

EMERGENCY DEPARTMENT TRIAGE IN SAUDI ARABIA:
TOWARDS A STANDARDISED NATIONAL TRIAGE
SYSTEM

Submitted By

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Abstract

More than 16 million patients are presenting for care in emergency departments (ED) in the Kingdom of Saudi Arabia (KSA) annually and this number is increasing. It is therefore essential that EDs utilise a systemic way to prioritise patients' care based on clinical urgency. Despite the increase in demand for ED services, a formalised triage system is not common practice in most of the public EDs in Saudi Arabia. Consequently, this thesis aimed to develop a national triage system for the KSA; this was achieved in three stages.

This thesis explores and describes current triage practice in public EDs in Saudi Arabia and investigates the support that is provided for the implementation of ED triage, including triage policy and procedures and education programmes. In addition, this thesis developed a national standardised 5-level triage system that is clinically and culturally appropriate for Saudi public EDs. To achieve these aims, 3 studies were conducted separately. The first and second studies focused on current triage practice, while the third study was concerned with the future of triage in public EDs in the KSA.

The first study was a quantitative comparative descriptive study that utilised previously validated simulation scenarios. This study explored current triage practice in public EDs in the KSA. Further, it described and compared the concordance and accuracy in triage decisions among 105 ED nurses and physicians working in Saudi public EDs.

The second study was a qualitative document analysis. It explored current triage policy and procedure as well as education programmes that currently support ED triage practice in both public and non-public EDs in Saudi Arabia. Triage policy and procedures as well as education programme documents were collected from the Ministry of Health (MOH) and three non-public hospitals.

The findings of Studies 1 and 2 illustrate that triage is not well organised or practiced in public EDs in Saudi Arabia. More than 50 per cent of the study participants believed that formal triage does not exist in their EDs. The findings also showed lack of agreement between triage policies and procedures in regard to the clinician responsible for triage, the qualification of the triage clinician, the triage

scale used and the education preparation for the triage role. Against international recommendations, the MOH triage policy recommended a three-level triage scale. Moreover, agreement in triage ratings among the ED clinicians was only fair (unweighted kappa = .25).

The third study employed a two-stage modified Delphi methodology. The aim of this study was to develop a Saudi national triage system that is clinically and culturally appropriate for public EDs. A panel of 31 ED nurses and physicians participated. Consensus was reached on a five-level triage scale. In addition, the panel members agreed on a list of clinical descriptors to be used with the new triage system. Moreover, the panel members identified a list of potential barriers and cultural issues that may influence the implementation of the new triage system.

In conclusion, current triage practice in public EDs in the KSA is ad hoc, and implementation is reliant on local interest. In light of the limited reliability and validity of the three-level triage system recommended by the MOH triage policy, it seems that public EDs do not adhere well to the policy. This study developed a five-level triage system to replace the current system.

Declaration

I declare that this thesis contains no material which has been accepted for the award of any other degree or diploma at any university or equivalent institution and that, to the best of my knowledge and belief, this thesis contains no material previously published or written by another person, except where due reference is made in the text of the thesis.

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List of Publications

- Aljohani, M. & Lyneham, J. (2008). Development of a triage system (SATS) in Saudi Arabia. 3rd National Conference for Emergency Nurses, Networking: Crossing Borders, 28–30 August 2008, Western Australia. *Australasian Emergency Nursing Journal*, 11(4), 203–203.
- Aljohani, M. & Lyneham, J. (2009a). Emergency department in Saudi Arabia: Why do we need a standardised triage system? 2009 CENA International Conference for Emergency Nursing. *Australasian Emergency Nursing Journal*, 12(4), 180–181. doi: 10.1016/j.aenj.2009.08.089
- Aljohani, M. & Lyneham, J. (2009b). Problems with implementing a standardised triage system in Saudi Arabia. 2009 CENA International Conference for Emergency Nursing. *Australasian Emergency Nursing Journal*, 12(4), 159–159. doi: 10.1016/j.aenj.2009.08.031
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Dedication

This dissertation is dedicated to my father Saeed, my mother Mabrukah, my wife Samah, my son Faisal, my daughter Mayar and my brothers and sisters. To each one I am grateful for your support.

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List of Abbreviations

AAEN	Australian Association of Emergency Nurses
ACEM	Australasian College for Emergency Medicine
AMI	Acute myocardial infarction
ATS	Australasian Triage Scale
BLS	Basic life support
BP	Blood pressure
CAEP	Canadian Association of Emergency Physicians
CCU	Critical care unit
CENA	College of Emergency Nursing Australasia
CTAS	Canadian Triage and Acuity Scale
ESI	Emergency Severity Index
ED	Emergency department
GCS	Glasgow Coma Scale
KSA	Kingdom of Saudi Arabia
LWBS	(patients who) Leave without being seen
MODA	Ministry of Defence and Aviation
MOH	Ministry of Health (Saudi Arabian agency responsible for managing the national health care system)
MOHE	Ministry of Higher Education
MOI	Ministry of Interior
MUHREC	Monash University Human Research Ethics Committee
MTS	Manchester Triage Scale
NENA	National Emergency Nurses Affiliation of Canada
NTS	National Triage Scale (precursor to the ATS)
RN	Registered nurse
SANG	Saudi Arabian National Guard
SATS	Saudi Arabian Triage System
SPSS	Statistical Package for Social Science software
SRCS	Saudi Red Crescent Authority (official KSA ambulance service)

Chapter 1: Introduction

1.1 Background

The emergency department (ED) is an essential division of any hospital and is a critical part of the healthcare system. It is often the first point of treatment for patients following a sudden illness or an accident. There has been a significant increase in the demand for emergency services internationally (Fernandes, Tanabe, Gilboy, et al., 2005; Funderburke, 2008; Göransson, Ehrenberg, Marklund & Ehnfors, 2005). With increasing numbers of patients presenting to the ED, it is a medical necessity that patients are seen according to medical priority, not in order of arrival.

Without a system that organises patients by medical need, patients with urgent conditions may be overlooked or have essential care delayed. The delay in attending to patients at the medically appropriate time could impact patient healthcare outcomes and satisfaction (Cooke, Watt, Wertzler & Quan, 2006). To avoid just such negative patient outcomes, ED clinicians require a systematic process to determine objective priorities when patients arrive at the ED (Van Gerven, Delooz1 & Sermeus, 2001). The process based on a patients' clinical urgency is called 'triage'.

The word triage originated from a French verb *trier*, which means 'to sort' (Richardson, 2009). Originally, triage was associated with managing military casualties during war. Its primary purpose was to ensure the best outcomes for battle by treating the greatest number of wounded men possible so that they could return to the battlefield (Richardson, 2009). More recently, the principles underpinning triage are justice and efficiency (Fitzgerald, 2000). 'Justice' implies that patients in urgent need should receive the required care quickly, and 'efficiency' implies that the level and quality of care should be appropriate to the patient's condition (Fitzgerald, 2000).

1.2 Types of Triage

The primary aim of triage is to sort patients for treatment based on an assessment of their medical conditions, using an established sorting system or plan,

particularly in situations of limited resources (Iseron & Moskop, 2007, p. 278). In any setting, the principle of making the best use of available resources to maximise positive outcomes remains the basis of triage (Richardson, 2009). There are three common types of triage: military triage, disaster triage and emergency department triage.

1.2.1 Military Triage

Military triage was the first formal triage system and is associated with wounded soldiers in the battlefields. The primary purpose of this system is to treat and evacuate the most severely injured soldiers regardless of military rank and to treat minor injuries so that soldiers can return to the field (Iseron & Moskop, 2007). However, military triage decisions include delaying the most severely injured, whose chance of survival is poor. This action is seen as resource¹ effective.

1.2.2 Disaster Triage

Disaster triage is a process that is used in cases of natural or man-made disasters that produce mass casualties. The American College of Emergency Physicians (2006) defines a medical disaster as a situation in which ‘the destructive effects of natural or man-made force overwhelm the ability of a given area or community to meet the demand for health care’ (American College of Emergency Physicians, 2006, para. 2). Disaster triage aims to rapidly identify patients with critical injuries from the total number of presenting casualties. Victims are typically sorted into categories that determine the priority for treatment and transportation to hospitals (Derlet, 2004). The disaster triage scales use either four or five levels of priorities. The four categories are: emergent (red), urgent (yellow), non-urgent (green) and dead or severely injured and not expected to survive (black) (Derlet, 2004). Sensitivity and specificity of disaster triage has not been established; however, presumably, triage in a situation of disaster improves outcomes (Derlet, 2004). Each country has their own disaster plan, and the World Medical Association recommends that victims are triaged into five categories (World Medical Association, 1994).

¹ Military resources include both personnel and equipment.

1.2.3 Emergency Department Triage

Formal ED triage is the foundation upon which all ED patients are sorted on arrival; such systems use an acuity rating scale (Zimmermann, 2001). In many countries, this process is carried out by suitably qualified registered nurses (RN) (Australasian College for Emergency Medicine, 2006; Beveridge et al., 1998). Appropriate triage ensures that the allocation of available resources is based on clinically derived criteria rather than on administrative or organisational needs (Aljohani, 2006; Yousif, Bebbington & Foley, 2005). The introduction of a formal triage system was in response to the growing demand for ED services, especially from patients with non-urgent problems (Fitzgerald, 1989; Mallett & Woolwich, 1990). Triage has become critical for the safe and efficient operation of most EDs (Manos, Petrie, Beveridge, Walter & Ducharme, 2002; Murray, 2003).

In the last three decades, many Western countries including Australia, Canada, the United Kingdom (UK) and the United States of America (USA) have developed and implemented triage systems to prioritise ED patient care (Beveridge et al., 1998; Gerdtz & Bucknall, 2001a; Zimmermann, 2001). ED triage systems are based on evidence that early medical intervention will result in improved patient safety via a reduction in waiting times and enhanced patient satisfaction (Blythin, 1983; Bruijns, Wallis & Burch, 2008; Jones, 1988; Kosits & McLoughlin, 2006; Mallett & Woolwich, 1990).

1.2.3.1 Triage scales

A variety of triage scales are used worldwide, ranging from two to five levels of acuity. Although the three-level triage scales are popular in many countries (Funderburke, 2008; Zimmermann, 2001), previous studies have indicated that their reliability and validity are low (Travers ET AL., 2002; Wuerz, Fernandes & Alarcon, 1998). In contrast, triage literature strongly supported the use of five-level triage systems (Zimmermann & McNair, 2006).

There is no universal agreement on the most reliable ED triage system (Murray, 2003). However, triage literature indicates that there are four reliable and valid triage systems: the Australasian Triage Scale (ATS), the Canadian Triage and Acuity Scale (CTAS), the Manchester Triage Scale (MTS) and the Emergency Severity Index (ESI) (Australasian College for Emergency Medicine, 2006;

Beveridge et al., 1998; Gilboy, Travers & Wuerz, 1999; Manchester Triage Group, 1997). Triage scales will be discussed in detail in the literature review.

The terms 'triage system' and 'triage scale' are used interchangeably in literature. However, it can be argued that a triage scale is one component of a comprehensive triage system (McNair, 2005). A triage system is more inclusive, addressing factors that affect implementation, education, access to health care and patient flow through the ED (Emergency Nurses Association, as cited in McNair, 2005).

The successful implementation of a comprehensive triage system can be attributed to many factors such as the use of a valid and reliable acuity scale as well as supporting policy and procedures, protocols, guidelines education preparation programmes. McNair (2005) raised the concern that some personnel or policy makers may mistakenly view the implementation of a reliable triage scale alone as sufficient for making safe and efficient triage decisions without taking the other aspects into account (McNair, 2005). For the purposes of this study, the following understandings of the concepts will be used:

- Triage scale: a set of numerical values that define each level within the scale and include a descriptive name, time to be seen and clinical descriptors
- Triage system: the scale, the supporting documents including policy and procedures involved and the education required to implement the system

1.3 Statement of the Problem

In the Kingdom of Saudi Arabia (KSA) institutional health care is provided to the population in three types of hospitals, each of which includes emergency services: public hospitals operated by the Ministry of Health (MOH), specific public hospitals operated by other government agencies (e.g. National Guard), and private hospitals. Treatment in some hospitals is subject to eligibility; for example, the National Guard hospitals only serve members of the National Guard and their families or patients referred from other hospitals. This thesis focuses only on the public EDs that are operated by the MOH. As of 2008, the Kingdom had 231 EDs, which represented approximately 60 per cent of the total number of EDs in the country (Ministry of Health, 2008).

As in Western countries, the demand for ED services in Saudi Arabia is increasing dramatically. MOH reports show a 19 per cent increase between 2002 and 2008 (Ministry of Health, 2002, 2008). This increase in demand can be linked to high population growth rate (3.2 per cent per year) (Central Department of Statistics and Information, 2005) and the inappropriate use of ED services by non-urgent patients (Al-Shammari, 1991; Siddiqui & Ogbeide, 2002).

Despite the steady growth in ED usage, triage practice in emergency departments in Saudi Arabia is ad hoc. A review of the literature uncovered no published research in the field of triage in both public and non-public EDs in Saudi Arabia. The lack of triage research significantly contributes to the ambiguity of current triage practice in the KSA. For example, it is not possible to know how ED patients are prioritised for care, which scale(s) are used, or who performs triage.

Standardised triage practice is not common in public EDs in the Kingdom, and when a triage system is used, it is likely to be adopted from another country where the health care system and culture are significantly different to Saudi Arabia. Some Saudi hospitals have adopted either the Australian or Canadian scales; however, any modification to these scales has never been validated or documented. The nature of triage in Saudi Arabia appears differ from that of Western hospitals. Though no literature supports this comment, personal observation and discussions with colleagues at other Saudi hospitals revealed the following differences: In Saudi Arabia, triage is not always practiced. Further, triage in the KSA is not limited to sorting patients but includes initiating advanced assessments, treatment, tests and evaluations normally conducted by the primary care team in Western hospitals. The differences in how triage is practiced impacts on how the triage area is staffed. The role of the nurse in triage is well defined in Western countries; in Saudi Arabia, however, triage is most likely performed by a physician, while the nurse's role is limited to taking vital signs (Al-Both'hi, 2007; Qureshi, 2010).

Two recent unpublished studies have been conducted by master's students into aspects of triage in Saudi Arabia. In the first study, Aljohani (2006) found a high level of variability in both consistency and accuracy of triage decisions among ED nurses and physicians in a metropolitan public ED. In the second study, Al-Both'hi (2007) found considerable variation and lack of uniformity in the implementation of triage in three public and non-public EDs.

These studies also highlight questionable practices, skills and knowledge. In addition, the absence of a standardised, formal triage system in public EDs in Saudi Arabia suggests that patient safety may be at risk. It is an observation of the writer that patients with similar health problems may receive different medical attention based on which hospital they visit. These issues highlight a current and urgent need to investigate and change current triage practice and to move towards formalising a standardised triage system in order to improve patient safety.

1.4 Aims of the Study and Research Questions

The aim of this research was twofold. First, the researcher sought to understand how triage is currently practiced in public EDs in Saudi Arabia and to ascertain the support provided for triage implementation. By understanding current triage practice in Saudi Arabia, comparison to the literature can be made, which, in turn, may provide a rational background from which the second aim of this study can develop: to develop a national standardised triage system for public EDs in Saudi Arabia. Three studies were developed to address these aims.

1.4.1 Study 1: Exploring and Describing Current Triage Practice

A quantitative comparative descriptive study was developed using previously validated triage simulation scenarios. The purpose of this study was to explore current triage practice in public Saudi EDs, using the following:

- A description of the level of agreement in ED urgency ratings among nurses and physicians in public EDs in Saudi Arabian using a standard five-point urgency scale,
- A comparison of the level of agreement in urgency ratings among the nurses and physicians in the Saudi Arabian public EDs,
- A description of accuracy of urgency ratings among ED clinicians using a validated urgency scale and
- A comparison of accuracy in the acuity ratings between nurses and physicians.

1.4.1.1 Research questions

- What triage systems or processes are currently used to prioritise patient care in Saudi Arabian EDs?
- How do nurses and physicians working in Saudi Arabian public EDs understand urgency in the context of triage decision making?
- How consistent and accurate is the decision making among nurses and physicians in the selected Saudi Arabian emergency departments?

1.4.2 Study 2: Analysis of Key Triage Documents

This component of the research employed qualitative document analysis. The aim of this study was to explore current triage policies and procedures as well as educational programmes that support ED triage practice in both public and non-public EDs in Saudi Arabia.

1.4.2.1 Research questions

- What triage policy and procedures are developed and implemented in public and non-public EDs?
- What triage training and education preparations currently support the implementation of triage in both public and non-public EDs?

1.4.3 Study 3: Development of a National Triage System

This was a two-stage modified Delphi study. The main aim of this study was to develop a Saudi national triage system that is clinically and culturally appropriate for the public EDs.

1.4.3.1 Research questions

Main question:

What are the elements of a triage system that can be implemented in Saudi Arabian emergency departments?

Subsidiary Questions:

1. How many acuity categories should the Saudi triage scale include?

2. What is the description of each acuity category?
3. What is the time 'to treat' for each acuity category?
4. What are the clinical indicators for each triage category?
5. What barriers might influence the implementation of a triage system in Saudi Arabia?
6. What religious and/or cultural issues need to be considered in implementing a triage system in Saudi Arabia?

1.5 Significance of the Study

This study is significant because there is *no* national formal triage system in Saudi Arabia, and in countries where such a system exists, there is a significant difference in patient outcomes and satisfaction (Bruijns et al., 2008; Kosits & McLoughlin, 2006). Consequently, this study will be the first that examines triage at a national level with a focus on cultural needs and clinical safety. The results of this study have the potential to provide a culturally and clinically sound triage system, which, in turn, may improve patient outcomes during ED visits.

In addition, the importance of this study is found in bridging the current knowledge gap in relation to current triage practice in public EDs in the KSA. This gap will be evident in the literature review in chapter two. It is expected that this study will provide background information for the MOH on how comparatively ineffective triage is currently. As a result, this information can be used to change current triage practice and that, in turn, will improve the quality of care and patient safety. In addition, it is expected that this study will provide information for those responsible for health policy in the MOH about the current poor level of compliance with the triage policy and procedures.

1.6 Overview of the Thesis

This thesis consists of eight chapters. This chapter introduced the study and provided a brief background of the basic concepts in this thesis. It also introduces the study aims and questions and describes the study significance. Chapters Two and Three present a review of relevant literature. Chapter Two provides a brief historical and geographical background to the study context. In addition, it overviews the

health care system in Saudi Arabia as well as access to emergency departments and triage. Chapter Three presents an overview of the emergency department triage, including its benefits and limitations, triage requirements and triage decisions. Further, it provides a comparison of reliability between triage scales. Finally, it overviews and describes the reliability and validity of the existing five-level triage scales.

Chapter four provides a breife overview to the three studies and discuss the ethical considarations. Chapter Five reports the first study. It describes and justifies the procedures and methods used to explore and describe the current triage practice in public EDs in Saudi Arabia. This chapter also presents and briefly discusses the findings from this study. Chapter Six presents a qualitative analysis of relevant documents. The chapter analyses triage policy and procedure documents as well as education programmes from both public and non-public EDs. This chapter presents the results and provides a brief discussion of the findings.

Chapter Seven focuses on and describes the steps used to develop the triage scale and clinical descriptors and identifies potential barriers and cultural issues. It presents the findings from stage one (development of the triage scale) and stage two (identification of clinical descriptors, potential barriers and cultural issues). It also provides discussion of the findings.

Chapter Eight focuses on linking and discussing the findings from the three studies conducted in this research project. It provides discussion for the future implementation of the new triage system and provides recommendations for implementation. Further, this chapter presents the conclusion and the implications of the findings to practice as well as the limitations to the study

1.7 Glossary of Terms

The following definitions were used in this study:

Triage

In this study, when triage is used alone, it refers to emergency department triage. Triage is a formal process in which all patients seeking ED care are categorised into groups by ED clinicians at the time of arrival on the basis of clinical urgency using a standard urgency scale (Richardson, 2009; Zimmermann, 2001).

Public emergency department or hospital

In this study when the term ‘public ED or hospital’ is used, it referred to the public EDs operated by the Ministry of Health.

Urgency

Urgency is a function of patients’ clinical conditions that can be used to ‘determine the speed of intervention necessary to achieve an optimal outcome’ (Fitzgerald, 2000, p. 586).

Accuracy of triage

Accuracy in this study refers to the ability of the participants to pick the expected triage outcome. The expected outcomes in the scenarios utilised in this study were identified by an expert panel and reported in the *Triage Education Resource Book* (Gerdtz et al., 2002).

Consistency of triage

Consistency is the degree to which clinicians agree on the allocation of triage urgency ratings across the patient population.

Chapter 2: Understanding the Study Context

2.1 Introduction

Saudi Arabia has its own characteristics that may be different from other countries. These differences affect the development and implementation of the Kingdom's systems, including its health care system. Therefore, studying the health system cannot be done in isolation of the other aspects of society that directly impact it, such as the economy, the culture, or the level of education. The focus of this study is on emergency department triage practices in the KSA. A review of related literature has been conducted and is presented in Chapter Two and Chapter Three.

This chapter provides an understanding of the study context. This chapter presents historical background on the KSA, including its location and geographic features, its climate, its administrative regions and its demographics. It also provides background on education in the KSA, including nursing education. In addition, the chapter provides an overview of the health system, including health resources, the work force and selected health indicators.

2.2 Search Strategy

The search for relevant materials was done using the following databases: CINAHL, Expanded Academic ASAP plus, Medline, and Blackwell Synergy. The search also included manual search from relevant books and journal articles. following keywords were used: triage, triage scale, emergency department, emergency room, triage accuracy, triage consistency, triage education, policy and procedure clinical descriptors and Saudi Arabia. This study provided an understanding for the triage including its history; therefore, the search was confined to the years 1980 to 2010.

Most of the literature that was identified for this review came from six countries: Australia, Canada, United Kingdom, United States of America, Sweden and New Zealand and the Netherland. The majority of triage studies were conducted in Australia, Canada and USA. Triage literature in Saudi Arabia is limited. The following keywords were used: triage, emergency department, emergency room,

triage accuracy, triage consistency, triage education, triage policy and procedure, and clinical descriptors.

