience (Graff 1999). In 2006, ED overcrowding was declared a "national emergency" in Ireland. In November 2015, emergency presentations had increased by 15,170 compared to the same period in 2014 according to the Health Service Executive's (HSE 2015). Additionally, prolonged waiting times were reported, with more than 100 patients waiting on trolleys for hospital admission every day, and 23% of patients waiting for more than 24 hours (HSE 2015). Although Ireland is not the only country that experiences prolonged waiting and overcrowding (Forero et

Assessment of patient experience to inform healthcare policy reforms— A literature review

Abstract

Purpose: To review and analyze the literature concerned with the quality of care in hospitals from the patient's eye. This review assesses the implementation of existing patient experience frameworks to measure the most important aspects of care to the patients. It also reviews the application of currently used instruments to inform the healthcare decision makers using the patient experience data.

Data Sources and Study Setting: A literature study was carried out on journal articles published in Science Direct, Emerald Insight or PUBMED databases for the period between 2005 and 2015. Hospital-based articles using patient experience instruments as a tool to inform healthcare decision makers.

Results: A total of 23 studies were included. Several developed frameworks have been identified that aim to capture key aspects of care affecting the experience of patients. However, the majority of researchers preferred to collect data about different aspects of care, which they identified to be essential to the patients in their healthcare organizations. The application of such data has been categorized into five main purposes, with thirteen studies focusing on highlighting the potential areas of improvements from the patient's eye. Whereas seven used the data to compare patients based on their socio-demographic background. Other applications of patient experience report to inform healthcare decision makers are to identify the most significant aspect of care that shapes the experience of patients, monitor progress of experience across time, and assess the effectiveness of an intervention imposed by administration to improve the experience of patients. Most researchers tended to use their data to serve two or more purposes, however few of them used it mainly to assess on the quality and effectiveness of different interventions aimed to improve the reported experience of care.

Conclusion: Despite the accumulation of extensive frameworks on significant aspects of care to a patient's experience, a series of disagreements and a theory-practice gap are revealed as challenging issues that need to be addressed. Two of the most important dimensions, which are often overlooked in theory, are "access to care" and "waiting times for services". Also, despite data on patient experience being increasingly collected worldwide, it is difficult to sustain improvements in patient experience or to leverage more substantial change without a more comprehensive strategy that is organization-wide and regarded as fundamental to organizational success.

Keywords: patient experience, policy/strategy reforms, decision support, quality improvements

BMC Health Services Research

Patients Expectations and Satisfaction with the Emergency Department at Tallaght Hospital

Heba Habib, Esmat Swallemeh, and Amr Arisha

Objective. To understand and manage patients' pre-visits expectations and their impact on their ultimate satisfaction with their provided services.

Patient satisfaction is a key administrative metrics by healthcare policy for improving cost efficiency and quality in healthcare facilities. Understanding patient's expectations in Emergency Department (ED) is crucial factor in improving hospital performance and patients' satisfaction.

Data sources/Study setting. The patient's expectation data was collected through in-visit survey during the patients waiting to see the doctor, and a postal survey to collect data from patients after 2 weeks from their ED visit was used to measure the patient satisfaction.

Data collection/Extraction methods. Patients answered questions related to two main constructs, patient expectations and patient satisfaction. The patient expectation measures were developed based

Principal findings. Four areas of expectations were identified including to be told about the anticipated waiting time, expected to be seen by a physician within suitable period of time, expected the procedures and the process to go organized and smoothly and expected the ED staff to be cooperative and caring. The difference between the satisfactions levels of those patients who were admitted compared to those who didn't was significant. Patients' were critically dissatisfied with overall long waiting time, an uncomfortable waiting area, no recreation facilities and no availability of beds.

Conclusions. The study findings indicated the need for focusing on communication with the patients attending ED. Also, efforts should focus on shortening waiting intervals and improving waiting area facilities.