2.3 Historical Background on Saudi Arabia

The Kingdom of Saudi Arabia is a relatively new country; its modern history developed through three main phases. Prior to the 19th century, the population of the Arabian Peninsula consisted of a number of loosely organised Bedouin tribes. In the early 18th century, the first phase began with the establishment of the first Saudi state. This phase began when Muslim scholar and reformer Muhammad bin Abdul Wahab formed an agreement with Muhammad bin Saud, the Ruler of Diriyah, to dedicate themselves to restoring the teaching of pure Islamic roles to the Muslim community. By 1788, the first Saudi state was formed in the central region of Najd, and its rule extended to the most of Arabian Peninsula. This phase ended when Muhammad bin Saud was defeated by the Ottoman army in 1818 (Royal Embassy of Saudi Arabia, Washington D.C., 2006)

In 1824, the Al-Saud family had regained political control over central Arabia; the ruler Turki Al-Saud established the capital in Riyadh and the second Saudi state. In 1865, the Ottoman campaign extended to the Arabian Peninsula and captured part of the Saudi state. The ruler at that time, Abdurrahman Al-Saud, clashed with the Al-Rashid family from Hail (in the northern region), who were determined to overthrow the Saudi state. Al-Rashid, with the support of Ottoman army, defeated Abdurrahman Al-Saud, who sought refuge in Kuwait with his family and son Abdulaziz in 1891 (Royal Embassy of Saudi Arabia, Washington D.C., 2006).

The modern Kingdom of Saudi Arabia was founded in 1902 when Abdulaziz returned from Kuwait to recapture Riyadh from the Al-Rashid family. After capturing Riyadh and surrounding cities, Abdulaziz captured all of the Hijaz (Makkah and Madinah) in 1924–1925. In the process, he united all Arabic tribes into one nation. On September 23, 1932, the country was formed and named the Kingdom of Saudi Arabia, an Islamic country with Arabic as its national language and the Holy Qur'an as its constitution (Royal Embassy of Saudi Arabia, Washington D.C., 2006).

2.4 Location and Geographic of the KSA

The Kingdom of Saudi Arabia is located in the southwest corner of Asia; the kingdom is at the crossroads of Europe, Africa and Asia. It is spread over 2,150,000 square kilometres, occupying almost 80 per cent of the Arabian Peninsula. The KSA has two water borders and seven land borders. It is surrounded by the Red Sea to the west; the United Arab Emirates, Qatar, Bahrain and the Arabian Gulf to the east; Jordan, Iraq and Kuwait to the north; and Yemen and Oman to the south. Saudi's western coastline with the Red Sea stretches about 1,760 kilometres, and the Arabian Gulf coastline is about 650 kilometres (see Figure 2.1) (Ministry of Economy and Planning, 2007).



Figure 2.1. Map of Saudi Arabia.

2.5 Climate

Desert covers more than half of the Kingdom of Saudi Arabia, while a mountain range runs parallel to the coastline of the Red Sea. These mountains peak at 3000 meters in the Asir province. There are two seasons in the KSA; in summer, it is extremely hot during day and mild during night. Temperatures in some areas reach 49°C, with the exception of the provinces of Asir and Taif, where the weather is

milder and rainy during the day. In winter, the average temperature is 23 °C in Jeddah and 14 °C in Riyadh. Winter temperatures drop to sub-zero in the central and northern parts of the KSA. The weather in the KSA is generally pleasant between October and May, with cool nights and sunny days. From April to November, in contrast, the weather is extremely hot in most parts of the country.

2.6 Administrative Regions

The KSA is ruled by a monarchy based on Islam. The government is headed by the king from the royal family (Al-Saud), and he acts a prime minister and Custodian of the Two Holy Mosques. The current king is Abdullah bin Abdulaziz. The king appoints a crown prince to help in government duties. The king governs with the help of the Cabinet, which consists of 22 ministers who are specialised in different areas. In addition, the king is advised by a legislative body called the Consultative Council (*Majlis Al-Shura*). This council includes 150 members appointed by the king for a 4-year period; the main role of the council is to recommend new laws to the king and amend existing ones.

In 1993, the late King Fahad bin Abdulaziz revised the Kingdom's administration system. Based on that revision, the KSA was divided into 13 administrative provinces. Each province contains a governor who is appointed by the king and who is assisted by a vice governor and a provincial council. These provinces are Riyadh, Makkah, Madinah, Al-Qassim, Hail, Eastern Province, Northern Province, Asir, Al-Baha, Najran, Jizan, Al-Jouf and Tabouk. In each administrative province, there is a health directorate that liaises with the Ministry of Health, which is responsible for any health-related matters in their area. In addition to these provinces, there are three health directorates, located in Jeddah, Hafr Al-Batin and Bishah (Mufti, 2000).

2.7 Demographics

In 2004, the population of the KSA was 22.67 million (55.4 per cent male and 44.6 per cent female). This is an increase of 33.8 per cent compared to the 1992 census of 16.94 million (Table 2.1). The annual population growth rate is estimated to be 3.2 per cent (Central Department of Statistics and Information, 2005). Saudi nationals accounted for 72.9 per cent (16.52 million) of the population and

expatriates 27.1 per cent (6.14 million). Among the Saudis, 50.1 per cent were male and 49.9 per cent were female (Central Department of Statistics and Information, 2005).

Table 2.1

*Total Saudi and Expatriate Population by Gender**

Gender	Saudi citizens	Percentage of Saudi by gender	Expatriates	Total population	Percentage expatriates by gender
Male	8,285,662	50.1	4,271,598	12,557,260	34.01
Female	8,243,640	49.9	1,872,638	10,116,278	18.51
Total	16,529,302	100	6,144,236	22,673,538	27.1

*Source: The Central Department of Statistics and Information, 2005

The population of Saudi Arabia is young: more than one third of the population (39.92 per cent) is less than 15 years old, while the elderly (above 65) comprise only 3.48 per cent of the total population (Table 2.2). The greatest proportion of the population is located in Makkah (24 per cent) and Riyadh (24 per cent), while the lowest population rate is found in the Northern Province, which has only 1 per cent of the total population in the KSA. The total labour force working in the KSA was 7.1 million; of this, Saudi nationals represented 49.7 per cent, and expatriates accounted for 50.3 per cent of the total (Central Department of Statistics and Information, 2005). From these figures, it can be seen that the Saudi nation is critically dependent on its expatriate labour force. This is especially true in health care.

Table 2.2

*Age Structure of the Saudi Population**

Age category	Percentage
Less than 15 years	39.92
15–64 years	56.59
65 and above	3.48
Total	100

*Source: The Central Department of Statistics and Information, 2005

2.8 Education in Saudi Arabia

Saud, the eldest son of Abdulaziz, succeeded to the throne in 1953. He moved Saudi Arabia rapidly into the 20th century. He instituted the Council of Ministers and established the Ministries of Health, Education, and Commerce. Consequently, a large number of schools and the King Saud University were opened in Riyadh in 1957. The KSA was experiencing rapid growth economically and was establishing itself in the world community. Educational advancement was slow until the 1970s, when King Fahd bin Abdulaziz was the Minister of Education under King Saud. By the time of his death in 2005, free education was available for all Saudi citizens (Ministry of Education, 2006).

The Ministry of Education provides public education from kindergarten to grade 12. Its role includes the development of strategic plans and the supervision of the education process. Saudi education policy aims ‘to ensure that education becomes more efficient, to meet the religious, economic and social needs of the country and to eradicate illiteracy among Saudi adults’ (Ministry of Education, 2006, para. 1).

Education in Saudi Arabia is not compulsory, and students can join and stop education at anytime. Public education is divided into four stages: kindergarten (age 5), 6 years of primary school (6–12 years of age), 3 years of intermediate school (12–15 years of age) and 3 years of high school (15–18 years of age). After completing the intermediate school (grade 9), students have the choice to enrol in high schools or vocational schools. The number of public schools in Saudi Arabia in 2008 was 31,798, with more than five million enrolled students (Ministry of Education, 2006).

University education is the responsibility of the Ministry of Higher Education (MOHE). The MOHE controls 24 government universities and 15 private colleges and universities (Ministry of Higher Education, 2010). Study at government universities is free for Saudi citizens.

2.8.1 Nursing Education in Saudi Arabia

Formal nursing education in Saudi Arabia started in 1925 when King Abdulaziz Al-Saud ordered the establishment of the first nursing school in Makkah (Khalil, 2001). In 1959 the Ministry of Health signed several conventions with the

World Health Organisation; one was related to the development of nursing. This convention was the starting point for the first nursing health institute for boys in Riyadh in 1960, followed by the establishment of a nursing health institute for girls in Riyadh and for boys in Jeddah in 1962. By 1976, the number of nursing health institutes had increased to 47 institutes providing nursing education at the secondary level (i.e. students enrolled after completing elementary school, grade 9).

In 1992, the MOH launched six colleges of health sciences: three for boys, in Jeddah, Riyadh and Dammam, and three for girls, in Riyadh, Jeddah and Onaiza. Courses included nursing and many other health care professions. It should be noted that by comparison to Western schools of nursing, graduates from these colleges are equivalent to an ancillary nurse level. By the end of 1994, the Kingdom had a total 13 of these colleges for both males and females. The upgrade from health institute level to collage level did not continue because the first private health institute (nursing diploma) was launched in 1999. These private health institutes continued to grow and have reached 106 health institutes that teach different professions including nursing. On completion of these courses, within the Saudi health system, graduates are considered to be equal to a Western registered nurse. However, those graduates may not be able obtain a registration as registered nurse internationally.

In contrast to Western nursing schools and colleges, Saudi nursing courses did not lead to formal registration originally, and there was no an accrediting body overseeing standards and curricula. Saudi Arabia introduced formal registration in 1992 (The Saudi Commission for Health Specialities, 2010). The newly formed registration board, however, has no control over the education of nurses except in private health institutes, where its role includes follow-up and evaluation but not curricula approval (The Saudi Commission for Health Specialities, 2010). This lack of control has resulted in each facility having different requirements and standards. Consequently, the quality of knowledge and skills varies significantly. As an example, in some institutes nursing is taught in Arabic; given that the language used in the hospitals is English, these graduates are unable to effectively communicate with the expatriate nurses who are in charge.

Nurse education at the university level began in 1976 (Khalil, 2001) but has not progressed well; only three universities two private nursing colleges, located in

Jeddah, provided nursing undergraduate degrees. Nowadays, however, most of the universities in Saudi Arabia offer undergraduate education for nurses.

Postgraduate nursing education started in 1987 at King Saud University in Riyadh at master's level for females only, and enrolment is very low. Nursing education standards, compared to Western countries, is not known; however, King Saud University rank is 221, internationally (QS World University Rankings 2010). Keep in mind that the high ranking does not necessarily reflect the standard of education in individual faculties. To date, no university in Saudi Arabia offers nursing education at the doctoral level. Most Saudi nurses who want a postgraduate qualification go overseas, mainly to Western universities and find that they are required to complete a bridging course or full undergraduate degree before progressing.

Abu-Zinadah (2006) reported that the Saudi nursing workforce mainly consisted diploma and associate degree holders (Table 2.3). She found that 28 nurses had completed master's degrees and six had attained their doctoral degrees (Abu-Zinadah, 2006). Master's degrees were awarded from Saudi and overseas education institutions. Doctoral awards were solely obtained from outside Saudi Arabia. Basic nursing education in Saudi Arabia is at a lower standard than that of countries such as Australia, due to the lack of standards in the system. Due to the fact that very few Saudi nurses hold undergraduate and postgraduate qualifications, Saudi system results in that nurses with a diploma being allowed to undertake roles and responsibilities of a registered nurse. This stands in contrast to other country like Australia, where a diploma in nursing indicates an enrolled nurse level, with appropriate restrictions on practice.

Table 2.3

Qualifications of Saudi Nurses in MOH

Qualifications of Saudi nurses in MOH hospitals	Percentage of Saudi nurses	Equivalent to Australian qualification*
Diploma	67	Diploma
Associate Degree	30	Diploma
Degree	3	3-year degree

*<https://www.aei.gov.au>

These figures are expected to increase dramatically in the next decade. The Saudi government is committed to establishing a bachelor's degree as the minimum entry to the nursing profession to meet WHO recommendations (Abu-Zinadah, 2006). Another reason to expect an increase in the number of nurses with bachelor's and postgraduate degrees is the expanded scholarship programme. Beginning in 2005, the Saudi government began providing a significant number of scholarships for Saudi citizens (including nurses) to study abroad. Nurses, both pre- and post-registration, are now studying in many countries including the United States of America (USA), the United Kingdom (UK), Australia and Canada. A recent report to the nurses' board reported that there have been at least 20 nurses awarded international bachelor's degrees and 50 nurses awarded international Master's degrees (Asharq Al-Awsat, 2010). Abroad, Saudi nurses usually pursue undergraduate, master and doctorate level studies in Western countries. It should be noted that studying for such a long period, separated from family is a great sacrifice.

2.9 Overview of the Health Care System in Saudi Arabia

As a unified country, the KSA is only 78 years old and is, in many ways, still developing in areas such as such as education and health. The Ministry of Health (MOH) was established in 1953 with significant growth from the 1970s due to oil revenues (El-Bushra, 1989). In the past two decades, health services in Saudi Arabia have made remarkable progress in all areas. The Saudi health system is a universal health care system; the Saudi government is responsible for providing a free medical care for Saudi citizens based on Article 31 in the Basic Law of Governance (Mufti,

2000). In addition, the government provides free treatment for expatriates working for government agencies.

The hospital system includes many providers, such as the MOH, that offer health care to Saudi nationals and also includes other government agencies such as the Saudi Arabian National Guard (SANG), the Ministry of Defence and Aviation (MODA), the Ministry of Interior (MOI) and King Faisal Specialist Hospital and Research Centre, which service the specific groups they represent. Recently the government has also sought to encourage greater private sector participation in the health field by offering long-term, interest-free loans for the establishment of hospitals and clinics (Royal Embassy of Saudi Arabia, Washington D.C., 2002).

The MOH, which is directed by the Minister of Health, is considered the main government agency responsible for running the country's health system. The ministry's role includes strategic planning, formulating specific policies and regulating and financing health care services in the Kingdom (Al-Yousuf, Akerele & Al-Mazrou, 2002). In addition, MOH undertakes follow-up and supervision of health-related activities provided by the private health sector.

The management structure of the MOH is shown in Figure 2.2. The directorates to some extent are autonomous in terms of staff recruitment, training, discipline, supervision and evaluation (Al-Yousuf et al., 2002). However, the recent health policy introduced by the latest health minister has provided a greater decentralisation of health services throughout the Kingdom.

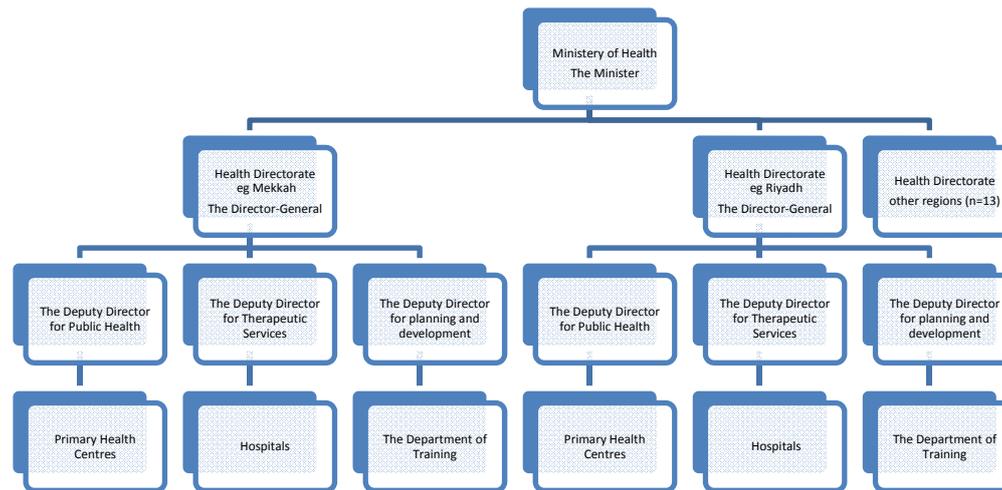


Figure 2.2. Summary for the organisational structure of the MOH.*

*Adapted from MOH unpublished organisational hierarchy document

The MOH provides services through two levels of health care. The first level is a network of primary health care centres throughout the Kingdom. These primary health care centres provide preventive, prenatal, emergency and basic health services. In 2008, there were a total of 1,986 health centres (Ministry of Health, 2008). Access to appropriate services including hospitals is by referral from the primary health centres (Mufti, 2000). Consequently, patients should be seen first by a primary health care physician to decide whether this patient requires a referral to a specialist. According to the Saudi health system, access to hospitals must be through the primary health centres, except in emergency cases, when patients can access the hospital directly. (Khoja, Al Shehri, Abdul-Aziz & Aziz, 1997). However, compliance with the referral system is limited, with queue jumping and inappropriate presentations to EDs being common (Siddiqui & Ogbeide, 2002).

The second level of health care is a network of general and specialised hospitals (secondary and tertiary). The total number of hospitals in Saudi Arabia is approximately 386, which includes both public and private hospitals. The MOH operates 57 per cent of the total number of hospital in Saudi Arabia, while other government agencies operate 10 per cent and the private sector operates 33 per cent of the hospitals. To meet growing needs, the number of MOH hospitals increased from 191 hospitals (28,140 beds) in 2001 to 231 hospitals (31,720 beds) by 2008

(Ministry of Health, 2001, 2008). Hospitals have a number of specialised functions; Table 2.4 provides a summary of the major MOH departments.

Table 2.4

MOH Departments

Category	Number
Hospitals (general and specialised)	231
Primary Health care Centres	1986
Dental Centres	20
Tuberculosis Centres	3
Rehabilitation Centres	13
Smoking Cessation Clinic	31

Source: MOH Statistics Year Book 2008

2.9.1 Health Resources

Health care is financed by the Saudi government. Approximately 75 per cent of the government revenues are from the sale of natural resources (oil products), and none is derived from taxation (Mufti, 2000). The funds given to the MOH and other government agencies through the national budget is the cornerstone for health resources. The government provides support to the MOH and other government agencies through a percentage of the total budget through a 5-year development plan. As shown in Table 2.5, the national government budget as well as the MOH budget is continually increasing. With increases in the population, the number of hospitals and the cost of health services (internationally), the allocated budget for the MOH has continued to increase, from 5.1 per cent of the national budget in 1992 to 6.2 per cent in 2008 (Al-Yousuf et al., 2002; Ministry of Health, 2008). Funding increases each year have matched or exceeded population growth.

Table 2.5

Budget for the MOH in Relation to the National Government Budget

Year	Government budget	MOH budget	Percentage of total government budget
2005	SAR 280b	SAR 16.87b	6.0
	\$Au 88b	\$Au 5.3b	
2006	SAR 335b	SAR 19.69b	5.9
	\$Au 105b	\$Au 6b	
2007	SAR 380b	SAR 22.81b	6.0
	\$Au 119b	\$Au 7.2b	
2008	SAR 450b	SAR 25.2b	5.6
	\$Au 141.5b	\$Au 7.9b	
2009	SAR 475b	SAR 29.6b	6.2
	\$Au 149.5b	\$Au 9.3b	

* SAR 1b \cong \$Au 314.6m

Source: MOH Statistics Book Year 2008

2.9.2 Workforce

The ratio of Saudi health workers to expatriate health works is low, especially in regard to physicians and nurses. As can be seen in Table 2.6., Saudi physicians represent only 20 per cent of the total number working in public hospitals (operated by MOH). Further, Saudi nurses represent only 36 per cent of the total nursing workforce. In contrast, more than 60 per cent of the pharmacists and allied health personnel are Saudi (Ministry of Health, 2008). The causes for the small number of nurses and physicians in Saudi Arabia are not known. However, it can be argued that Saudi universities do not graduate enough Saudi nurses and physicians to meet the growing demand in the Kingdom.

In non-MOH hospitals, Saudi physicians and nurses represent 48 per cent and 16.6 per cent respectively (see Table 2.7). As shown in Table 2.8, the lowest rate can be found in private hospitals, where Saudi physicians represent 4.5 per cent and Saudi nurses 4.1 per cent of the workforce, respectively (Ministry of Health, 2008).

Table 2.6

Workforce in MOH Hospitals by Nationality

Category	Saudi	Expatriates	Total	Ratio of Saudi to expatriates
Physician	3,617	14,436	18,053	1:4
Nurse	14,737	26,195	40,932	1:2
Pharmacist	677	388	1,065	2:1
Allied health personnel	14,856	5,147	20,003	3:1

Source: MOH statistics book year 2008

Table 2.7

Workforce in Other Government Sectors

Category	Saudi	Expatriates	Total	Ratio of Saudi to expatriates
Physician	5,569	5,973	11,592	1:1
Nurse	3,908	19,628	23,536	1:5
Pharmacist	822	298	1,420	3:1
Allied health personnel	7,756	8,007	15,763	1:1

Source: MOH statistics book year 2008

Table 2.8

Workforce in Private Sector Hospitals

Category	Total	Saudi to expatriates
Physician	16,444	4.5 per cent
Nurse	22,333	4.1 per cent
Allied health personnel	8462	17.3 per cent

Source: MOH statistics book year 2008

It is clearly evident that the Ministry of Health relies on expatriates to provide the bulk of health care to the population. Expatriates come from many different countries with varying professional education levels, languages and cultural/

religious backgrounds. The majority of nurses who work in MOH hospitals are from Asian countries such as the Philippines and India. Western nurses from Australia, New Zealand, Canada and England usually work in other government hospitals such as National Guard Hospitals. Brown and Busman (2003) claimed that reliance on expatriate health care workers 'can be problematic for the health-care sector, from recruitment and retention to more fundamental issues in service delivery that may result from differences in culture, language and professional skills' (p. 347).

The affect of this over-reliance on expatriate nurses is poorly understood because of the paucity of research in this critical area in Saudi Arabia. There are a significant number of issues relating to foreign nurses caring for the Saudi population. English is the language of health care in the KSA because the Kingdom initially adopted a Western model of health care, mainly derived from the United States. Consequently, expatriate nurses need specific orientation and education to understand the Saudi health system, the culture and the people. The workforce is not stable, as it is difficult to predict who will stay in the KSA to work. This uncertainty negatively affects nursing staffing levels and education planning; for example, in times of political unrest, many expatriates return to their home countries.

2.9.3 Health Indicators

Formal documentation of health statistics is relatively new in Saudi Arabia. It is difficult to ascertain exactly when data was first obtained. According to the MOH, the main health issues in Saudi Arabia are communicable diseases, injuries caused by motor vehicle accidents and lifestyle diseases such as diabetes and hypertension. Despite the increased population and the documentation of new diseases, health indicators show a decrease in some communicable diseases such as malaria, measles and whooping cough and the almost eradication of other diseases such as poliomyelitis. In recent decades, statistics show decreasing mortality rates, changing morbidity patterns and improved quality of life (see Table 2.9) (Ministry of Health, 2008). Despite the noticeable improvement in these indicators, progress still lags behind that reported in other countries, such as Australia (Australia's National Agency for Health and Welfare Statistics and Information, 2010).

Table 2.9

Improvement of Selected Health Indicators

Indicator	Saudi Arabia		Australia	
	1998	2008	1998	2008
Life expectancy at birth (years)	71.4	73.4	77.0	82.4
Crude death rate /1000 population	5.1	3.9	7.4	6.6
Infant mortality rate /1000 population	21.4	17	5.0	3.0
Under 5 mortality rate / 1000 population	29.0	20.6	7.5	5.0
Maternal mortality rate / 10,000 live birth	1.8	1.4	0.82	0.65

Source: MOH statistics book year 2008 and www.aihw.org.au

Chapter 3: International Emergency Department Triage Practice

3.1 Introduction

Triage is not common practice in most of the EDs in the study setting; therefore, it was important to review triage-related studies that cover varying aspects of the topic, starting with the history of and concept behind triage through current international evidence-based triage practice. This chapter presents the second part of the literature review, discussing access to EDs and overcrowding internationally. It provides the history of triage and presents the benefits and limitations of an ED triage system. In addition, it discusses the components that are required for a successful implementation of an ED triage, including triage scale, policy and procedures, triage personnel, triage education, triage experience and the design of the triage area. This chapter also discusses the accuracy of triage decisions and the use of clinical descriptors in making triage decisions. Further, it provides a comparison of reliability and validity between different triage scales. It provides a description of the current five-level triage scale and discusses its reliability and validity. Finally, it discusses the delivery of ED services and access to ED and triage in Saudi Arabia.

3.2 Access to Emergency Departments and Waiting Times

An issue faced by most emergency departments across the globe is overcrowding and consequently the increase in the time it takes to be seen by medical staff. There are many reasons for this, including an increase in patient acuity, staffing shortages, staff of mixed skill levels, an increase in the number of patients and availability of ward beds in the hospital (Hadley, 2005; Read et al., 1992). For example, the patient presentations to the EDs in the State of Victoria, Australia, increased by 18.3 per cent between 1998 and 2002 (Taylor, Bennett & Cameron, 2004). There are many reasons for the increase in demand for ED services, and this varies between EDs. Two reasons proposed in the literature are inappropriate visits to the ED by non-urgent patients and changes caused by economic variability that alter a person's ability to access private care (Al-Shammari, 1991; Almeida, 2004; Field & Lantz, 2006; Read et al., 1992; Siddiqui & Ogbeide, 2002).

The ED is seen as a 24-hour shelter for the ‘walking well’ or worried persons in addition to the usual critically ill or injured people (Almeida, 2004). Zimmermann (2001) reported the following causes of overcrowded EDs:

1. Increases in patient volume that outstrip the resources of the unit
2. EDs becoming the principal provider for primary medical care during off-duty hours
3. Emergency third-party payer pressure (Zimmermann, 2001, p. 246).

Any increase in waiting time has the potential to influence patient outcomes and satisfaction (Cooke et al., 2006). There is a flow-on effect with waiting times that can increase the number of patients who leave without being seen (LWBS). Research studies have reported an increase the number of people who leave ‘before been seen’ due to overcrowding and increased waiting times (Johnson, Myers, Wineholt, Pollack & Kusmiesz, 2009; Mohsin et al., 2007). A study by Monzon, Friedman, Clarke and Arenovich (2005) found that 3.6 per cent of the patients left the ED without being seen by a physician. According to the authors, these patients were low acuity but were still at risk of adverse outcomes. The study also found that long wait times are the most common reason for leaving the ED without being seen. Other reasons for leaving included that the patient felt too sick to wait or was beginning to feel better (Monzon et al., 2005). In another study, Johnson et al. (2009) conducted a phone survey with patients who left EDs without being seen to understand their reasons for leaving. The study found that the majority of the patients (76.7 per cent) identified the waiting time as the main reason for leaving the ED without being seen by a physician.

The consequences of the increase in presentations, waiting times and number of in patients who leave before being seen can affect patient outcomes and safety. Patients with less obvious but urgent problems may be overlooked in a busy ED. In addition, patients who deteriorate while waiting to be seen may also be missed. In a study, Derlet, Richards and Kravitz (2001) found that 33 per cent of the participants (nurses) reported poor patient outcomes as a result of overcrowding.

Triage is one of the recommended strategies to increase the efficiency of ED throughput and to improve patient outcomes. Ciesielski and Clark (2006) stated that ‘triage is an important place to start when looking at the ED throughput’ (p. 5).

According to McNally (1996), problems such as increased patient presentations, treating non-urgent conditions, overcrowding and long waiting times can be 'attributed to dysfunctional triage facilities and may be eased by incorporating accepted triage practice' (p. 123). Although dated, McNally's comments are still relevant today. Research consistently reported that effective triage systems have resulted in a decrease in ED overcrowding by reducing waiting times (Bruijns et al., 2008; Qureshi, 2010). Further, it has been argued that ED triage is an effective system for reducing waiting times and ensuring that all patients receive the appropriate treatment based on their clinical condition (Bruijns et al., 2008; Ciesielski & Clark, 2006; Grouse, Bishop & Bannon, 2009; Murray, 2003).

The effect of a standardised triage system on waiting times has been extensively studied. Bruijns et al. (2008) conducted a study to evaluate the effect of introduction of triage on waiting time in an ED in South Africa. Data from the pre-triage period was compared with the post-triage period. The results showed that the overall waiting times were significantly reduced from 234 minutes to 146 minutes and from 216 minutes to 38 minutes for high-priority level patients (Bruijns et al., 2008). The impact on patient outcomes was not mentioned; however, early intervention has been shown to improve patient outcomes (Richardson, 2009).

3.3 History of Triage

The development of emergency departments occurred as a consequence of the industrial revolution. Gradually, hospitals in industrialised countries designated areas to cope with industrial accidents and other accidents such as road trauma (caused by horse and buggy accidents). By the 1950s, accident and emergency departments had emerged but were not considered a speciality area, just a point of patient stabilisation. Around the late 1960s, emergency departments became organised into two areas: one for acute patients and one for patients requiring resuscitation. By the 1980s, many emergency departments had gradually reorganised into five distinct areas: resuscitation, acute, sub-acute, paediatric and triage. Additionally, the 1980s saw triage systems beginning to be a feature in most EDs, and formalised systems were being developed (Derlet, 2004; Lyneham, 2004).

Triage developed independently of emergency departments as a function of warfare. Triage as a formal process was first seen in the battlefields in the 18th

century, although the ancient Greeks and Romans only treated soldiers who could be returned to the battlefield. Formal triage was first documented by Baron Dominique Jean Larrey, a chief surgeon in Napoleon's Imperial Army (Fernandes, Groth, et al., 1999; Iseron & Moskop, 2007). Larrey recognised that wounded soldiers need to be assessed and categorised promptly. In addition, Larrey's system included treating and evacuating those requiring the most urgent medical care immediately instead of delaying their care until the end of the battle, as had been the norm (Iseron & Moskop, 2007). He set the rules of sorting soldiers for treatment based on severity of injury, regardless of rank or distinction (Richardson, 2009).

In 1846, British surgeon John Wilson made the next major contribution to military triage. Wilson focused on the outcomes of treatment. He argued that in order to make their efforts effective, surgeons should focus on those wounded who needed immediate treatment and for whom treatment was likely to be successful. Wilson advocated delaying treatment for soldiers with less severe and potentially non-fatal injuries (Iseron & Moskop, 2007). However, other triage planners in World War 1 suggested treating the less severely wounded soldiers immediately so they could return to the battlefield quickly.

The post-World War Two period saw a rapid change in health care systems internationally. For example, in the 1960s, US patients who were covered by health insurance for the first time began to visit hospitals in growing numbers. As a result of the rise in the number of patients presenting to EDs, patients received care based on need rather than arrival time, a more efficient triage process (Fernandes, Groth, et al., 1999; Richardson, 2009). As an example, Australia introduced a national formal triage system in 1994. This system utilised a five-level triage scale and included an informal education component. Other countries such as Canada and the UK also introduced formal triage on a national level (Beveridge, Ducharme, Janes, Beaulieu & Walter, 1999; Fitzgerald, 2000; Manchester Triage Group, 1997; Wuerz, Milne, Eitel, Travers & Gilboy, 2000).

3.3.1 Benefits of Developing a Triage System

The effectiveness of a formal triage system is measured by the improvement in patient outcomes when compared to an informal system or no triage system at all. However, in a health system where there is a lack of mandatory data collection,

patient outcomes may be difficult to establish. To ensure a safe and efficient system of triage, patient prioritisation must be based on clinical criteria and patient acuity. Effective triage also contributes to appropriate use of resources—both staff and equipment. The staff and resources in the ED are allocated by area. For example, in the resuscitation area, one would find senior experienced staff and equipment such as ventilators and rapid IV infusion equipment are found; in contrast, the sub acute areas might be manned by junior ED staff and house low fidelity equipment that would be seen on general wards. Consequently, when a severely ill or injured patient arrives, allocating them to the resuscitation area means that the staff should have the knowledge and skills to manage the patient and the physical resources should be close at hand. Decisions concerning an obviously critical patient occur quickly. It may be argued that the triage decision is relatively easy when an obviously ill or injured patient enters an emergency department; however, many people who visit EDs do so with undifferentiated illnesses or injuries. Therefore, prioritising all patients according to their clinical urgency becomes crucial (Göransson, Ehrenberg, Marklund, et al., 2005). The best example of this is head injury. Many serious cases present conscious and alert and do not appear urgent. A head injury patient can deteriorate slowly or rapidly, depending on the underlying injury; this is why most hospitals require that head injury patients are kept under observation for 4 hours.

Fitzgerald (2000) argued that formalising a triage system within an emergency department addresses a number of important clinical, administrative and research needs, including the following:

- Optimising outcomes by ensuring that patients are treated appropriately according to their clinical needs
- Maximising the efficiency of direct care by ensuring a patients receive the levels of medical care that are appropriate to their conditions
- Ensuring patients receive immediate assessment and initiation of treatment
- Maximising the efficiency of resource utilisation
- Improving workload descriptions, which aid in policy formulation
- Ensuring high quality patient care

- Providing systems that ensures support for the staff in their decision making
- Providing standard urgency descriptions for intervention studies (Fitzgerald, 2000, p. 586)

Richardson (2009) argues a consequentialist perspective in that ‘the overall philosophy of doing the greatest good for the greatest number requires resource allocation on the basis of needs which in turn requires a standard process to identify and prioritise the needs of the presenting population’ (p. 793). The basic principles supporting ED triage are those of justice (or equity) and efficiency (Richardson, 2009). Significantly, a well-developed triage system has the best prospect of ensuring equity of access to ED services as a function of clinical need rather than of external factors such as emergency department workload or ability to pay for services (Aljohani, 2006).

Accompanying improved patient outcomes as a consequence of triage has been a reduction in the number of written and verbal complaints and an increased level of satisfaction among ED staff (Blythin, 1983; Bruijns et al., 2008; Jones, 1988; Mallett & Woolwich, 1990). In addition, triage helps to determine other needs, such as the treatment location and type of provider, infection control protocols and the management of the flow of patients (McMahon, 2003).

Establishing a standardised triage system that can be used on a national level has been promoted (Fernandes, Tanabe, Bonalumi, et al., 2005; Fernandes, Tanabe, Gilboy, et al., 2005). The literature revealed that many countries, including Australasia, Canada and the UK, have successfully implemented national standardised triage systems (Australasian College for Emergency Medicine, 2005; Beveridge & Ducharme, 1997; Manchester Triage Group, 1997; Wuerz et al., 2000). A triage acuity scale is a cornerstone of any standardised triage system. There are two prevalent acuity scales: a three-level and the more common five-level scale used in EDs where triage is practiced. Both have been shown to improve outcomes by allocating all ED patients to the appropriate urgency category and treating them accordingly.

The institutional benefits of implementing a formal standardised triage system, including an acuity scale, are reported in the literature (Fernandes, Tanabe,

Gilboy, et al., 2005; Fernandes, Wuerz, Clark & Djurdjev, 1999). However, most ED staff and patients do not focus on institutional benefits but instead want to know how the system will benefit them.

The benefits include:

- facilitating data benchmarking;
- facilitating different types of surveillance, such as public health, injury and disease-specific; and
- supporting clinical research. (Fernandes, Tanabe, Gilboy, et al., 2005, p. 12)

The specific benefits of a standardised triage system include an improvement in patient safety and ED services. Fernandes, Tanabe, Bonalumi, et al. (2005) stated that ‘triage standardisation is a necessary first step in improving ED efficiency, allowing recognition of clinical and quality indicators and reduced variance in the ED’ (p. 204). A standardised triage system enhances patient safety by prioritising the sickest patient to receive treatment first according to a timeframe for each urgency category. In addition, it facilitates ED operation by controlling the flow of patients, especially non-urgent cases, who are designated low priority and will wait for care. Fernandes, Groth, et al. (1999) claimed that standardised triage should improve triage quality, enhance utility and allow a new patient classification taxonomy to develop. Quality improves as standardised triage helps to set standards for timelines for the delivery of care and as a standardised structure for screening process is developed. In addition, standardisation allows for classifying patients according to ‘urgency and the intensity of service that they may require’ (p. 6).

3.3.2 Risks and Limitations of ED Triage

The ideal triage system should identify patients in medical need and should be sensitive enough to identify patients at risk of physiological deterioration when the signs of illness are not obvious (Bergeron, Gouin, Bailey & Patel, 2002; Fernandes, Tanabe, Gilboy, et al., 2005). This ideal is complicated by the fact that patients may deteriorate whilst waiting for care. Current triage systems are not perfect. Problems may lie not in the systems themselves but in the implementation and education associated with the systems (Le Vasseur et al., 2001; McNair, 2005).

Issues such as inappropriate staffing and funding also impact the efficacy of a triage system.

Inconsistency in the application of triage is identified in the literature as a major concern in many countries including Australia and Canada. Consistency in triage refers to the degree to which triage clinicians agree on the triage code (category) across an ED population. Many studies have reported varying degrees of inconsistency in the application of triage scales worldwide (Beveridge et al., 1999; Crellin & Johnston, 2003; Dilley & Standen, 1998; Goodacre, Gillett, Harris & Houlihan, 1999; Göransson, Ehrenberg, Marklund, et al., 2005; Hollis & Sprivulis, 1996; Jelinek & Little, 1996). West and Pitzer (1997) claimed that the assessment of patient acuity must be accurate and consistent in order to improve quality of care while managing costs. Inconsistency in triage decision making may lead to inappropriate clinical decisions, which may increase the cost of care unnecessarily. The treatment of a patient with an obscure but urgent health problem might be delayed while other patients with less urgent problems are seen immediately. Such a situation may affect the health care outcomes of the genuine urgent patient and waste valuable resources. As an example, two patients present with a similar history of chest pain; one is allocated to category 2/5 (to be seen within 10 minutes) and the other to 3/5 (to be seen within 30 minutes). Both are experiencing an acute myocardial infarction. The additional 20-minute wait for the second patient may result in permanent damage to the heart or poorer outcomes.

According to Fitzgerald (2000), 'the magnet effect', shifting the queue and over- or undertriage are potential problems with implementing any ED triage system. Fitzgerald argued that the triage process itself may determine resource allocation that is disproportionate to the patient's needs. Fitzgerald also claimed that ED patients might be waiting in a long queue to be triaged instead of getting the necessary medical treatment. In a situation like this, the triage time for a patient may be affected by his/her position in the queue. This, in turn, might delay the commencement of treatment for a patient with an urgent problem (Derlet, 2004). Finally, inappropriate decisions may lead to over- or undertriage; the results of allocating patients to a triage category that is considered as inappropriate (based on the patient's presenting clinical condition) can lead to delays in care and/ or unsuitable resource allocation. Undertriage refers to allocation of a triage code that is

less than the patient's clinical needs, and overtriage is the assignment of a triage code that is higher than clinically warranted (Fitzgerald, 2000).

Fitzgerald's (2000) concerns can be moderated by having the appropriate staff in triage. An experienced and appropriately qualified ED nurse should have the ability to quickly assess all patients in the queue and identify those who require immediate care (Lyneham, 2004). However, with the current shortage of nurses, especially specialised nurses, triage units are often staffed with junior and minimally prepared staff.

3.4 Triage Requirements

Successful implementation of any ED triage system relies on many factors. Adopting or developing a valid and reliable triage scale is an important step towards formalised triage practice (Fernandes, Tanabe, Gilboy, et al., 2005). However, the presence of a triage scale alone is not enough to claim the existence of a triage system (McNair, 2005). Funderburke (2008) stated:

Strong evidence exists to indicate 4 distinct areas of best practice and improvements for triage in the emergency department: standardised 5-level acuity system understood by nursing staff, physicians and paramedics; a shortened triage process with standing orders initiated by the emergency nurse or physician; electronic systems that aid in decision making and provide reminders; and specific education and competency for this specialised area. (p. 180)

Review of the triage literature revealed several elements that should be taken into account when planning for a comprehensive ED triage system:

- a reliable triage scale,
- supporting policy,
- procedures,
- qualified triage clinicians,
- education preparation for the triage role and
- design of the triage area.

These elements will be discussed below in detail.

3.4.1 Triage Scale

Given the high patient turnover in any ED, it is essential to focus on the primary function of triage: the sorting of ED patients using a standardised acuity scale (Zimmermann, 2001). The triage acuity scale is the cornerstone in any ED triage system. The primary purpose of a triage acuity scale is to sort patients on arrival based on the assessed acuity of their illness or injuries. This categorisation helps ED clinicians know which patient requires treatment first and who can safely wait.

There is no universal agreement on an ideal triage scale. It has been suggested by Fernandes, Wuerz, et al. (1999), Fernandes, Tanabe, Gilboy, et al. (2005) and Zimmermann and McNair (2006) that an ideal triage scale has the following characteristics:

- it must be easily understood and rapidly applied;
- acuity levels must be clearly defined;
- it must have high rates of inter-rater agreement;
- it must demonstrate high levels of reliability, validity and utility;
- it must be applicable across all patient populations and age groups; and
- it must reflect the severity of illness or injury and should not be influenced by ED volume

Although it is not a primary purpose of triage, the ideal triage scale must be accurate enough to predict the patients' clinical outcomes such as mortality and likelihood of admission in addition to predicting ED resource use (Fernandes, Tanabe, Gilboy, et al., 2005; Fernandes, Wuerz, et al., 1999).

Internationally, ED triage systems utilise various acuity scales, ranging from three to five levels of acuity. Table 3.1 provides an example of the triage scales that are currently in use in many countries. The three-level acuity scale is the most popular and is used in many countries such as the USA and Sweden (Funderburke, 2008; Zimmermann, 2001). Over time, with changes in medical care and the ageing population, the acuity of patients presenting to the ED appears to be increasing. Thus, categorising patients into three acuity groups (emergent, urgent, or non-urgent) may be limited in prioritising patient care. The discrimination between categories in

a three-level scale is too narrow and may result in a large number of patients being considered emergent and thus who must be seen within 30 minutes, which could push ED resources beyond their capacity. In addition there would need to be intra-category discrimination, such as identifying the sickest of the sick, to be seen first.

In the last two decades, use of a five-level acuity scale has increased. Bergeron et al.(2002) claimed that using a greater number of urgency categories allows for greater precision in urgency allocation; however, adding more categories can be a source of confusion, too. According to McMahon (2003), the five-level scales were developed and implemented as a result of the recognition of the limitations of the three-level and four-level acuity scales.

Table 3.1

Example of ED Triage Scales

3 Levels	4 Levels	5 Levels
1-Emergent	1-Life-threatening	1-Immediately life-threatening
2-Urgent	2-Emergent	2-Imminently life-threatening
3-Non-urgent	3-Urgent	3-Potentially life-threatening
	4-Non-urgent	4-Potentially serious
		5-Less-urgent

Confusion exists in some countries, with policy makers under the mistaken belief that having a triage scale is sufficient; in the Saudi hospitals where triage exists, this is the belief. McNair (2005) argued that a triage scale is only one component of a comprehensive triage system. This confusion may be related to the use of term 'triage scale' in literature to describe some well-known ED triage systems such as the Australasian Triage Scale (ATS) and the Canadian Triage and Acuity Scale (CTAS). However, triage system in the countries utilising these scales is not merely a triage scale; rather the system also addresses other aspects such as access to EDs, legislation and guidelines and education (Australasian College for Emergency Medicine, 2005; Beveridge et al., 1998).

3.4.2 Triage Policy and Procedures

Successful implementation of any system needs supporting policy and procedures to guide the implementation process. Policies and procedures are different, according to Swinburne University guidelines on writing policy and procedure (Swinburne University, 2009). According to the guidelines, policies do the following:

- Describe the rules that establish what will or will not be done
- Can range from a broad philosophy to specific rules
- Are usually expressed in standard sentence and paragraph format
- Include WHAT the rule is, WHY it exists, WHEN it applies and WHO it covers. (p. 1)

In contrast, procedures have the following attributes:

- Describe the critical steps undertaken to achieve policy intent
- Are succinct, factual and to the point
- Are usually expressed using lists
- Include HOW to achieve the necessary results. (p. 1)

Issuing new policy and procedures is not the end point of a process but rather the beginning. A person must be designated to oversee the implementation process. Given the dynamic nature of health care, regular revision is critical. Policy and procedure revision varies depending upon its type and scope. Every 3 years is a typical timeframe, but it should not take more than 5 years (Monash University, 2003). According to Monash University (2003), a policy and procedure should be revisited to investigate whether the policy and/or procedure is still consistent with best practices and whether the policy meets stakeholders' needs. Further, it should be revisited to investigate the level of compliance with the existing policy and/or procedures. In order to promote user adherence to new policy and procedures, the developers should provide appropriate support and training when necessary (University of California Santa Cruz, 1994).

In the emergency department context, triage is either implemented on a national level such as ATS and CTAS or, as in Saudi Arabia, at the hospital level. In the absence of a national triage policy, individual hospitals adopt or develop a triage

system that suits their perceived needs. Despite the reliability and validity of the developed triage systems, significant issues exist. One issue is that making changes to the original triage scale may reduce its validity and reliability. Another issue is that use of different triage scales within the same health care system is problematic. This situation may result in the application of different standards to prioritise care for patients with similar health problems. If the decision of which triage system to use is solely based on individual EDs' perceived needs or familiarity with a particular system, it is less likely to be effective.

In many countries including Australia and Canada, triage is supported by a national policy that introduced a five-level triage in all EDs (Australasian College for Emergency Medicine, 2006; Canadian Association of Emergency Physicians, 2002). Though no evidence shows that the policy is applicable to private hospitals, private emergency departments widely use the ATS (personal conversation, L. Cloughessy 12/7/2010). In contrast, in the USA, federal policy recommends the adoption of a five-level triage scale (CTAS or ESI), but its use is not mandatory (American College of Emergency Physicians, 2003). That means EDs may decide either to use a three-, four-, or five-level triage system or even not to use a triage system at all.

Australia has a national triage policy and procedure document that is endorsed by the Australasian College for Emergency Medicine and the College of Emergency Nursing (Australasian College for Emergency Medicine, 2006). However, It is acknowledged that policy and procedures for triage may exist in other countries; however, they are not readily available for examination.

The ACEM policy document required the following implementation procedures in all Australian EDs:

- All patients should be triaged on arrival by a trained and experienced registered nurse.
- All patients should have a triage code that must be recorded.
- The triage nurse must maintain continual re-assessment of patients waiting for care in the waiting area and must change triage codes if the clinical condition changes.

- The triage nurse must initiate appropriate initial management or investigation according to the organisation guidelines (Australasian College for Emergency Medicine, 2006).

The procedures for triage may vary according to many factors such as the ED location and physical design. The document supporting triage should also include an education programme, clinical support and measurement of evaluation. The ACEM triage policy provides a baseline for writing local triage policy and procedures. The policy is combined with other documents such as implementation guidelines and standardised education.

3.4.3 Triage Personnel

In many countries including Australia, Canada, the UK and the USA, ED triage is predominantly a role for a registered nurse, with some countries stating that the nurse must have the appropriate education and experience (Almeida, 2004; Australasian College for Emergency Medicine, 2005, 2006; Canadian Association of Emergency Physicians, 2002; Göransson, Ehrenberg, Marklund, et al., 2005; Le Vasseur et al., 2001). However, the final decision of who performs triage is up to the hospital policy. Some hospitals may assign medical officers, nurses, paramedics, or a multi-disciplinary team to perform triage (Qureshi, 2010).

Given the long history of triage, there have been relatively few studies that have evaluated the effectiveness of triage nurses' decision making. However, studies on the reliability of triage nurses' decisions are evident. These studies have established that triage nurses were able to make valid and reliable triage decisions (Bergeron et al., 2002; Vance & Sprivulis, 2005). Bergeron et al. (2002) compared inter-rater agreement of triage nurses with paediatric emergency physicians using four-level triage scale. The researchers found that agreement level was moderate for both nurses ($\kappa = .45$) and physicians ($\kappa = .41$). Further, they found that there is no significant difference between nurses and physicians in assigning acuity ratings. The low level of inter-rater agreement can be attributed to the use of the four-level triage scale, which has been shown to have a low sensitivity and specificity level.

Vance and Sprivulis (2005) conducted a study to assess the reliability and validity of triage nurse assessments of patient complexity on arrival to ED, using the ESI. Triage nurses were asked to estimate the required procedures and consultations

for each patient. The validity of triage nurses' assessments were determined by comparing the triage nurses' estimates with the actual number of procedures and consultations. Patients with up to one procedure or consultation were considered to present 'low complexity', and patients who required two or more were considered to present 'high complexity' (Vance & Sprivulis, 2005). Reliability was determined by measuring the agreement between the triage nurse estimates and assessment nurse estimates. The study found that triage nurses' estimations of complexity were correct 85 per cent of the time, and the agreement level was substantial ($\kappa = .80$). The authors concluded that triage nurses validly and reliably estimated the complexity of ED patients (Vance & Sprivulis, 2005).

Interestingly, the addition of a senior physician to the triage has benefits such as decreasing the length of stay in the ED and decreasing the number of patients who leave EDs without being seen by a physician (Partovi, Nelson, Bryan & Walsh, 2001; Richardson, Braitberg & Yeoh, 2004). Partovi et al. (2001) found that the use of medical staff in triage reduced the length of stay; however, the cost of care increased significantly. This finding was supported by Richardson et al. (2004).

3.4.4 Triage Education

Fernandes, Tanabe, Bonalumi, et al. (2005) stated that 'education of triage nurse will always be a critical element in accurate triaging with any system' (p. 204). McNair (2005) stated that triage nurses should have adequate training and education before performing triage. Smart, Pollard and Walpole (1999) found that decisions about mental health issues improved as a result of triage education. The Emergency Nurses' Association USA recommended comprehensive triage education that addressed a variety of issues including systematic assessment, critical thinking skills, documentation skills and clinical-based knowledge for various populations (McNair, 2005, pp. 601, 602). Similarly, the Emergency Nurses' Association of Victoria (as cited in Le Vasseur et al., 2001) recommended preparing triage nurses for the triage role through 'structured unit based education programmes informed by nationally established triage standards' (p. 50).

The literature fails to elicit a consensus on a triage education curriculum. Further, there are a significant number of education tools for the role of triage reported in the literature. In a study examining the education preparation for the

triage role in some Australian EDs, Kelly and Richardson (2001) found that two of the participating EDs reported no formal triage training and three reported formal regional courses. The remaining EDs used combinations of activities including lectures, self-learning packages and mentor experience. This study was conducted before the development of the federally funded, *Triage Education Resource Book*. This book was published in 2002 and revised in 2007 (Gerdtz, Considine, et al., 2007). However, the current status of education preparation required for the triage role in Australian EDs has not been reported in the literature.

Although no uniform triage curriculum exists, some professional organisations state minimal educational requirements recommended for a triage education preparation. In a position statement, the Australian Association of Emergency Nurses (AAEN) recommended that triage preparation include:

- an 8-hour theoretical component duration,
- 24 hours of structured supervision,
- access to experienced triage personnel at all times and
- an annual performance audit (Gerdtz et al., 2002).

In addition, the College of Emergency Nursing Australasia (CENA) (2007) recommended that triage nurse training and education should include the following core components:

- history, science and practice of triage;
- the Australian health care system;
- the role of the triage nurse;
- the use of the ATS;
- effective communication skills;
- legislative requirements and considerations;
- assessment and triage decision making by presentation type, such as trauma paediatric emergencies; and
- quality and safety in health care (p. 3).

Despite the importance of triage education prior to commencing a triage role, no significant association was found between triage nurses' education levels and triage category allocation. Considine, Ung and Thomas (2001) studied the correlation between the triage decisions (expected triage, overtriage and undertriage) and the triage nurses' qualifications (i.e. no qualification, certificate in emergency nursing, critical care nursing, midwifery and tertiary qualifications). The results showed no significant correlation between triage decisions and nil qualification and a certificate in emergency nursing or critical care nursing. However, a positive correlation was found between the midwifery qualification and triage decisions and a negative correlation between triage decisions and a tertiary qualification.

A search of the literature revealed that several education strategies are used to prepare nurses for the triage role. These strategies include informal and formal education methods. Informal education methods include rating triage case scenarios and attending in-service courses, whereas formal methods include using a comprehensive triage education programme such as the Emergency Triage Education Kit (Cheung, Heeney & Pound, 2002; Gerdtz, Considine, et al., 2007). McNally (2001) conducted a survey of six ED nurses who had completed a hospital triage education programme to examine their beliefs and experience regarding triage education. The findings showed that the preferred resources for triage education ranged from completion of an orientation package to the most preferred method, an education programme supported by mentoring (McNally, 2001).

In Australia, the Emergency Triage Education Kit is distributed nationally, establishing a nationally consistent approach to the education preparation for the triage role and to promote consistent application of the ATS (Gerdtz, Considine, et al., 2007; Gerdtz et al., 2008, p. 251). The College of Emergency Nursing Australasia (CENA) endorsed the Triage Education Kit as a resource book for nurse educators to promote the consistent application of the ATS (College of Emergency Nursing Australasia, 2007).

3.4.5 Triage Experience

The term 'experience' in nursing literature is not well defined; commonly the passage of time (years of experience) is used (Considine, Botti & Thomas, 2007). Although dated, Watson (1991) suggested that passage of time, exposure to events

and gaining knowledge or skills are important criteria for experience. The latter view is more in line with Benner's (1984) widely accepted stages of practice development.

A review of triage literature showed considerable variability in the documented experience required to perform the triage role. Experience required varied from 3 months to more than 2 years (Kelly and Richardson, 2001; Ritchie, Crafter & Little, 2002). Kelly and Richardson (2001) conducted a survey in which charge nurses and unit nurse managers identified the prerequisite experience and training undertaken by nurses for triage roles in their institutions. The study found that the required experience varied. The most commonly reported experience duration was 12 to 18 months. Similarly, Ritchie et al. (2002) found that experience of triage nurses varied from 12 months to more than 8 years of ED experience (Ritchie et al., 2002). The American Emergency Nurses Association required that triage nurses have at least six months of ED experience before commencing to triage (McNair, 2005).

Although many researchers stressed the importance of experience in triage decision making (Cioffi, 1999; McNair, 2005), triage studies failed to find a relationship between consistency and accuracy of triage decisions and triage nurse experience (Aljohani, 2006; Considine et al., 2001; Jelinek & Little, 1996). These studies exclusively used the passage of time (year of experience) to define experience. This may affect the results because experience is sometimes acquired through exposure to events. Therefore, using years of experience alone to define experience is not always accurate.

3.4.6 Design and Function of Triage

The design and structure of a triage area vary according to the role, location and size of the ED (Richardson, 2009). Although no evidence supports a single, specific design of facilities for triage, effective triage systems share a number of important features: a single point of entry, appropriate facilities and a system that maintains traffic flow.

Single point of entry: The triage desk should be allocated immediately within the main entrance of the ED so all patients presenting to the ED are seen and triaged by the triage nurse. The triage desk should also have easily identifiable

signage, well lighted and enables the triage nurses to have visual access to patients who are in the triage queue as well as for patients who in the waiting area (Nelson, 1983; Richardson, 2009). In EDS that are under construction, it is possible to design the triage desk and triage; however, this is not always possible in existing EDs. Some EDs do not allow for changing the structure of the building to meet triage requirements.

Appropriate facilities: It is important to have appropriate facilities, such as equipment for undertaking brief assessments or first aid treatment and washing facilities for patients and staff (Richardson, 2009). Further, the wheelchair and stretcher area should be adjacent to the triage desk (Nelson, 1983). The triage area should be manned by security officers, and triage workers should have easy access to ED physicians through a paging system.

Maintain traffic flow of patients: Triage systems should have ‘a balance between competing concerns of accessibility, confidentiality and security’ (Richardson, 2009, p. 704). It is important to decrease the congestion in the triage area in order to provide visual accessibility for all patients entering the ED (Nelson, 1983). Security can be maintained through a safety-glass-enclosed area. According to Nelson (1983) using a safety-glass-enclosed area is favourable in EDs where the patient volume is low. In contrast, it is not practical in an ED that has a large patient volume (over 100 patients per 8-hour shift); instead, ‘an open counter area may be more feasible’ (Nelson, 1983, p. 53). An open counter, however, decreases the patients’ privacy when performing triage assessments. Therefore, the open counter is not feasible in a community like the KSA. Most of the female patients cover their faces, and it is not normally acceptable to uncover if the triage area is open to others’ sight.

3.5 Accuracy of Triage Decisions

Triage decisions can be divided into primary and secondary decisions. The primary decision is related to conducting the triage assessment, allocating the triage category, and sending patients to the appropriate area. The secondary triage decision is related to the initiation of nursing interventions and the promotion of patient comfort (Le Vasseur et al., 2001, p. 10).

It can be argued that accurate triage decisions increase the potential for timely and quality emergency care (Beveridge, Kelly, Richardson & Wuerz, 2000). In comparison, inaccurate or inappropriate triage decisions can cause delays in care, patient dissatisfaction, poor outcomes and excess cost to the organisation (Beveridge et al., 2000; Wuerz et al., 1998). Triage accuracy is usually determined by a consensus between triage nurses and a group of triage experts, or by comparing the triage categories with admission rates or mortality rates (Aljohani, 2006; Gerdtz & Bucknall, 2001a; Göransson, Ehrenberg, Marklund, et al., 2005).

Undertriage may result in the delay of treatment and in prolonging patient waiting times, which may increase the risk of an adverse patient outcome. Conversely, overtriage may reduce the time before the patient receives medical care; however, it increases the waiting for other patients who may need more urgent care and subsequently increases the risk of adverse outcomes. In addition, access to resources may be misappropriated, for example, a person not requiring cardiac monitoring may occupy a monitored bed that is needed for other patient. Inappropriate triage results in questionable resource utilisation (Considine, Le Vasseur & Villanueva, 2004; Fernandes, Tanabe, Gilboy, et al., 2005). The costs associated with poor triage decisions can be very high. Beveridge et al. (2000) claimed that ‘the mean cost of care for a category one patient is approximately ten times that of a category five patient’ (p. 2). Consequently, the ability to allocate patients to the appropriate triage category is critical, both to patient safety and to the best use of ED resources.

Research shows that triage decisions are relatively easy when the patient’s condition is obvious (Göransson, Ehrenberg, Marklund, et al., 2005). Ruger, Lewis and Richter (2007) found that the most accurate triage decisions were at either end of the scale (resuscitation and non-urgent), whereas the middle categories (two, three and four) are problematic. A significant number of patients presenting to EDs in these categories are at risk of undertriage or overtriage as their presenting histories and symptoms may be vague or not specific (McNair, 2005). Ruger et al.’s study (2007) found that the urgent category constituted 47 per cent of all ED patients. The study also found that 10 per cent of the patients who required admission were allocated to the non-urgent category. Further, a 2009 study found that 50 per cent of patients with acute myocardial infarction (AMI) were triaged into categories three,

four and five (Atzema, Austin, Tu & Schull, 2009). It can be argued that finding measurable errors in triage may be unavoidable because atypical presentations are common. For example, Canto et al. (2007) and Diercks (2009) found that 27 per cent of AMI patients present without chest pain.

Many strategies have been used worldwide to enhance the accuracy of triage decision making. These strategies include utilising algorithms (Zimmermann, 2006), identifying clinical indicators (Australasian College for Emergency Medicine, 2005; Beveridge et al., 1998) and utilising computerised systems. Some researchers have claimed that introducing a computerised system into the triage unit will help the triage nurse make quick and efficient triage decisions (Aronsky, Jones, Raines & Slusser, 2008; Funderburke, 2008). In addition, a computerised system in triage facilitates the registration and tracking of ED patients (Zimmerman & Clinton, 1995).

3.6 The Role of Clinical Descriptors in Triage Decisions

The challenge in making a correct triage decisions is often related to limited time and the lack of a definitive diagnosis (Considine, Le Vasseur & Charles, 2002). To this end, many triage systems such as the ATS, CTAS and MTS developed clinical descriptors. Descriptors in this case are criteria that assist in the decision-making process. For example, a blood pressure (BP) > 60 systolic in an adult would be a category one and a simple fracture of a long bone, a category three. The aim of these descriptors is to direct triage decision-making and to provide a consistent research-based approach for triage education (Australasian College for Emergency Medicine, 2005; Beveridge et al., 1998; Considine et al., 2002). The clinical descriptors provide typical presentations for each triage category and related parameters.

Clinical descriptors act as a guide for identifying urgency, but they do not negate the judgment of expert triage nurses. The descriptors provide a useful tool to guide triage decision making, especially for novice triage clinicians (Australasian College for Emergency Medicine, 2005). Considine, Thomas and Potter (2009) claimed that 'future use of reliable predication rules might lead to increased accuracy of triage category allocation, early referral to specialist services, or expedited discharge from the ED' (p. 825). There are a number of physiological characteristics

associated with hospital admissions. Considine et al. (2009) found that significant abnormalities in vital signs increased the likelihood of admission to critical care. Further, Ruger et al. (2007) established that adding a few specific primary complaints to the existing CTAS protocol assisted in the identification of patients at risk of subsequent hospital admission.

Clinical descriptors in the ATS are based on research evidence and expert consensus. The clinical descriptors are based on the primary patient survey: airway, breathing, circulation, disability and in mental illness, the level of psychological distress. In addition, the clinical descriptors include specific parameters for each triage category such as heart rate, respiratory rate, the Glasgow Coma Scale (GCS), temperature and blood pressure. Clinical descriptors also take into account specific clinical groups such as paediatric and psychiatric patients (Australasian College for Emergency Medicine, 2005).

The CTAS used a similar approach to develop its clinical descriptors (category definitions). The Canadian descriptors and guidelines were endorsed by the Canadian Association of Emergency Physicians (CAEP) and the National Emergency Nurses Affiliation of Canada (NENA). The CTAS clinical descriptors list is similar to that of the ATS; however, in category two (emergent), there are more descriptors than the ATS (Beveridge et al., 1998). This is likely to be a result of the differences in the time to treatment in category two between the ATS (10 minutes) and the CTAS (15 minutes).

The MTS differs from the ATS and CTAS as it uses an algorithm to identify patients' urgency level. Traditional clinical descriptors are not used, but they are integrated within the algorithm. The MTS has six discriminators to identify patient urgency. These discriminators are life-threatening, haemorrhage, pain, conscious level, temperature and acuteness. For instance, temperature can be used as a marker for patient urgency. A patient whose temperature is less than 32°C, a child whose temperature exceeds 38.5°C and an adult with a temperature of 41°C are categorised as orange (very urgent). Adult patients with temperatures of 38.5°C are categorised into the yellow category (urgent), and any mild pyrexia is categorised as green (standard) (Marsden & Windle, 2006).

3.7 A Comparison of Reliability between Triage Scales

Reliability is an important issue in any measure. In the triage context, reliability refers to the degree to which clinical assessment of the same patient using a triage scale will deliver the same acuity level (Twomey, Wallis & Myers, 2007). Internationally, no agreement exists on which of the scales to use. However, three- and four-level triage scales are criticised for their lack of reliability and validity. Fernandes, Tanabe, Bonalumi, et al. (2005) stated that ‘only a few studies demonstrate the poor reliability of three- and four-level systems, but we believe this is sufficient to recommend against these systems’ (Fernandes, Tanabe, Bonalumi, et al., 2005, p. 204). In addition, Zimmermann and McNair (2006) note that three- or four-level triage systems are not supported or recommended by any professional or governmental organisation (p. 18).

The reliability (inter-rater agreement) of the three- and four-level acuity triage systems was found to be only poor to moderate in a number of studies (Bergeron et al., 2002; Brillman et al., 1996; George et al., 1992; Travers et al., 2002; Wuerz et al., 1998). Wuerz et al. (1998) conducted a study to measure the inter-rater and intra-rater agreement of a three-level triage system and to investigate the ability of the system to identify patient urgency and to predict resource utilisation. Eighty-seven registered nurses and emergency medical technicians working in two EDs in the USA were asked to rate urgency for five standardised patient scenarios. Participants were asked to re-rate the same scenarios after 4 to 6 weeks. The study found poor inter-rater and intra-rater agreement in the acuity ratings for the five patient scenarios. Further, the participants often failed to agree on their own acuity ratings. The authors concluded that the three-level triage system is not reliable in determining urgency and in predicting ED resource utilisation (Wuerz et al., 1998).

More recently, Travers et al. (2002) compared the reliability and validity of a three-level triage scale with a new five-level triage scale. The authors measured the reliability and validity of actual acuity ratings of triage nurses using the three-level scale for a particular time period and then used a five-level triage scale during another time period. Despite attending a mandatory triage refresher course on the use of the three-level triage system, the inter-rater agreement was only moderate. In contrast, the inter-rater reliability improved when the five-level triage scale was used.

The authors believed that ‘the addition of two categories provided greater discrimination between ED patients’ acuity, without a loss of reliability’ (p. 398). Travers et al. (2002) found that the validity of the three-level triage scale cannot be established because of the absence of agreement on what constitutes degree of urgency. The authors concluded that the five-level triage system is safer and provides better reliability, greater discrimination and improved sensitivity and specificity than a three-level triage system (Travers et al., 2002). According to Gilboy (2005), inter-rater and intra-rater reliability of three-level scales are poor due to the lack of a universal definition for each triage level. This in turn leads to triage personnel using different criteria to assign patients to the categories (Gilboy, 2005).

Studies evaluating four-level triage systems found them to have demonstrated poor to moderate inter-rater reliability (Bergeron et al., 2002; Brillman et al., 1996; George et al., 1992). George et al. (1992) found that the use of a four-level triage system increased the waiting time, particularly for those who requiring the most urgent attention. Bergeron et al. (2002) compared the triage assignments in a paediatric ED among registered nurses and paediatric emergency physicians. The study utilised a four-level urgency scale (1= resuscitation/ emergent, 2= urgent, 3= less urgent, 4= non-urgent). The study found that the inter-rater agreement among the participants was only moderate. Brillman et al. (1996) found similar results. In their study, the agreement in urgency ratings between nurses and physicians using a four-level triage scale was only moderate.

However, other studies reported a better inter-rater reliability when using four-level triage systems. In Italy, Parenti, Ferrara, Bacchi Reggiani, Sangiorgi, And Lenzi,. (2009) measured and compared the reliability and validity of an old four-level triage system with a newly developed four-level triage system. The old triage system used 32 flow charts and the new triage system used only one flow chart. The results showed that these triage systems had good inter-rater agreement for rating triage acuity ($\kappa = .73$ and $.79$ respectively) and were accurate in predicting a patient’s admission. Though the authors recognised the reliability of existing five-level triage systems, they stated that the new four-level triage system was devised to satisfy Italian guidelines that required a four-level triage scale (Parenti et al., 2009)

In contrast, studies of five-level triage systems have demonstrated a range of inter-rater agreement that varies from fair to very good (Beveridge & Ducharme, 1997; Cooke & Jinks, 1999; Dilley & Standen, 1998; Doherty, 1996; Hollis & Sprivulis, 1996; Jelinek & Little, 1996). In the last few years, support for the five-level acuity triage systems has increased. Available literature and documentation show that all internationally recognised triage scales that are currently in use are five-level scales (Aljohani, 2006). The validity and reliability of five-level urgency scales will be discussed in details in the next section.

3.8 Five-Level Triage Scales

Five-level triages scales have been developed and used internationally. However, universal agreement on the most reliable five-level scale does not exist (Murray, 2003). A review of the literature showed that there are four well-validated and reliable five-level triage scales: the Australasian Triage Scale (ATS) (Australasian College for Emergency Medicine, 2005), the Canadian Triage and Acuity Scale (CTAS) (Beveridge & Ducharme, 1997), the Manchester Triage Scale (MTS) (Manchester Triage Group, 1997) and the Emergency Severity Index triage scale (ESI) (Gilboy et al., 1999; Wuerz et al., 2000). These scales are ranked in a descending order of acuity, where level one indicates the highest level of urgency and level five indicates the lower level of urgency (Fernandes, Tanabe, Gilboy, et al., 2005).

3.9 Reliability and Validity of Existing Five-Level Triage Scales

The utility of any triage system is underpinned by its reliability and validity. Schneider, Elliott, LoBiondo-Wood and Haber (2003) defined reliability as ‘the consistency or constancy of a measuring instrument’ (p. 448); while validity is ‘the determination of whether a measurement instrument actually measures what it is purported to measure’ (Schneider et al., 2003, p. 451). The reliability or consistency of triage among clinicians has been the focus of much research on emergency health care (Beveridge et al., 1999; Crellin & Johnston, 2003; Dilley & Standen, 1998; Goodacre et al., 1999; Hollis & Sprivulis, 1996).

Fernandes, Groth, et al. (1999) claimed that reliability is an essential attribute of triage for clinicians, researchers and third-party payers. Unreliable triage rating

can be harmful and may affect treatment options (Fernandes, Groth, et al., 1999). Reliability of triage systems is reported in the triage literature in the form of inter-rater reliability (agreement in triage ratings between multiple raters rating the same patient) and intra-rater reliability (agreement in triage ratings for the same patient on separate occasions). Inter-rater reliability is most frequently reported in triage studies using kappa statistics (Fernandes, Tanabe, Gilboy, et al., 2005).

Fernandes, Groth, et al. (1999) argued that measuring the inter-rater reliability by percentage of agreement only is unacceptable, because some degree of agreement would be expected by chance alone; therefore, researchers use kappa to measure inter-rater agreement. Kappa statistics consider both percentage of agreement between raters and agreement expected by chance (Twomey et al., 2007). Kappa (κ) is expressed on a scale of -1 to $+1$, where 0 represents the degree of agreement that would be observed by chance alone, -1 indicates no agreement beyond chance and $+1$ indicates perfect agreement (Fernandes, Tanabe, Gilboy, et al., 2005). Inter-rater agreement levels are defined according to kappa values as follow: kappa 0.20 = poor inter-rater agreement, 0.21 – 0.40 = fair, 0.41 – 0.60 = moderate, 0.61 – 0.80 = good and 0.81 – 1.00 very good (substantial) (Altman, 1991).

Consistency of triage decision making is determined by the degree to which clinicians agree on the allocation of a triage code across an ED population (inter-rater reliability) (Aljohani, 2006). Consistency can be determined by adjusting percentage agreement for chance using the kappa indicator of inter-rater reliability. Alternatively, consistency can be examined descriptively where the modal triage category (concurrence) is determined (Considine et al., 2004; Dilley & Standen, 1998; Goodacre et al., 1999).

The use of simulation case scenarios to measure consistency among triage clinicians is common (Aljohani, 2006; Considine et al., 2004; Göransson, Ehrenberg, Marklund, et al., 2005). Simulation scenarios have been used because the nature of ED does not allow for conducting studies in a life-threatening situation. The simulation scenario has been criticised because it does not provide the triage nurses with some important factors that help in decision making such as visual cues or communication. In addition, it does not take into account the time limits and stress that exists in an actual triage situation (Göransson, Ehrenberg, Marklund, et al.,

2005; Thomas, Wearing & Bennett, 1989). Despite these limitations, Worster, Sardo, Eva, Fernandes and Upadhye (2007) found moderate to high agreement between live cases and paper case scenarios.

In a triage context, validity refers to the degree to which the measured acuity level reflects the actual acuity at the time of triage (Twomey et al., 2007). Validity of any instrument is usually compared with a 'gold standard' that has absolute accuracy. However, in acuity rating, there is no gold standard measure of medical acuity against which a triage scale can be compared (Fernandes, Tanabe, Gilboy, et al., 2005). In addition, it is not possible to measure true patient acuity because many events (such as length of time to initiate care, the quality of care) can occur from the time that a patient presents in the ED to the time of discharge (Twomey et al., 2007). As a result, surrogate outcome markers of validity have been used as criteria by researchers in triage studies. The most common surrogates used in triage literature are hospital admission rates, mortality rates and resource utilisation (Fernandes, Tanabe, Gilboy, et al., 2005; Twomey et al., 2007).

3.9.1 Australasian Triage Scale

The Australasian triage scale was the first standardised five-level urgency scale to be introduced as a national system (Fernandes, Groth, et al., 1999; Zimmermann, 2001). Box Hill developed the first Australasian triage scale, which was described by Pink and Brentnall in 1977 (Beveridge et al., 2000; Richardson, 2009). In this scale, verbal descriptions were used to classify patients into five categories without time consideration: immediate, urgent, prompt, non-urgent and routine (Beveridge et al., 2000). In 1989, Fitzgerald modified the Box Hill Scale to produce the Ipswich Triage Scale. This scale used five coloured categories, and a timeframe was given for each triage category. This scale showed a good inter-observer reliability and a good level of predicting ED resource use (Fitzgerald, 1989).

In 1994, The Australasian College for Emergency Medicine (ACEM) modified the Ipswich Triage Scale to formalise the National Triage Scale (NTS). The NTS categories were immediate, 10 minutes, 30 minutes, 1 hour and 2 hours. The NTS was the first scale to be adopted on a national level. It was also recognised as

a performance indicator by the Australian Council of Healthcare Standards (Beveridge et al., 2000).

In 2000, the Australasian College for Emergency Medicine and the Emergency Nurses Association refined the NTS and subsequently renamed it the Australasian Triage Scale (ATS) (Richardson, 2009). The concept of the NTS remained unchanged, but the ATS provides better definitions for waiting times, uses numeric classifications only, and includes implementation guidelines (Richardson, 2009). The ATS uses five levels of urgency (Table 3.2). ED patients are categorised in response to the statement 'this patient should wait for medical assessment and treatment no longer than'. The categories are: immediate, 10 minutes, 30 minutes, 60 minutes and 120 minutes (Australasian College for Emergency Medicine, 2006).

The ATS provides indicator thresholds; these thresholds represent the percentage of patients in each triage category who received medical assessment and treatment within the described time goal (Australasian College for Emergency Medicine, 2006). The ATS has been adopted in a number of other countries including New Zealand, Canada, Sweden, Papua New Guinea and some South Pacific nations (Gerdtz & Bucknall, 2001a; Göransson, Ehrenberg & Ehnfors, 2005; Khanal, Lewis, Lewis, Newbury & Malla, 2005; Murray, 2003; Yousif et al., 2005).

The ATS was developed in response to the need for time-critical interventions to enhance patient safety, improve health care quality and relieve suffering (Australasian College for Emergency Medicine, 2005; Cioffi, 1998; Gerdtz & Bucknall, 1999). In Australia, the ATS acuity is also used to inform funding of emergency departments by providing an objective measure of case mix (the numbers/percentages of high and low acuity patients) (Aljohani, 2006; Richardson, 2009). In addition, other research has demonstrated that triage categories are a strong predictor of ED outcomes such as admission rates, ED length of stay and mortality rates (Richardson, 2009). The data have revealed that ATS categories are useful in many ways. For example, they might be used in planning ED operations, such as staffing levels, stocking levels and new equipment needs (Dent, Rofo & Sansom, 1999).

Table 3.2

Description of the Australasian Triage Scale Categories

ATS code	Description	Maximum waiting time	Performance threshold
1	Immediately life-threatening	Immediate	100%
2	Imminently life-threatening	10 minutes	80%
3	Potentially life-threatening	30 minutes	75%
4	Potentially serious	60 minutes	70%
5	Less urgent	120 minutes	70%

Source: Australasian College for Emergency Medicine, 2005

The ATS (formerly the NTS) is a reliable and valid tool. A number of studies have been conducted to evaluate the validity and reliability of the ATS, and it has been shown to have a fair to moderate degree of inter-rater reliability (Dilley & Standen, 1998; Hollis & Sprivulis, 1996; Jelinek & Little, 1996; Khanal et al., 2005). In addition, it has shown a strong correlation between resource utilisation, admission rates, mortality rates and ED length of stay (Australasian College for Emergency Medicine, 2005).

The majority of ATS studies were conducted in the 1990s. Few recent studies have evaluated the ATS reliability and validity. This might be attributed to the fact that the ATS has shown good levels of reliability and validity in the past, and nothing has changed since then; therefore, there has been no need to recheck its reliability and validity. Instead, current triage studies in Australia are concentrating on other areas in triage such as consistency and education.

Jelinek and Little (1996) conducted one of the early studies to measure the inter-rater reliability of the National Triage Scale (the forerunner to the ATS). The study included 115 triage nurses from eight Australian EDs. The participants were asked to rate urgency for 100 patient scenarios using the NTS. This resulted in 11,500 triage occasions included for analysis. The researchers used the term ‘model response’ to describe the most frequent response for each scenario, ‘concurrence’ to describe the percentage of responses in the model category, and ‘spread’ to describe the percentage of responses in the model category plus or minus one (Jelinek & Little, 1996).

The study found that 86 per cent of the triage nurses responded within one category for all patient scenarios ($n = 100$). For 96 scenarios, 95 per cent of the nurses responded within one category of the model category. The researchers concluded that the concurrence was acceptable as more than 50 per cent of the participants agreed with the model categories for 89 per cent of the scenarios. However, the study did not give details of the exact number or percentage of the participants who agreed with the model category.

Jelinek and Little (1996) concluded that the inter-rater reliability of the NTS was good based on the percentage of triage responses that fell in the model category or one category above or below. The study did not use kappa statistics to measure the NTS reliability; therefore, it is difficult to compare their findings with other studies that used kappa. The authors concluded also that the NTS is a reliable measure for rating the urgency of patients presenting to the ED. In addition, the study found that neither the triage nurse's experience nor hospital type appeared to affect triage nurse decisions ($p = 0.89, 0.12$ respectively). These findings are supported by Hollis and Sprivulis's (1996) findings.

Dilley and Standen (1998) assessed the level of uniformity in utilising the NTS among Victorian public hospital triage nurses. The study recruited 188 triage nurses from 14 EDs. The triage nurses were asked to rate triage acuity for 20 written case scenarios. A descriptive analysis and kappa statistics were employed. Not one patient scenario was allocated into the same triage category by all triage nurses. Of the 20 scenarios, 75 per cent were spread across four categories and four scenarios across three categories. In 14 patient scenarios, over than 50 per cent of the triage nurses selected the model triage category. The researchers found that the overall inter-rater agreement among the triage nurses was fair ($\kappa = .25, p = 0.01$). In addition, the study found no significant relationship between work experience and agreement level, with kappa ranging from .24 to .29 (Dilley & Standen, 1998). However, it is not clear whether the researchers meant experience in ED in general or experience in triage. Agreement level in this study may have been affected by the limitations of using written scenarios, which lack important information and visual cues that might affect decision making.

Considine, Ung and Thomas (2000) recruited 30 triage nurses to rate 10 written triage scenarios. This study found great variability in ATS category allocation; no one scenario was allocated to the same category by all participants. The researchers did not use kappa statistics to measure the agreement level among the study participants; instead they reported agreement in a form of percentage for expected category and model category. Of the total triage occasions ($n = 310$), the level of agreement among the triage nurses was 58 per cent (expected triage category) and 62 per cent (model triage category) (Considine et al., 2000). The researchers also found no correlation between triage nurse qualifications (no qualification, certificate emergency nursing, critical care nursing, or tertiary qualification) and the frequency of selecting the expected triage category (Considine et al., 2001).

In Considine, Le Vasseur and Villanueva (2004) a combination of paper-based and computer-based triage scenarios was used. The study aimed to examine emergency nurses' performances using triage scenarios characterised by the type of patients (adult versus paediatric) and the mode of delivery (paper versus computer). A total of 167 triage nurses were asked to rate 28 triage scenarios using the ATS. The study used 14 paper-based scenarios and 14 computer-based scenarios, with an equal number of paediatric and adult cases. The study found that 61 per cent of triage decisions were expected triage decisions, 18 per cent were undertriage decisions and 21 per cent were overtriage decisions. The results showed the overall inter-rater agreement level was moderate for both modes of delivery. However, the computer-based scenarios appeared to have higher degree of agreement ($\kappa = .56$) than the paper-based scenarios ($\kappa = .42$). The researchers concluded that the mode of delivery (paper versus computer) might influence the agreement level. However, it is not clear whether this improvement was due to using visual clues (pictures) and whether a similar improvement would occur if the pictures were used with the paper-based scenarios. Although the aim of this study was to examine the effect of patient type and mode of delivery on the triage agreement level, the study also demonstrated that the ATS has moderate inter-rater reliability.

The inter-rater reliability of ATS with paediatric patients were examined by Crellin and Johnston (2003). The researchers described the agreement level between nurses applying ATS to paediatric patients as 'poor'. Further, the agreement level

appeared to be lower than the consistency achieved when dealing with ED adult patients (Crellin & Johnston, 2003).

The reliability of ATS has also been evaluated in other countries. In Belgium, Van Gerven et al. (2001) evaluated the validity of the NTS, examining triage nurses' judgments of the urgency of a patient's condition and their case-mix description of the patient's profile. Four educated triage nurses conducted triage during a randomly selected shift for 12 weeks using the NTS. The researchers concluded that the correlation between the sentinel and the admission percentage ($z = .827$; $p > 0.05$) confirms the validity of the NTS. The study also found that the presenting complaints, patient clinical factors (pain, distress) and arrival patterns were the most common factors that affected urgency rating decisions (Van Gerven et al., 2001).

In Nepal, Khanal et al. (2005) reported a successful implementation of the ATS in a tertiary hospital. The consistency of staff triage ratings using the ATS was moderate ($\kappa = .60$). However, the study reported an unsatisfactorily long waiting time. An audit was designed to evaluate the triage practice against the ACEM performance indicators. The results showed that only 70.5 per cent of the patients in category one and category two were seen within the recommended benchmark time. In contrast, patients in categories three, four and five were seen within the recommended time. This result could stem from the fact that the ATS was designed to suit a developed country and the health care system and staff backgrounds may be quite different in a developing country like Nepal.

The study also found a relation between admission rates and mortality rates and ATS categories. The study findings suggested that the ATS validly predicted some outcomes such as admission and morbidity. However, Twomey et al. (2007) argued that a triage scale designed for developed countries may be valid in that context, but if the same scale is implemented in a developing country, the results may vary due to different resources and skills. Twomey et al. (2007) believed that it is not suitable to use surrogate markers (admission rates, mortality rates, or resource utilisation) to measure the validity of a triage scale that is adopted from a developed country. This is due to the differences in record keeping and the effectiveness of care between developed and developing countries. Instead, Twomey et al. (2007) suggested using Delphi methodology to validate a triage scale in developing

countries. Adopting triage scales from developed countries is common in some hospitals in Saudi Arabia (Qureshi, 2010). No evidence exists to assess the appropriateness of these scales for Saudi EDs or how reliable and valid the scales are in determining urgency and predicting resource use.

Despite strong evidence of ATS reliability and validity, evidence concerning consistency has varied (Considine et al., 2004; Considine et al., 2000; Dilley & Standen, 1998; Hollis & Sprivulis, 1996; Jelinek & Little, 1996; Khanal et al., 2005; Van Gerven et al., 2001). Jelinek (2008) discussed two approaches that have been used to optimise the consistency of triage in Australia: the development of clinical guidelines and the development of training programmes. The author stated that none of these approaches have been evaluated to measure how they actually affect consistency. Australasian College for Emergency Medicine (2005) developed guidelines for implementation of the ATS in EDs; these guidelines were developed in 2000 and updated in 2005, and no further changes have been made to date. The guidelines provide information about the function of triage, triage assessment and safety during triage as well as defining time to treatment and waiting times. The guidelines also define performance indicators, document standards and provide information on how to triage paediatric and mental patients. Finally, the guidelines provide clinical descriptors for each triage category to help triage nurses with their decision making.

In 2002, Gerdtz et al. developed a triage education resource book that provided a nationally consistent educational framework to support nurse educators who prepare emergency nurses for the triage role. The programme provided theoretical and clinical aspects of triage, including written patient scenarios. The programme was revised by Gerdtz, Considine, et al. (2007) and named the 'Emergency Triage Education Kit'. It included additional information about mental triage, paediatric triage, rural and remote triage, pregnancy triage and self-test simulation scenarios (Gerdtz, Considine, et al., 2007). In addition, Considine, Le Vasseur and Charles (2002) developed an education strategy to optimise consistent application of the ATS. The study resulted in development of guidelines and adult and paediatric physiological discriminators. The purpose of these physiological discriminators was to provide a consistent, research-based approach to triage education (Considine et al., 2002).

3.9.2 Canadian Triage and Acuity Scale

The CTAS was developed in 1995 by a group of Canadian ED physicians (Zimmermann, 2001). The system was endorsed by the Canadian Association of Emergency Physicians and the National Emergency Nurses Affiliation, and its use became official policy in Canada in 1997 (Zimmermann, 2001, p. 250).

The CTAS is a five-level-urgency scale based on the NTS. Timeframes in the CTAS and ATS are very similar with the exception of level two, in which time-to-care is within 10 minutes in the ATS and 15 minutes in the CTAS (Göransson, Ehrenberg, Marklund, et al., 2005). The CTAS contains a list of clinical descriptors for each category (Murray, 2003). The CTAS has received widespread acceptance in Canada as a reliable ED triage scale. In addition, it has been adopted in other countries such as the USA and Sweden (Göransson, Ehrenberg, Marklund, et al., 2005; Worster et al., 2004).

Table 3.3

Description of the Canadian Triage and Acuity Scale Categories

Category number	Category name	Response time
1	Resuscitation	Immediate
2	Emergent	Within 15 min
3	Urgent	Within 30 min
4	Less urgent	Within 60 min
5	Non-urgent	Within 120 min

Source: Canadian Association of Emergency Physicians, 2002

In 2001, a paediatric version of the CTAS was introduced (Bullard, Unger, Spence & Grafstein, 2008), and in 2004 the adult CTAS guidelines were revised to include the concept of modifiers (Murray, Bullard & Grafstein, 2004). The primary purpose of the modifiers is to assist triage nurses in the assignment of the appropriate triage acuity level (Bullard et al., 2008). Modifiers were divided into first-order modifiers and second-order modifiers. The first-order modifiers are defined as modifiers that are broadly applicable to a wide number of complaints such as vital

signs, pain severity and mechanism of injury. The second-order modifiers are specific to a limited number of complaints, such as low blood sugar (Bullard et al., 2008; Murray et al., 2004). Further revisions occurred in 2006 and 2008 (Bullard et al., 2008; Warren, Jarvis, LeBlanc & Gravel, 2008).

Reliability of the CTAS was established by Beveridge et al. (1999). The study evaluated the inter-rater reliability of the CTAS. Ten physicians and 10 nurses were recruited to rate urgency for 50 actual ED case scenarios. Each scenario included the presenting complaint, mode of arrival and vital signs. None of the participants had had any formal training or experience with the use of the CTAS (Beveridge et al., 1999). Nine nurses and eight physicians completed and returned all the scenarios. The results showed that the agreement level between the physicians and the nurses in urgency allocation using the CTAS was very good ($\kappa = .80$). The researchers concluded that both physicians and nurses understood and interpreted the CTAS categories in similar ways. Further, they concluded that the CTAS is a reliable triage scale (Beveridge et al., 1999). However, the results of this study may be limited because of the small sample size.

In a similar study, Manos et al. (2002) measured the inter-rater reliability of the CTAS on triage allocation by first-time users with different training and backgrounds. Twenty emergency care providers (five physicians, five nurses, five Basic Life Support [BLS] paramedics and five Advanced Life Support paramedics) were selected to assign triage codes for 41 triage scenarios that had been previously developed and used by Beveridge et al. (1999). The participants did not have any formal training on the use of the CTAS. The results showed that the majority of the triage ratings (63.4 per cent) matched the model triage category. Agreement was found to be higher in the most urgent categories than the less urgent categories. The overall level of agreement among the participants was good, with a weighted kappa of .77. The inter-rater agreement seemed to be higher (very good) in among the physicians and nurses than among the BLS and ALS paramedics groups (good). The weighted kappa for each group of participants was as follows: .82 for physicians, .80 for nurses, .76 for BLS paramedics and .73 for ALS paramedics (Manos et al., 2002).

A retrospective study by Stenstrom, Grafstein, Innes and Christenson (2003) measured the predictive validity of the CTAS. The study found that the CTAS had

excellent predictive validity for clinical outcomes (patient disposition, ED length of stay and hospital length of stay) and resource utilisation.

The inter-rater reliability and validity of CTAS have also been evaluated in other countries such as Sweden and the USA. In Sweden, Göransson, Ehrenberg, Marklund, et al. (2005) investigated the accuracy and concordance of emergency nurses acuity ratings of patient scenarios in the ED setting using the CTAS (Göransson, Ehrenberg, Marklund, et al., 2005). The CTAS was used because no national triage scale existed in Sweden. The results showed considerable variability in RNs acuity ratings. Of the total triage occasions (7550), no one scenario was triaged into the same category by all the participants. Moreover, 57.6 per cent of the triage episodes were triaged in concordance with the expected category. Overtriage occurred in 28.4 per cent of cases and undertriage occurred in 13.9 per cent of the triage occasions. Further, the results showed that the inter-rater reliability was moderate to good (kappa score values .46 unweighted and .71 weighted) (Göransson, Ehrenberg, Marklund, et al., 2005). The variability in acuity ratings may be attributed to unfamiliarity of the RNs working in Swedish EDs with the use of the CTAS. Further, it was not clear if any information or education were given for the participants before rating the case scenarios. In the USA, Worster et al. (2004) evaluated and compared the inter-rater reliability of the CTAS with the ESI. The researchers found that the CTAS inter-rater reliability was excellent ($\kappa = .91$).

In Saudi Arabia, the CTAS is widely used in non-public hospitals, such as National Guard hospitals and King Faisal Hospital and Research Centre, and in some MOH hospitals, such as King Fahad Medical City (Qureshi, 2010). However, its reliability and validity have not been reported. Further, it is not clear whether a modification has been made to the CTAS before implementation or not.

The consistency in application of the CTAS among triage nurses in Canadian EDs remains the focus of the CTAS's developer and related parties. The CAEP and NENA have endorsed an implementation guidelines document for the CTAS (Beveridge et al., 1998). These guidelines are very similar to the ATS's guidelines. These CTAS guidelines were revised in 2001, 2004 and 2008 (Bullard et al., 2008; Murray et al., 2004; Warren et al., 2008). In addition to guidelines, a combined adult and paediatric CTAS education pack was developed in 2006.

3.9.3 Manchester Triage Scale

The MTS is a five-level triage scale. It was developed in the UK by the Manchester Triage Group in 1994 (Marsden & Windle, 2006). The MTS has received wide acceptance in British EDs as the gold standard for triage care. It has also been adopted in other European countries including Portugal and The Netherlands (Roukema et al., 2006). The MTS uses name, colour and triage code to identify the timeframe for seeing an ED physician (Gilboy, 2005), see Table 3.4.

Table 3.4

Description of the Manchester Triage Scale Categories

Name	Colour	Target Time
Immediate	Red	0
Very urgent	Orange	10
Urgent	Yellow	60
Standard	Green	120
Non-urgent	Blue	240

Source: Zimmermann & McNair, 2006

The MTS uses 52 flowcharts based on common presentation to guide the triage decision. The flowcharts are based on six key discriminators: threat to life, consciousness level, haemorrhage, pain, acuteness and temperature (Fernandes, Tanabe, Gilboy, et al., 2005; Manchester Triage Group, 1997; Marsden & Windle, 2006). The MTS consists of four steps (Figure 3.1). According to Zimmermann (2001), the MTS is advantageous for novice ED nurses as it requires less dependence on patient history and communication skills. However, this approach is believed to constrain the expert nurses because it requires a structured interview (Zimmermann, 2001).

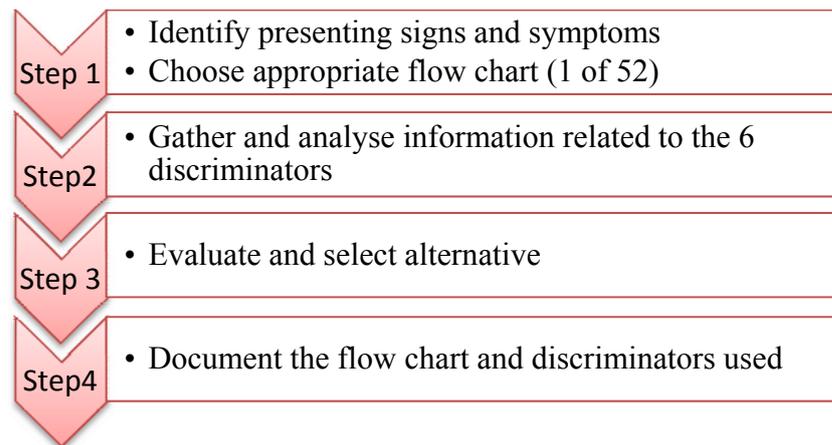


Figure 3.1. Process of triage according to the Manchester Triage Scale.

Source: (Zimmermann, 2001, p. 252).

Reliability and validity of the MTS have been evaluated within the UK and in other countries. Interestingly, only a few studies have examined MTS reliability and validity within the UK (Cooke & Jinks, 1999; Goodacre et al., 1999). Recently, studies in The Netherlands, Sweden, Portugal and Australia have investigated the reliability and validity of the MTS (Grouse et al., 2009; Martins, Cuña & Freitas, 2009; Olofsson, Gellerstedt & Carlström, 2009; Roukema et al., 2006). These published studies suggest that the MTS has fair to very good inter-rater reliability and good validity for predicting admission and mortality (Cooke & Jinks, 1999; Goodacre et al., 1999; Grouse et al., 2009; Martins et al., 2009; Olofsson et al., 2009; Van der Wulp, Schrijvers & Van Stel, 2009; Van der Wulp, Van Baar & Schrijvers, 2008).

Goodacre et al. (1999) examined the level of agreement between senior medical staff when they were asked to perform retrospective case note reviews of nursing triage decisions using the MTS. Four medical staff allocated triage for 50 ED patients after reviewing the patient notes. The medical reviewers were blind to the allocated triage category. The agreement between the four medical reviewers and the triage nurses who initially triaged the patients was fair to moderate ($\kappa = .27$ to $.53$). After using formal guidelines, the agreement level tended to improve ($\kappa = .31$ to $.63$) (Goodacre et al., 1999). In this study, the researchers used the medical reviewers as the gold standard to identify the true urgency level; however, they did not explain why it was used. Moreover, the study did not provide details of the number of the

triage nurses who initially triaged the actual patients. Despite the limitations above, the overall results of the study indicate that the MTS is a reliable triage scale.

Cooke and Jinks (1999) conducted a retrospective review of 91 patients admitted to a critical care unit (CCU). The aim of the study was to determine whether the MTS can reliably predict patients who will subsequently need admission to critical care areas. The original ED triage category was compared with the admissions to critical care areas. The result showed that 67 per cent of the patients admitted to the CCU were correctly triaged into MTS level one and two when presented to the ED; 18 per cent of the patients were incorrectly triaged into other categories. The authors attributed most of these errors in triage allocations to triage personnel not complying with the MTS algorithm. However, it should be remembered that not all patients relay all the necessary information required to make an accurate decision. The researchers concluded that the MTS is a sensitive tool for detecting those who are ill upon arrival in the emergency department and who subsequently need critical care (Cooke & Jinks, 1999). However, The MTS failed to identify some patients who later deteriorated. Using admission to hospital, especially to critical care areas, as a measure of validity of any triage scale should be undertaken with caution. The patient condition between the time of triage and the time for admission can be affected by other factors such as a long stay in the ED, delay in diagnostic tests, or stress-related factors.

In two studies, conducted in Sweden and Australia, the MTS showed fair to excellent inter-rater reliability. In Sweden, Olofsson et al. (2009) investigated the inter-rater reliability of the MTS. The study recruited 72 nurses to assign triage codes for 14 patient scenarios using the MTS. The results showed that the MTS had a good to excellent inter-rater reliability (unweighted kappa = .61, weighted kappa = .81). It also showed that the accuracy in decision making was high (73 per cent). The study found that the participants were likely to select the correct triage category when the patients were at MTS category one and two (immediate and very urgent).

A lower inter-rater reliability was found in the other study. Grouse et al. (2009) evaluated the inter-rater reliability of the MTS in an Australian ED. A group of 20 nurses who had been trained to use the MTS were asked to assign triage codes for 50 actual patient scenarios. The results showed that in 75 per cent of the triage

occasions, the participants agreed on a model category. In addition, agreement level was found to be fair to good. Weighted kappa varied from .40 to .80, with a median of .63.

Van der Wulp et al. (2008) assessed the reliability and validity of the MTS in a general ED patient population in two EDs in The Netherlands. Fifty-five triage nurses from two EDs assigned triage codes using the MTS for 50 patient scenarios; then after 19 days, the participants were asked to rate the same scenarios again.

The results showed that the MTS had a moderate to good inter-rater agreement level. Unweighted kappa was .48, and weighted kappa was .62. Further, the results showed the intra-rater reliability was high ($\kappa = .75$). The results also showed that no significant association was found between the agreement levels and the nurses' work experience. In relation to validity, the results showed that one-third (32.9 per cent) of the triage occasions were not in concordance with the expert ratings. Overtriage occurred in 7.6 per cent of the triage occasions, while undertriage occurred in 25.3 per cent of the triage occasions.

Martins et al. (2009) conducted a study in one hospital in Portugal to assess the association between the MTS codes and different outcomes such as death in ED and hospitalisation. The data were collected from the hospital database over a 30-month period. The collected data included the MTS codes, death outcomes and admissions. The study found that the MTS correlates well with short-term mortality ($\chi^2 756.67, p = 0.001$) and shows good levels in predicting hospital admission ($\chi^2 15320.41, p = 0.001$). The authors concluded that the MTS is a powerful tool for identifying patients with high and low risk of short-term death and as well as those who need admission (Martins et al., 2009).

The validity of the MTS in a paediatric population was investigated in a retrospective observational study by Roukema et al. (2006) in an ED in The Netherlands. The sample included 1,065 patients aged less than 16 years. The validity was assessed by comparing the correlations between the MTS triage ratings and resource utilisation and hospitalisation. The study found that resource use increased with higher levels of urgency (MTS one and MTS two) and decreased in lower acuity categories. In contrast, the study reported a sensitivity level of 63 per cent and a specificity level of 78 per cent in emergent and urgent patients. The

researchers concluded that the MTS has a moderate sensitivity and specificity (Roukema et al., 2006).

Despite the varying degrees of inconsistency in the application of the MTS, it is not known what strategies were taken to optimise the consistency among the triage nurses. It can be assumed that training for the triage role is hospital-based, but this does not necessarily imply that a national education tool is absent. However, the MTS provides a number of discriminators that help triage nurses reach the same triage acuity level for similar patients. The number of these discriminators was increased in 2005 from 186 to 195 (Lipley, 2005).

3.9.4 The Emergency Severity Index

The ESI was developed by Richard Wuerz and David Eitel in the late 1990s (Wuerz et al., 2000; Zimmermann, 2006). ESI is a five-level acuity scale: Level one represents the highest acuity and complexity, and level five represents the lowest (Table 3.5) (Richardson, 2009; Zimmermann, 2006). However, it is different from the other triage scales in its approach and application. Unlike the timeframes in the ATS, CTAS and MTS, the ESI determines condition severity for discrimination. According to Zimmermann and McNair (2006), the developers of the scale believed that not defining a specific timeframe is more appropriate for the litigious US society (p. 21). In addition to identifying severity, ESI is unique in that it also requires the triage nurse to anticipate resource needs (Fernandes, Tanabe, Gilboy, et al., 2005). ESI defines *severity* as 'stability of vital functions and the potential for life, limb, or organ threat'. It has been claimed that the ESI expands the concept of triage from when the patient should be seen to what resources the patient needs (Gilboy, 2005; Zimmermann, 2006).

Although research has clearly demonstrated that the ESI is a reliable and valid triage scale, its adoption in the USA is fragmented. U.S. hospitals are still using different triage scales including three-, four- and five-level scales, even though the national emergency management bodies support a five-level triage scale (American College of Emergency Physicians, 2003).

Table 3.5

Description of the Emergency Severity Index's Categories

Category name	Response Time
ESI 1	Immediate
ESI 2	Minutes
ESI 3	Up to 1 hour
ESI 4	Could be delayed
ESI 5	Could be delayed

Source: Zimmermann, 2006

Although the ESI is similar to the ATS, CTAS and MTS in term of acuity levels, it differs from the previous scales because it sorts patients according to their clinical acuity and resource needs. Zimmermann (2006) claimed that the ESI has excellent inter-rater reliability, has a high correlation between ESI levels and admission rates and accurately predicts ED resource needs. Many studies have evaluated the reliability and validity of the ESI (Eitel, Travers, Rosenau, Gilboy & Wuerz, 2003; Storm-Versloot, Ubbink, Choi & Luitse, 2009; Travers et al., 2002; Worster et al., 2004). Reliability has been measured by the kappa statistic (inter-rater reliability), and validity has been measured by comparing the ESI categories with some clinical outcomes such as admission, mortality rates and resource consumption.

Travers et al. (2002) used a time-series design to evaluate ESI reliability in a tertiary ED that switched from a three-level triage scale to the ESI. The inter-rater reliability was measured by comparing the initial triage nurse ratings with expert nurses' (the authors) ratings. Results showed that that the ESI had higher inter-rater reliability ($\kappa = .68$) than the three-level triage scale ($\kappa = .53$) (Travers et al., 2002).

Eitel et al. (2003) assessed the reliability and validity of the ESI at seven EDs in the USA. The study recruited 257 nurses to assign triage for 20 written scenarios. The study was undertaken after implementation of the ESI. Reliability was measured in terms of inter-rater reliability using weighted kappa. The validity was measured by comparing the ESI categories with hospital admission, resource consumption, ED length of stay and mortality within 60 days (Eitel et al., 2003). The results found that the ESI showed good to very good inter-rater reliability (kappa ranged from .70 to .80). Further, the study found that the ESI urgency categories correlate well with

admission, resource consumption, length of stay in the ED and mortality within 60 days. The authors concluded that the ESI (version 2) produced reliable and valid stratification of patients in the study sites (Eitel et al., 2003).

Moreover, Worster et al. (2004) compared the inter-rater reliability of the ESI and the CTAS. Ten Canadian nurses who had experience with the use of the CTAS were equally randomised into two groups. The first group received a 3-hour refresher training on the CTAS, and the second group attended a 3-hour introductory training on the ESI. Then, the nurses in each group were required to use the ESI or the CTAS to assign triage codes to 200 ED case scenarios. The study found that both of the scales (ESI and CTAS) had excellent inter-rater reliability (weighted kappa of .89 for the ESI and .91 for the CTAS) (Worster et al., 2004). However, the small sample size (five in each group) could limit the study findings.

The validity of ESI was also compared with the MTS in one study in The Netherlands. Van der Wulp et al. (2009) compared the degree to which the ESI and the MTS predict admission and mortality. The researchers found that both systems predicted admission and mortality well. However, the ESI seemed to provide a better prediction for admission than the MTS.

In The Netherlands, Storm-Versloot et al. (2009) conducted a comparative clinical study in three EDs to compare the inter-rater reliability of ESI and MTS. A group of 18 triage nurses were recruited to assign triage to 50 patient scenarios derived from actual cases. Eight triage nurses rated triage urgency for the 50 scenarios using the MTS, six using the ESI and four using both systems. The results showed that the ESI had moderate to good inter-rater reliability (unweighted kappa = .46 and weighted kappa = .82). The study also found that the level of experience with using the triage scale did not appear to affect the agreement level.

Although evidence does not show that the ESI is becoming a national triage scale in the USA, the developers (Richard Wuerz and David Eitel) and the ESI Triage Research Team created and distributed an implementation handbook to ensure consistent application of the system (ESI Triage Research Team, n.d.). This handbook provides an introduction to the ESI and discusses the expected resource needs and the role of vital signs in the ESI. It also presents guidelines for the implementation of the ESI and discusses issues related to evaluation and quality

improvement. Further, it provides case scenarios to help triage nurses practice categorising patients and assessing triage competency level using the ESI (ESI Triage Research Team, n.d). However, no published studies were found that evaluated the effects of this implementation handbook and its contribution to the consistency in using the ESI.

3.10 Access to the Emergency Department and Triage in the KSA

Most hospitals in Saudi Arabia operate emergency departments that provide full-time emergency services for individuals requiring urgent medical care (Al-Yousuf et al., 2002). Patients prefer to go directly to the ED instead of going to primary health care centres (Siddiqui & Ogbeide, 2002). This behaviour can be explained by the absence of off-hours services in the centres and by public misconceptions concerning the level of care provided. Hospitals are considered to provide a high quality of care, while the primary health care centres are seen as offering basic care only (Khoja et al., 1997).

The most recent data from the Saudi Ministry of Health (2008) reports an increase in presentations to MOH EDs of 19 per cent between 2002 (11,490,565) and 2008 (16,881,258) (Ministry of Health, 2002, 2008). Table 3.6 demonstrates that the majority of the presentations (83 per cent) in 2008 were disease-related emergencies, while injury-related emergencies constituted 13.5 per cent (156,934) of the total ED presentations in the Saudi public EDs. Gynaecological, obstetrics and neonatal presentations were 2.4 per cent and 0.4 per cent (respectively) of the total cases (Ministry of Health, 2008).

Table 3.6

Description of the Emergency Cases in the MOH EDs by Type of Disease or Injury

ED Presentation cause	Number	Percentage
Disease related presentation	141,128,615	83.7
OBS/GYN Disease	411,612	2.4
Neonatal disease	67,176	0.4
Injury related presentation	2,273,855	13.5
Total	16,881,258	100

Source: Ministry of Health Statistics 2008

Motor vehicle accidents represented 7.3 per cent of the injury-related presentations in 2008 compared to 9.3 per cent in 2002. The percentage of motor vehicle accident victims in this statistic includes public hospitals only (60 per cent of the total hospitals). However, motor vehicle accidents is a major cause of death in Saudi Arabia. The General Administration of Traffic claimed that motor vehicle accidents in Saudi Arabia have led to the death of more than 30,000 people and the injury of 177,000 in the past 5 years; additionally, 2 million traffic accidents were reported during this period, leading to the loss of billions of riyals (Aljarousha, 2010).

The Saudi Red Crescent Authority (SRCA), the official ambulance service within the Kingdom, provides first aid and transport to all ill and injured persons. In 2008, SRCA transported 181,105 cases to public EDs (Ministry of Health, 2008). That means the SRCA transported 1.07 per cent of the total number of public ED patients who presented. This data suggests that the majority of patients who visit public EDs are either self-referrals or are referred from other agencies such as the police and Civil Defence. This means that a large number of patients may present without notice, as might happen if the patient was brought by the SRCA. This large number of unexpected patients creates an extra burden on ED clinicians.

The physical configuration of Saudi EDs is divided into two sections. For religious and cultural reasons, males and females are separated. Females in Saudi Arabia wear a black coat called an *abaya*, and the majority cover their faces with a veil or *neqab*. In addition, female waiting areas are separated from male areas or

screened from public view (Bond, 2001). The balance between female privacy and patient safety is a challenge. Given that the majority of EDs workforce are expatriates from different cultural and religious background (refer to chapter 2), understanding the sensitive cultural issues may be a problem. In addition, due to these cultural aspects, triage nurses do not always have visual access to female patients to detect any deterioration. However, this is possible if these issues have been taken into account when designing the triage area and when creating related policy and procedures and guidelines. For example, assigning a female nurse to timely re-assess female patients in the waiting area will reduce the possibility that a female patient deteriorates without being noticed.

Qureshi (2010) believes that 'while the importance of triage in the ED has been recognized for some time in developed countries, less developed countries [including the KSA] are not utilizing the full potential of this health developmental trend' (p. 691).

Although the MOH recommends a nurse-led triage system based on three levels of urgency (Qureshi, 2010), triage is not a common practice in most of the MOH EDs (public EDs). However, some MOH EDs such as Riyadh Medical Complex and King Fahad Medical City have individually adopted a Western triage system (CTAS). Currently, nurses in public EDs in Saudi Arabia have little or no involvement in triage decision making (Qureshi, 2010). In contrast, some non-public tertiary hospitals such as the King Faisal Hospital and Research Centre (KFHRC) and the National Guard Hospitals have adopted Western triage systems. However, it appears that the process of triage is somewhat disorganised and does not fully acknowledge the cultural issues.

Currently, there are no publications on how triage is organised in Saudi Arabia and if any system is being used. Consequently, the utility and validity of any triage system in the KSA is unknown. Anecdotally, in many public EDs, when a patient arrives by ambulance he/she will be attended to quickly, regardless of the patient's clinical urgency. In contrast, if the patient is walking, he/she might be asked to wait without being evaluated by an ED clinician (nurses or physician), especially a patient who presents with no obvious illness or injury.

Research on triage in Saudi Arabia is extremely limited (Qureshi, 2010). Searching the published studies revealed that no triage-focused studies have been conducted in Saudi Arabia. However, two recent unpublished Master's theses investigating triage in Saudi Arabia were found. Aljohani (2006) conducted a comparative correlational study in one metropolitan public ED in Saudi Arabia. This study aimed to describe and compare the level of consistency and accuracy in triage decision making using a standardised triage scale.

The study utilised a set of 20 previously validated paper-based triage simulation scenarios. A total of 52 ED clinicians (nurses and physicians) drawn from a non-probability convenience sample participated and produced 840 occasions of triage decisions. The study found a significantly high level of variability in agreement among participants using the ATS. Not a single patient scenario was allocated to the same ATS category by all nurses and physicians. Only 45.6 per cent of the triage occasions were in concordance with the expected triage category.

Consistency of triage among the participants varied for both nurses ($n = 22$, $\kappa = .27$) and physicians ($n = 20$, $\kappa = .26$), and overall the agreement level was fair ($\kappa = .26$). While the findings from this study cannot be generalised to other Saudi EDs, they highlight issues related to patient safety. Given that the majority of public EDs in Saudi Arabia have no formal process for prioritising patient care, it is not clear what processes are employed to prioritise ED patient care (Aljohani, 2006). The author suggested that public EDs in the KSA need to implement a standardised triage system to enhance patients' safety. The findings from Aljohani's study were the base for the present study.

Al-Both'hi (2007) conducted another mixed-methods study in non-MOH tertiary EDs in Saudi Arabia that had adopted Western triage systems. This study investigated the nature of triage nurses' practice and the educational and experiential background of triage nurses. The study was conducted in three tertiary hospitals in the capital city Riyadh. It used a convenience sample of 149 nurses, with 91 returned, 61 per cent response rate.

Al-Both'hi's study found that the three EDs managed triage in a different ways. The majority of the nurses attended an in-service education programme before

commencing the triage role. The ED practice experience required prior to performing triage varied from 1 month to 15 months.

Further, the study found a high percentage of conformity (80–100 per cent) with regard to primary activities and skills such as initial history, and there was a considerable variability in relation to the secondary skills performed (for example, blood sugar level testing). Al-Both'hi found that the triage nurses who had less education and experience did not perform secondary activities. The author believed that the discrepancies arose as an issue of differing interpretations of the triage role. One of the recommendations from this study was the use of a standardised triage system that would include a formal programme of study (Al-Both'hi, 2007). Although the study was conducted in non-MOH hospitals, it draws attention to the importance of standardising ED triage practice in Saudi Arabia and the confusion that exists concerning nurses' preparation and practice for triage.

3.11 Conclusion

Triage as a method of ensuring that patients receive timely and appropriate care has been established internationally. Many developed countries have produced and implemented standardised triage systems (Australasian College for Emergency Medicine, 2005; Beveridge et al., 1998). These systems are based on different level of urgencies ranging from three to five levels. The primary purpose of these systems is to ensure that ED patients are treated based on their actual clinical urgency (Gerdtz & Bucknall, 2001b).

In Saudi Arabia, the demand for ED services is on the rise, yet triage practice is not standardised. In some public EDs operated by the MOH, formal triage is not common (Qureshi, 2010), while other EDs have individually adopted different Western triage systems. The utility of these systems in the ED context in Saudi Arabia has not been established. The lack of a standardised triage system in Saudi EDs presents many problems, from confusion on who should be seen as a priority to how resources should be distributed. It can be argued that implementation of a standardised triage system in the Saudi EDs may improve patient safety and access to ED services. The evidence in the literature has demonstrated many clinical and operational benefits to the implementation of a standardised triage system (Fernandes, Groth, et al., 1999; Fernandes, Tanabe, Gilboy, et al., 2005; Fitzgerald,

2000; McMahon, 2003; Richardson, 2009). These benefits include improving patient safety, facilitating ED operation by controlling the flow of patients, allowing for data benchmarking and surveillance and improving triage quality (Fernandes, Groth, et al., 1999; Fernandes, Tanabe, Gilboy, et al., 2005).

In many countries such as the USA and Sweden, three-level triage systems are popular (Zimmermann, 2001). Many triage studies, however, have criticised the three- and four-level triage systems. The reliability and validity of these systems have proven to be low (Bergeron et al., 2002; Travers et al., 2002). In contrast, current evidence supports the use of five-level triage systems to prioritise ED patients' care. Five-level triage systems are reliable and valid in detecting patient urgency and predicting resource use (Zimmermann & McNair, 2006). The literature demonstrates that there are four reliable and valid five-level triage systems currently in use: the ATS, the CTAS, the MTS and ESI. These systems have shown fair to very good inter-rater reliability and validity (Dilley & Standen, 1998; Khanal et al., 2005; Van Baar & Schrijvers, 2008; Wuerz et al., 2000).

Although the term 'triage scale' and 'triage system' are used interchangeably in the triage literature (McNair, 2005), their operational meanings differ. Triage scale is the cornerstone in any ED triage system. However, adoption of a triage scale alone is not sufficient to ensure the successful implementation of a safe and effective triage system. A comprehensive triage system addresses other factors such access to ED services and patient flow. In addition, a triage system should include guidelines and protocols that direct and control the implementation process. Further, it should address the appropriate training and education that is required before the triage clinicians may undertake the triage role.

Although the ATS, CTAS, MTS and ESI have demonstrated good levels of reliability and validity, transferability to Saudi Arabian EDs is not guaranteed. Adoption of any of these triage systems must be based on evidence that ensures that this system is appropriate for Saudi EDs: this include examining the system's reliability and validity as well as its utility. However, it should be noted that using surrogate outcomes for those used in developed countries to determine the triage system validity in Saudi Arabia may provide inaccurate results.

Chapter 4: Structure and Overview of the Components Involved in this Research.

4.1 Introduction

The focus of this research is on triage practice in public emergency departments in Saudi Arabia. Triage systems are complex in nature and a single approach would not identify the three main aspects required to develop a new system. Consequently, this research was conducted in three separate studies. The purpose of this short chapter is to provide a brief overview of the total research and to discuss ethical issues related to this research.

In Saudi Arabia, research and practice in the field of triage appears to be virtually non-existent. In fact, no studies have been published in this area. However, it is not clear whether no studies have been conducted or if some have been conducted but not published. Triage is practiced in some hospitals but it is not based on the needs of the Saudi people or health care system. Through my experience in emergency departments in Saudi Arabia, I have become convinced that the triage system is in need of improvement. This feeling has been reinforced by visiting other EDs and having conversations with colleagues.

4.2 Study 1

The first step in any new system is establishing what current practice is. Given that information about triage in public EDs in Saudi Arabia is limited, it was important to conduct a comparative descriptive study to understand the current triage practice: this was the first study conducted for this research project. The importance of this study (study 1) became obvious when a search for triage literature in Saudi Arabia was conducted. Searching for literature revealed a paucity of publications in the field of triage in public EDs, which represent near to 60 per cent of the total EDs in the Kingdom of Saudi Arabia. This gap of knowledge about the current triage in public EDs reinforced the need to understand how triage is currently practiced in public EDs. This study utilised a questionnaire consisted of two parts. The first part aimed to gain an understanding of how ED patients are currently seen and prioritised for care and whether a consistent approach to prioritise patients is used among all

EDs or not. The second part aimed to describe and compare the triage accuracy and concordance in triage acuity ratings among ED nurses and physicians.

The study included nine EDs from five geographic areas in Kingdom of Saudi Arabia. These EDs were conveniently selected. An effort was made to include more EDs, however, this was hindered by many barriers such as some hospitals did not show an interest to participate in this study or to reduce the cost as data collection from EDs requires travelling to each hospital, postage is not effective.

The findings from study revealed great variations among the participants in regard to the current triage practice. These variations were related to the existence of a formal triage system, the used triage scales and clinician responsible for performing triage. In addition, the study showed a low level of agreement on triage acuity ratings among the participants. The findings from Study 1 informed the next study.

4.3 Study 2

The stage in developing a new system is to explore if there are documents, policies and procedures in place that support, in this case, triage. The majority of the participants in study 1 responded that a formal triage system does not exist in their EDs. In addition, for those who believed that triage system is operated in their EDs, there was disagreement on the number of urgency levels of the used triage scales and on clinicians performing triage. It is therefore the study 2 was conducted to understand what administrative and education support is currently available for triage practice in public EDs in KSA. This second study involved content analysis for key triage documents obtained from the MOH and other non-MOH hospitals. The documents included triage policy and procedures and triage training and education programmes. The findings from study 2 showed that the current triage practices (study 1) do not adhere to the MOH triage policy and procedures recommendations. In addition, it showed a lack of triage education preparations for the triage role. This study was followed by the final study.

4.4 Study 3

The stage in developing a new system is to explore if the validated systems have any relevance for the new system. The literature review clearly demonstrated

that a 5 level system was best practice. The findings from Studies 1 and 2 indicated that triage in public EDs in Saudi Arabia is not standardised and is absent in some EDs. In addition, the current triage scale recommended by the MOH was not based on current evidence; therefore, the third study was conducted. The purpose of this study was to develop a national triage system to replace current practice. The system was based on consensus among a panel of expert ED nurses and physicians working in public EDs in Saudi Arabia.

The three studies were undertaken in Saudi Arabia. Data collection started in July 2007 and continued until December of the same year. Research in Saudi Arabia is still in its infancy. During this study, few difficulties were met. The most significant problem was the difficulties to get access to statistics and documents. These difficulties in getting access may be linked to the lack of interest in research or the absence of a professional body that facilitates access to information required by researchers. In addition, access to the potential participants was difficult. The reasons for this difficulty may be attributed to the lack of professional and specialised associations. For example, there are no associations for emergency nurses or physicians as there are in other countries. Access to participants required that the researcher visit individual EDs to invite clinicians to participate. This was, at times, frustrating and time consuming.

4.5 Ethical Considerations

The ethical considerations for this thesis need to be considered firstly as a whole and then the ethics as they related to each part of the thesis. The research protocol was submitted as a low-risk research project involving humans. Ethical approval was sought and granted from the Monash University Human Research Ethics Committee (MUHREC), formerly the Standing Committee on Ethics in Research Involving Humans at Monash University (Appendix A). In addition, ethical approval was obtained from the Research Department at the Saudi Arabian MOH (Appendix B). This research has been conducted in accordance with the National Statement on Ethical Conduct in Research Involving Humans (Commonwealth of Australia, 2007).

In Study 1, the participants' identities were de-identified and consent was assumed if the participant returned the completed questionnaire in a sealed envelope

in the secured designated box. In Study 2, identities of the non-MOH that provided triage key documents for analysis were unidentified; instead, codes were used to name these hospitals.

In Study 3, anonymity between the expert panel members was established and maintained throughout the study. The first questionnaire included participants' names and demographic information. Identification of the expert panel members was removed and replaced with codes only known to the researcher. These codes then were used in subsequent rounds.

4.5.1 Confidentiality

Participation in this study was voluntary, and no names or identity codes were used that could lead to identification of individuals. Further, the completed questionnaires were returned individually by the participants in sealed envelopes in a secured box in their ED.

4.5.2 Storage of Data

The completed questionnaires were collected in a secured box in the study setting. Storage of the data collected adhered to university regulations and will be kept on university premises in a locked cupboard/filing cabinet for 5 years. Only the researchers will have access to the original data. Electronic data is saved in a computer file that needs a password

Chapter 5: Study One: Exploration and Description of Current Triage Practice in Public EDs in Saudi Arabia

5.1 Introduction

The main aim of this thesis was to develop a triage system that can be implemented in emergency departments in Saudi Arabia. In order to achieve this aim, this study was conducted in three phases. The first phase (Study 1) aimed to explore and describe the current triage practice. The second phase (Study 2) aimed to identify current triage policy and procedures as well as current education documents that support triage practice in the Saudi EDs. The final phase (Study 3) aimed to develop the triage scale and clinical descriptors for each triage category and to identify the possible barriers to a successful implementation of a triage system in Saudi Arabia.

Due to the absence of validated triage practice in Saudi public hospital EDs, a descriptive comparative study was undertaken. Based on the researcher's experience, most of the public EDs in Saudi Arabia do not use a systematic approach to prioritise patient care. However, where triage is practiced in Saudi Arabia, it is usually a modification of some other country's system. Therefore, it was essential to conduct a study that improves understanding of the current triage status. The findings from this study (Study 1) identified confusion in the application of triage practice in public EDs in Saudi Arabia in relation to the existence of triage, the use of triage scales and the triage decision-making process. These findings demanded that another study be conducted in order to find out what triage policy, procedures, and education programmes currently support triage practice in Saudi EDs. In addition, the findings from this study emphasised the need for a national standardised triage system in Saudi Arabia, which became the aim of Study 3. This chapter describes the first study. The chapter will be divided into three sections: method, results and discussion.

5.2 Method

The method section iterates the study purpose and questions and relates these to the study design and methods. In addition, it describes the data collection analysis

process. Further, it outlines the ethical considerations that have been taken into account during this study.

5.2.1 Purpose

The main purpose of Study 1 was to gain an understanding of current triage practice in the MOH (public) EDs in Saudi Arabia. Therefore, this study aimed to:

- Describe triage practice in public EDs (operated by the Ministry of Health) in Saudi Arabia
- Describe and compare the level of agreement in ED urgency ratings among nurses and physicians in public EDs in Saudi Arabia using a standard five-point urgency scale
- Describe and compare the accuracy of urgency ratings among ED clinicians using a validated five-point urgency scale

5.2.2 Questions

In order to achieve the study aims, it was important to answer the following questions:

- What triage systems or processes are currently used to prioritise patient care in the Saudi Arabian EDs?
- How do nurses and physicians working in the Saudi Arabian public EDs understand urgency in the context of triage decision making?
- How consistent and accurate is the decision making among nurses and physicians in the selected Saudi Arabian emergency departments?

5.2.3 Procedure

In this study, paper-based simulation scenarios were used to examine triage decisions among the participants. Triage literature has demonstrated that five-level triage scales have greater reliability and validity than scales with fewer levels; therefore, the Australasian Triage Scale (ATS) was chosen to rate urgency for the provided scenarios. The ATS has been successfully used in a similar study in one public ED in Saudi Arabia (Aljohani, 2006). The decision to use paper-based simulation scenarios was made because of the noted ethical and clinical issues in studying triage decision making in a real situation. Another advantage of using

paper-based simulation is that the inter-rater reliability of triage scales can be assessed (Aljohani, 2006; Considine et al., 2004; Göransson, Ehrenberg, Marklund, et al., 2005).

Using static simulation scenarios in the health field is helpful in many ways. This method is cost-effective compared to other methods such as observation. Such simulations allow for control and manipulation over the variables that exist in real-life situations. Moreover, their use helps to avoid ethical issues involved in testing triage decisions using real patients (Gerdtz & Bucknall, 2007; Thomas et al., 1989). However, lack of context and cue stimuli are some of the limitations associated with using static simulation in triage studies. Static simulation scenarios are fixed and do not contain environmental cues that exist in the real situation, such as sensory information, time pressure and social interactions (Göransson, Ehrenberg, Marklund, et al., 2005; Thomas et al., 1989).

5.2.4 Study Design

Current triage practice, consistency, and accuracy of triage decision making in the public EDs in Saudi Arabia is unknown; therefore, this study used a quantitative comparative descriptive design. This design allowed for a description of the current situation of triage in public EDs to be made (i.e. is triage a common practice? If so, how and how successful was the implementation?). In addition, the design facilitates the identification of differences between groups in natural settings (Burns & Grove, 2005). This is especially important in Saudi Arabia because both nurses and physicians are believed to be responsible for sorting patients for care; however, no data exists on whether there are differences between nurses and physicians in relation to the accuracy and concordance of triage decisions. Additionally, this design is appropriate for a study where there is a lack of information (Burns & Grove, 2005).

The main outcome measures of interest for the study were twofold:

1. Agreement: This was measured as the raw percentage of responses in the model category and then adjusted for chance (kappa).
2. Accuracy: This was measured by the percentage of the responses in the expected triage category.

These outcomes were measured by asking the study participants to complete 15 previously validated paper-based simulation scenarios. The participants were asked to assign one of five ATS triage categories to each case scenario. The accuracy of acuity ratings was measured by comparing the participants' rating for each scenario with the expected triage. The expected triage category referred to the experts' allocation of acuity ratings that was provided in Gerdtz et al. (2002).

5.2.5 Setting

Twelve hospitals were approached to participate in this study, nine hospitals responded. The study was undertaken in nine metropolitan MOH (public) hospital EDs in Saudi Arabia. These hospitals were conveniently selected from five geographic regions in Saudi Arabia: the northern, southern, eastern, western and central region. One hospital was selected from each region with the exception of the western region (being the largest in population), where five hospitals were selected from three different cities in the region (Table 5.1). All the hospitals selected for this study are busy public hospitals and directly operated by the Saudi Arabian MOH.

Table 5.1

Description of the Participating Hospitals

Hospital	City	Number of beds
Northern region hospital	Dheba	200
Southern region hospital	Dhahran Aljanoob	100
Central region hospital	Riyadh	200
Eastern region hospital	Qatef	417
Western region hospital (W1)	Jeddah	500
Western region hospital (W2)	Madinah	500
Western region hospital (W3)	Madinah	100
Western region hospital (W4)	Madinah	100
Western region hospital (W5)	Yanbu	146

5.2.6 Participants

A convenience sample of ED nurses and physicians employed at each of the nine hospital EDs involved in this study was used. Initially, 150 ED nurses and

physicians agreed to participate—15 clinicians in each ED, with the exception of three EDs in which 20 clinicians agreed to participate. Of the 150 participants, 105 participants returned completed questionnaires. This sample provided for the analysis of a total of 1,575 triage occasions. The sample size is consistent with the minimum number of cases needed to assess the reliability of a five-point rating scale (Cicchetti, 1976 as cited in Gerdtz & Bucknall, 2007).

5.2.7 Inclusion and Exclusion Criteria

The study included all nurses and physicians who were working full-time in one of the selected EDs and who had responsibility for direct patient care. The researcher in this study made an assumption that if no formal triage system was in place, both nurses and physicians might be involved in the prioritisation of patient care. In contrast, the study excluded any clinician who was from another department and was temporarily working in the ED or who had no clinical role (i.e. administrative or teaching role only). In addition, physicians who were not involved in the primary decision making were excluded from participation.

5.2.8 Recruitment Procedure and Data Collection

After gaining the required approvals from Monash University and from the MOH, the researcher approached the specified hospitals. The researcher approached the participants individually or in groups in the central and western regions hospitals (n = 5). A research assistant, who was a nurse or physician with no managerial position, was used in each of the remaining EDs for recruitment, distribution and collection of the questionnaires. The questionnaires were returned in sealed envelopes to the researcher.

Each participant in this study was given an explanatory statement, a questionnaire and a return envelope. The explanatory statement (Appendix C) has information about the researcher and the study purpose. The participants were asked to complete the questionnaire anonymously. The questionnaires were returned by each participant in a sealed envelope into a designated secured drop box.

5.2.9 Data Collection Tool

A questionnaire was used in this study (Appendix D). The questionnaire consisted of three parts. Part one ascertained the participants' demographic data including profession, gender, age, qualification, professional work experience and ED work experience. The qualification categories included those common to Saudi Arabia—health institute diploma, intermediate university degree, bachelor's degree and postgraduate studies. In the Saudi Arabian context, the health institute diploma and intermediate university degree are nursing studies. The health institute diploma is a 2-year course, and the intermediate university degree is a 3-year course after high school.

The second part of the questionnaire sought data about emergency departments, including number of beds, availability of a triage system, number of urgency categories used, the clinician responsible for triage, the availability of a screening area and the basis for prioritising patient care.

The third part of the questionnaire consisted of 15 previously validated paper-based simulation scenarios (Gerdtz et al., 2002). In each of the five ATS categories, three case scenarios were included in a random order. For each scenario, the participants were asked to respond to three questions. The first question was about the ideal time that the patient in the scenario could safely wait to see a physician. In this question, the ATS was used to determine the ideal urgency category for each scenario. The second question focused on the most appropriate area in which to initially allocate the patient until seen by a medical officer. These areas included the waiting area, an un-monitored bed, a monitored bed, resuscitation, or other area. The third question was an open-ended question about the usual waiting time for the type of patient in the scenario in the participant's ED.

5.2.10 Instrument Construction and Validation

The simulation scenarios used in the study were adopted from the work of Gerdtz et al. (2002), which was published in the *Triage Education Resource Book*. The approval to use the scenarios was obtained from the Commonwealth Department of Health and Ageing (Appendix E). These scenarios have been previously validated

and used as part of a national training framework throughout Australia (Gerdtz et al., 2002) and in one public ED in the KSA (Aljohani, 2006).

In brief, the scenarios were constructed by an expert panel consisting of two emergency physicians and four triage nurses. The expert panel used the International Classification of Diseases, version 10 (ICD-10) to develop 30 case scenarios that represented six simulation scenarios for each of the five categories of the ATS. These scenarios were then sent to 120 expert triage nurses throughout Australia to test the scenarios' face and content validity as well as to determine inter-rater reliability. Inter-rater reliability tests the consistency of ratings of two or more individuals and is measured as a percentage of agreement between scores or as the correlation between the scores assigned to the observed behaviours (Elliott, 2003). The panel set the acceptance criteria for each scenario at a minimum concurrence rate of greater than or equal to 70 per cent and a kappa of .6, as recommended by the ACEM.

In the first round, good to very good levels of concurrence were demonstrated between triage nurses for all ATS categories. However, only 17 scenarios out of 30 met the acceptance criteria. In the second round, a revision for the ATS categories 4 and 5 was completed, and subsequently, these scenarios were sent again to the triage nurses to be tested. Three scenarios from the second round met the acceptance criteria to give a total of 20 validated scenarios. The descriptive and inferential analysis indicated that the 20 scenarios demonstrated a good to very good level of agreement. These triage scenarios were subsequently used for the *Triage Education Resource Book* (Gerdtz et al., 2002). Of these scenarios, 15 scenarios were chosen for inclusion in this study.

5.2.11 Translation of Scenarios

The study was conducted in Saudi Arabia, where the spoken language is Arabic. The participants in this study were nurses and physicians from different countries, and the majority of them do not speak Arabic. Although English is the official language used in hospital documents, a decision was made to translate the questionnaire into Arabic (Appendix F). This was performed for the convenience of the Arabic-speaking participants and to ensure that the questions were well understood. In addition, the participants' explanatory statement was translated into

Arabic (Appendix G). The translation was made by an accredited translator (Appendix H).

5.2.12 Data Analysis

The raw data obtained from the questionnaires were entered into Statistical Package for Social Science software (SPSS) version 16. A descriptive analysis (frequency distribution) was used to explore the participants' demographics and the hospitals' demographic characteristics. Descriptive analysis was initially conducted for all participants (nurses and physicians) as a single group. It was then conducted for the nurses and physicians separately. The analysis included frequency distributions and percentages for each scenario category based on the ATS categories. Moreover, the frequencies and percentages for the participants' agreement with the expected triage codes provided by the expert panel in Gerdtz et al. (2002) were calculated.

In order to measure the agreement of triage decision making among the study participants, an unweighted kappa test was utilised. The literature showed no agreement on which type of kappa test (weighted or unweighted) should be used in order to calculate the inter-rater agreement in triage studies (Aljohani, 2006; Considine et al., 2004; Gerdtz & Bucknall, 2001b; Göransson, Ehrenberg, Marklund, et al., 2005). In this study, an unweighted kappa was used to calculate the participants' agreement level. The unweighted kappa test was chosen in order to follow a more conservative approach (Altman, 1991). Unweighted kappa statistics are calculated on judgments of total correctness, and all disagreements are treated equally (Göransson, Ehrenberg, Marklund, et al., 2005). For example, if the expected urgency rating for a patient scenario is 3; only the category 3 rating for that scenario is considered correct (Altman, 1991). The interpretation of the k-values was made based on Altman's (1991) definitions (Table 5.2). In addition, weighted kappa was calculated for six pairs randomly selected from the participants, the purpose of doing so is to compare the findings of this study with other studies that reported weighted kappa.

Table 5.2
Interpretation of Kappa Values

Kappa	Agreement Degree
≤ .20	Poor
.21–.40	Fair
.41–.60	Moderate
.61–.80	Good
.81–1.00	Very good

Accuracy in this study refers to the participants' ability to select the expert recommended triage code, and *concordance* refers to the agreement between the nurses' and physicians' ratings on a model answer (Göransson, Ehrenberg, Marklund, et al., 2005).

The formula used in this study to calculate kappa was devised by Fleiss, Nee and Landis (1979).

$$K_j = \frac{P_j - p_j}{1 - p_j} = \frac{\sum_{i=1}^N n_{ij}^2 - Nn_{pj}[1 + (n-1)p_j]}{Nn(n-1)p_j q_j}$$

The unweighted kappa test (95 per cent CI) was conducted for all participants' ratings as a single group. It was then calculated for the nurses and physicians separately. Applying the same formula, unweighted kappa statistics were also calculated for the participants' agreement on the most appropriate area to initially allocate the patient until seen by an ED physician.

In order to examine the associations between the participant characteristics and the agreement level, inter-rater agreement was calculated for each demographic group separately. The overall kappa (unweighted) and standard error were calculated and compared for the participants' characteristics groups; for example, for nurses versus physicians, the significance level was set at 0.05. The statistical analysis used in this study allows for comparing the κ value for only two groups at a time. Therefore, participant characteristics that have more than two categories were collapsed to yield two categories. Qualification was reduced to (1) below bachelor

degree and (2) bachelor degree or above. Professional work experience was reduced to (1) less than 5 years and (2) 5 years or more. Further, ED work experience was reduced to two categories: (1) less than 1 year and (2) 2 years or more.

5.3 Results

The main purpose of Study 1 was to explore and describe current triage practice in public EDs in Saudi Arabia. The results section describes the data collected according to the method described in the previous section. This section presents the demographic characteristics of the participants and hospitals. It also presents the accuracy and concordance of the triage decisions made by participants. In addition, it presents the participants' inter-rater agreement level and the association between the participants' characteristics and the agreement levels. Inter-rater agreement on the treatment area for the simulation scenarios is also presented in this chapter.

5.3.1 Response Rate

A total of 150 questionnaires were distributed in nine public hospitals. In six EDs, 15 clinicians agreed to participate. In the remaining three EDs, 20 participants agreed to take part in this study. Of the 150 questionnaires sent out, 105 questionnaires were returned completed. All of these questionnaires were eligible for analysis. The total response rate was 70 per cent. The highest response rate was 95 per cent from the western region hospital (W5). The lowest response rate was 26.6 per cent from the western region hospital (W3). Table 5.3 shows the response rate for each hospital.

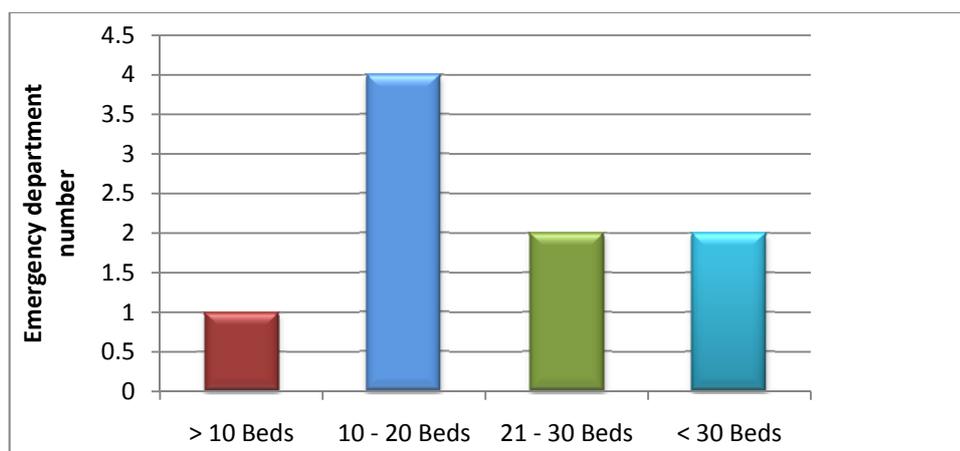
Table 5.3

Response Rate by Hospital

Hospital	Number of questionnaires distributed	Number of returned questionnaires	Response rate %
Northern region hospital	15	10	66.6
Southern region hospital	15	9	60
Central region hospital	15	12	80
Eastern region hospital	15	12	80
Western region hospital (W1)	20	15	75
Western region hospital (W2)	20	15	75
Western region hospital (W3)	15	4	26.6
Western region hospital (W4)	15	9	60
Western region hospital (W5)	20	19	95

5.3.2 Hospital Characteristics

As shown in Figure 5.1, the number of beds in the participating EDs varied. Only one ED (11.1 per cent) had less than 10 beds. Four EDs (44.4 per cent) had 10 to 20 beds, while two EDs (22.2 per cent) had 21 to 30 beds. Two EDs (22.2 per cent) had more than 30 beds.

*Figure 5.1.* Number of ED beds.

5.3.3 Participant Characteristics

The participants were asked to state their profession, gender, age category, qualifications, professional work experience and ED work experience. A descriptive analysis (frequency distribution) was conducted for the participants' demographics, and the results were as follows.

As shown in Table 5.4, of the study participants, 47 were physicians (44.8 per cent) and 58 (55.2 per cent) were nurses. Of the total number of participants ($n = 105$), 69 (65.7 per cent) were male and 36 (34.3 per cent) were female. Of the physician group, 81 per cent ($n = 38$) were male, while 19 per cent ($n = 9$) were female. In contrast, male nurses represented 53.5 per cent ($n = 31$) of the nurses group, while female nurses represent 46.5 per cent ($n = 27$). A total of 48.6 per cent ($n = 51$) of the participants were aged between 26 and 35 years. Of the physicians group, 53 per cent ($n = 25$) were aged between 26 and 35 years. Of the nurses group, 44.8 per cent ($n = 26$) were also aged between 26 and 35 years.

In addition, Table 5.4 shows that the majority of nurses (67.2 per cent) held a health institute diploma, which is a 2-year course after the completion of high school (grade 12). None of the nurse participants in this study held a postgraduate qualification. In the physicians' group, 27 (57.4 per cent) had completed a bachelor's degree, and 20 physicians (42.6 per cent) had obtained a postgraduate qualification.

The participants varied in terms of their professional work experience. As shown in Table 5.4, 48 (45.7 per cent) of the participants had less than 5 years of profession work experience, the majority in this cohort being nurses (68.8 per cent). Those who had 5 to 9 years of profession work experience were next, with 27 participants (25.7 per cent). Those with greater than 15 years of profession work experience included 17 participants (16.2 per cent), and only 13 participants (12.4 per cent) indicated 10 to 15 years of experience. The majority of the physicians fell into the work experience categories of either less than 5 years or 5 to 9 years, with 15 participants (31.9 per cent) in each category. The majority of the nurses' group (56.9 per cent) fell into the work experience category of less than 5 years, and only six participants (10.3 per cent) had more than 15 years of profession work experience.

Table 5.4 shows that 21 participants (20 per cent) had less than one year's ED work experience. The majority of the participants 64 (61 per cent) had worked in emergency departments from 1 to 6 years. Nine participants (8.6 per cent) had worked in EDs from 7 to 10 years and 11 participants (10.5 per cent) had worked in EDs for more than 10 years. Of the physicians' group, 12.8 per cent of participants had less than one year of ED work experience, and only five participants (10.6 per cent) had worked for more than 10 years in EDs. In terms of nurses' ED work experience, 15 participants had worked for less than 1 year, and six participants (10.3 per cent) had work experience of more than 10 years.

Table 5.4

Summary of the Participants' Characteristics

Characteristics	Physicians (47)		Nurses (58)		Total (105)	
	N	(%)	N	(%)	N	(%)
Gender						
Male	38	(80.9)	31	(53.0)	69	(65.7)
Female	9	(19.1)	27	(47.0)	36	(34.3)
Age						
18–25 Y	1	(2.1)	22	(37.9)	23	(21.9)
26–35 Y	25	(53.2)	26	(44.8)	51	(48.6)
36–50 Y	14	(29.8)	8	(13.8)	22	(21.0)
≥ 50 Y	7	(14.9)	2	(3.5)	9	(8.6)
Qualifications						
Health Institute ¹	N/A	N/A	39	(67.3)	39	(37.2)
Intermediate University Degree ²	N/A	N/A	6	(10.3)	6	(5.8)
Bachelor	27	(57.4)	13	(22.4)	40	(38.0)
Post graduate	20	(42.6)	0	(0.0)	20	(19.0)

Note. 1 = equal to Certificate IV, 2 = equal to Diploma in Australia

Table 5.4

Summary of the Participants' Characteristics (continued)

Characteristics	Physicians (47)		Nurses (58)		Total (105)	
	N	(%)	N	(%)	N	(%)
Profession Experience						
Less than 5 years	15	(31.9)	33	(56.9)	48	(45.7)
5–9 years	15	(31.9)	12	(20.7)	27	(25.7)
10–15 years	6	(12.8)	7	(12.1)	13	(12.4)
>15 years	11	(23.4)	6	(10.3)	17	(16.2)
ED work Experience						
Less than 1 year	6	(12.8)	15	(25.9)	21	(20.0)
1–6 years	33	(70.2)	31	(53.4)	64	(61.0)
7–10 years	3	(6.4)	6	(10.3)	9	(8.6)
>10 years	5	(10.6)	6	(10.3)	11	(10.4)

5.3.4 Triage System

The participants were asked to respond to availability of a triage system in their ED, urgency scale levels, who performs the triage, the bases for assigning priorities and availability of designated areas.

5.3.4.1 Use of a triage system

The participants were asked to indicate whether they have a triage system in place in their EDs or not. As shown in Figure 5.2, 52 participants (50.5 per cent) believed that they did not have a triage system in their EDs.

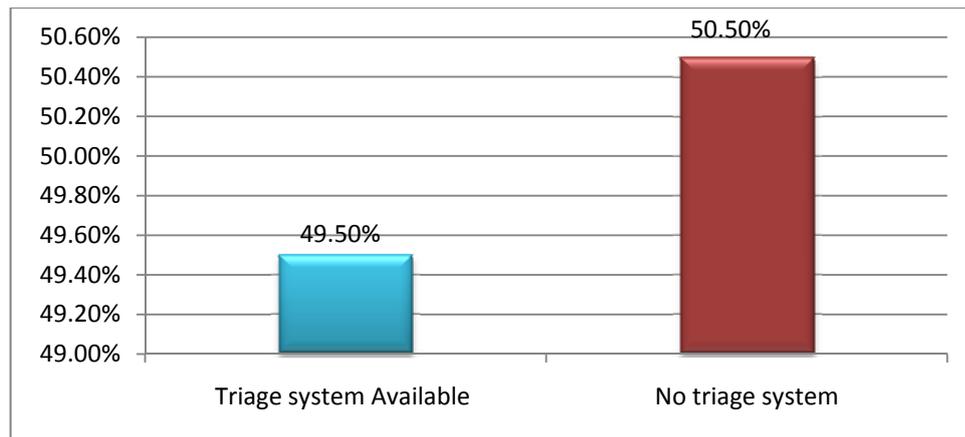


Figure 5.2. Participants' overall responses to the availability of a triage system.

5.3.4.2 Urgency scale

Respondents who indicated that their ED did have a triage system (n=52) were then asked about the number of urgency levels included in the system. Of the 52 participants, four (7.7 per cent) believed that they had two urgency levels, 14 participants (27.0 per cent) selected three levels and nine participants (17.3 per cent) selected four urgency levels. Moreover, 20 participants (38.4 per cent) believed that their EDs were using five urgency levels. Of the participants (n = 52) five (9.6 per cent) did not answer this question, see Figure 5.3.

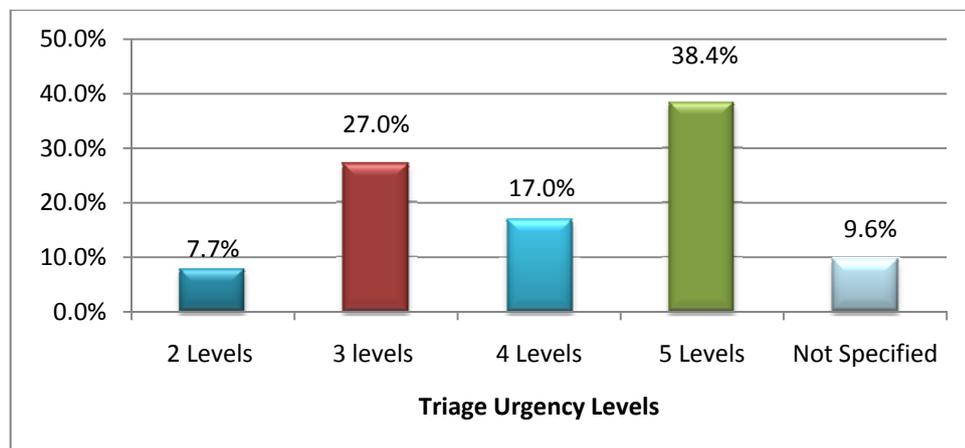


Figure 5.3. Distribution of the number of urgency levels used in the EDs.*

* missing values = 5

5.3.4.3 Who performs the triage

As shown in Figure 5.4, 31 (59.6 per cent) of the 52 participants said that the triage is performed by physicians in their EDs. Ten participants (19.2 per cent) answered that the triage was a nursing role in their EDs. In addition, ten participants (19.2 per cent) believed that both nurses and physicians share the responsibility of performing triage for all ED patients. Only one participant (2 per cent) claimed that triage was done by ward clerks. Cross tabulation was conducted to examine the responses of nurses and physicians to the clinician responsible for the triage role (Table 5.5).

The results showed a significant difference was found between the two groups ($p = 0.002$). The majority of the physicians (82.8 per cent) responded that triage is undertaken by physicians, and 6.9 per cent believed it is performed by nurses. Of the nurses group, only 30.4 per cent responded that triage is performed by nurses, 30.4 per cent by physicians and 30.4 per cent believed that triage is performed by both nurses and physicians.

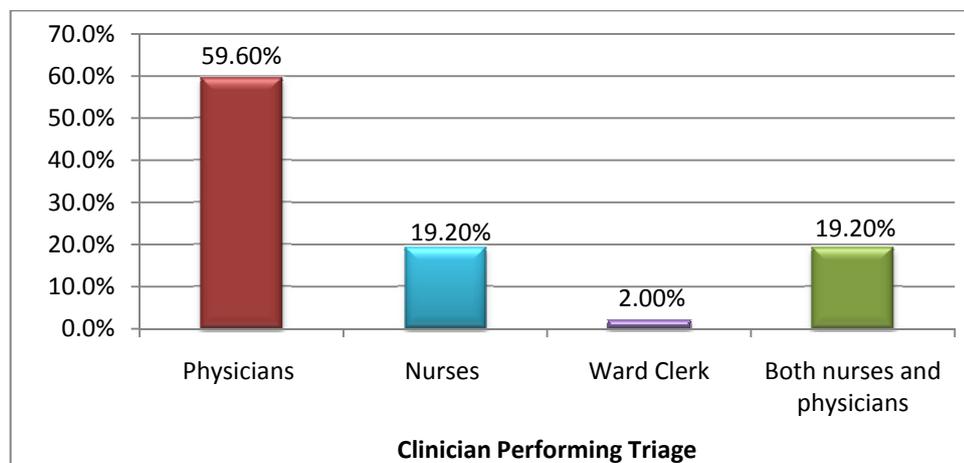


Figure 5.4. Participants' responses for the clinician responsible for doing triage.

Table 5.5

Cross Tabulation for Nurses and Physicians' Responses to Who Performs Triage

Profession	Who is responsible for triage?				Total
	Physicians	Nurses	Ward Clerk	Other	
Physician	24	2	0	3	29
Nurse	7	8	1	7	23
Total	31	10	1	10	52

5.3.4.4 Assignment of priority for treatment

All the study participants (N = 105) were asked about the bases for the decision on which patient should get treatment first. As shown in Table 5.6, the majority of the participants 89 (84.8 per cent) believed that the patients were prioritised based on the obviousness of their illness or injuries. Only one participant believed that the ED patients were prioritised based on patient history. Five participants (4.8 per cent) claimed that the treatment priority was based on the patients' time of arrival. Four participants (3.8 per cent) believed that patient care was prioritised based on the patient clinical condition. In addition, two participants (1.9 per cent) mentioned that both obviousness of illness and injuries and the patient history were the bases for prioritising ED patient care.

Table 5.6

*The Bases for Prioritising ED Patients' Care**

Who receives care first	No	%
Obvious illness or injury	89	84.8
Patient history	1	1.0
Time of arrival	5	4.8
Other		
Clinical condition	4	3.8
Obvious illness or injury and patient history	2	1.9

*Missing values = 4

5.3.4.5 Availability of designated area

The participants (N = 105) were asked if they had a designated area in which all ED patients are seen and prioritised. As show in Figure 5.5, the majority of the participants (75.2 per cent) claimed that they have this type of area, while 24.8 per cent of the participants responded that there is no designated area in their EDs in which all ED patients are seen and prioritised.

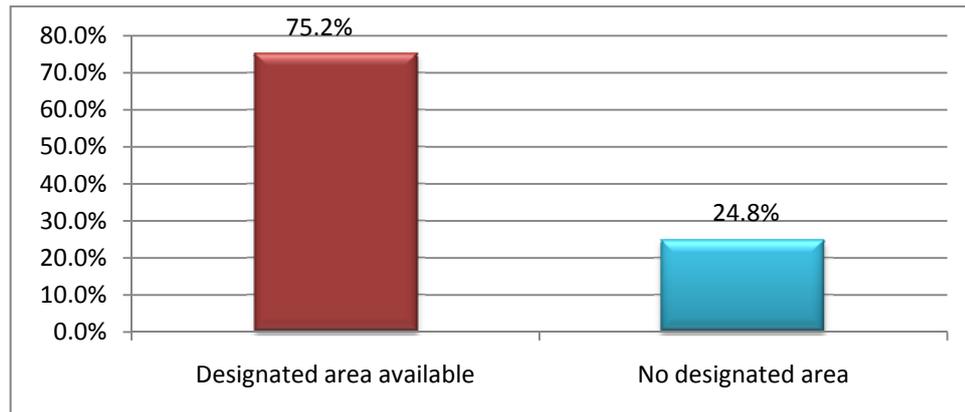


Figure 5.5. The participants' responses to the availability of designated area.

5.3.5 Triage Decisions

For each scenario presented, the participants were required to allocate one of the five ATS triage categories. The 15 simulation scenarios revealed a total of 1,575 triage occasions. The physicians completed 705 scenarios, and nurses completed 870 scenarios.

5.3.5.1 Consistency of triage decisions.

Examination of all triage decisions revealed a great variability in the triage categories selected. As shown in Table 5.7, none of the 15 triage scenarios was triaged into the same triage category by all 105 participants. Allocation of triage categories was 66.7 per cent across five ATS categories, 20 per cent across four categories and 13.3 per cent across three categories. Not one patient scenario was triaged into a single category by all participants nor were responses in a single scenario confined to only two categories.

Table 5.7

Descriptive Statistics of Responses for All Scenarios (Physicians and Nurses)

Scenario No	ATS Categories					Agreement to model category %
	1	2	3	4	5	
	N (%)	N (%)	N (%)	N (%)	N (%)	
1	80 (76.2)	16 (15.2)	9 (8.6)	0 (0.0)	0 (0.0)	76.2
2	29 (27.6)	37 (35.2)	28 (26.7)	10 (9.5)	1 (1.0)	35.2
3	99 (94.3)	4 (3.8)	2 (1.9)	0 (0.0)	0 (0.00)	94.3
4	7 (6.7)	17 (16.2)	37 (35.2)	26 (24.8)	18 (17.1)	35.2
5	7 (6.7)	27 (25.7)	42 (40.0)	24 (22.9)	5 (4.8)	40.0
6	91 (86.7)	10 (9.5)	3 (2.9)	1 (1.0)	0 (0.00)	86.7
7	23 (21.9)	31 (29.5)	27 (25.7)	20 (19.0)	4 (3.8)	29.5
8	74 (70.5)	20 (19.0)	8 (7.6)	2 (1.9)	1. (1.0)	70.5
9	4 (3.8)	9 (8.6)	35 (33.3)	26 (24.8)	31 (29.5)	33.3
10	10 (9.5)	38 (36.2)	37 (35.2)	17 (16.2)	3 (2.9)	36.2
11	74 (70.5)	26 (24.8)	3 (2.9)	2 (1.9)	0 (0.0)	70.5
12	10 (9.5)	27 (25.7)	39 (37.1)	20 (19.0)	9 (8.6)	37.1
13	95 (90.5)	7 (6.7)	2 (1.9)	1 (1.0)	0 (0.0)	90.5
14	38 (36.2)	40 (38.1)	23 (21.9)	4 (3.8)	0 (0.0)	38.1
15	1 (1.0)	2 (1.9)	12 (11.4)	28 (26.7)	62 (59.0)	59.0

As shown in Table 5.8, in the physician group, the triage allocation for four scenarios (26.7 per cent) was spread across all five ATS categories. In seven (46.7 per cent) of the scenarios, triage allocations were spread across four categories; in three scenarios (20 per cent), responses were spread over three categories; and in one scenario, two categories were chosen. In 47 per cent of the scenarios completed by physicians, agreement on a model category was greater than 50 per cent. The model category refers to the triage category that was most frequently chosen by the participants in each scenario. Less than 50 per cent of these model categories matched the expected triage code that was previously identified by the expert panel.

Table 5.8

Descriptive Statistics of Responses for All Scenarios (physicians, n = 47)

Scenario No.	ATS Categories					Agreement to model category
	1	2	3	4	5	
	N (%)	N (%)	N (%)	N (%)	N (%)	
1	41(87.2)	4(8.5)	2(4.3)	0(0.0)	0(0.0)	87.2
2	13(27.7)	18(38.3)	11(23.4)	5(10.6)	0(0.0)	38.3
3	46(97.9)	1(2.1)	0(0.0)	0(0.0)	0(0.0)	97.9
4	2(4.3)	8(17.0)	17(36.2)	11(23.4)	9(19.1)	36.2
5	4(8.5)	16(21.3)	22(46.8)	10(21.3)	1(2.1)	46.8
6	43(91.5)	3(6.4)	1(2.1)	0(0.0)	0(0.0)	91.5
7	9(19.1)	12(25.5)	16(34.0)	10(21.3)	0(0.0)	34.0
8	33(70.2)	11(23.4)	3(6.4)	0(0.0)	0(0.0)	70.2
9	1(2.1)	3(6.4)	20(42.6)	11(23.4)	12(25.5)	42.6
10	4(8.5)	18(38.3)	18(38.3)	7(14.9)	0(0.0)	38.3
11	31(66.0)	14(29.8)	1(2.1)	1(2.1)	0(0.0)	66.0
12	4(8.5)	8(17.0)	20(42.6)	11(23.4)	4(8.5)	42.6
13	41(87.2)	4(8.5)	1(2.1)	1(2.1)	0(0.0)	87.2
14	20(42.6)	20(42.6)	5(10.6)	2(4.3)	0(0.0)	42.6
15	1(2.1)	5(10.6)	14(29.8)	27(57.4)	0(0.0)	57.4

In relation to the nurse participants, Table 5.9 shows that for nine (60.0 per cent) of the scenarios, triage allocation was spread across five ATS categories. In 40 per cent of the scenarios, the categories were equally spread across three and four categories. In less than half of the scenarios completed by nurses, agreement on a model category was greater than 50 per cent. In well over half of these model categories, there was a match between the nurses' allocations and the expected triage category.

Table 5.9

Descriptive Statistics of Responses for All Scenarios (nurses, n = 58)

Scenario No.	ATS Categories					Agreement to model category %
	1 N (%)	2 N (%)	3 N (%)	4 N (%)	5 N (%)	
1	39(67.2)	12(20.7)	7(12.1)	0(0.0)	0(0.0)	67.2
2	16(27.6)	19(32.8)	17(29.3)	5(8.6)	1(1.7)	32.8
3	53(91.4)	3(5.2)	2(3.4)	0(0.0)	0(0.0)	91.4
4	5(8.6)	9(15.5)	20(34.5)	15(25.9)	9(15.5)	34.5
5	3(5.2)	17(29.3)	20(34.5)	14(24.1)	4(6.9)	34.5
6	48(82.8)	7(12.1)	2(3.4)	1(1.7)	0(0.0)	82.8
7	14(70.7)	19(32.8)	11(19.0)	10(17.2)	4(6.4)	32.8
8	41(70.7)	9(15.5)	5(8.6)	2(3.4)	1(1.7)	70.7
9	3(5.2)	6(10.3)	15(29.9)	15(29.9)	19(32.8)	32.8
10	6(10.3)	20(34.5)	19(32.8)	10(17.2)	3(5.2)	34.5
11	43(74.1)	12(20.7)	2(3.4)	1(1.7)	0(0.0)	74.1
12	6(10.3)	19(32.8)	19(32.8)	9(15.5)	5(8.6)	32.8
13	54(93.1)	3(5.2)	1(1.7)	0(0.0)	0(0.0)	93.1
14	18(31.0)	20(34.5)	18(31.0)	2(3.4)	0(0.0)	34.5
15	1(1.7)	1(1.7)	7(12.1)	14(24.1)	35(60.3)	60.3

5.3.5.2 Inter-rater agreement in triage ratings.

The inter-rater agreement among the participants (N = 105) for the 1,575 triage episodes was calculated for the five ATS categories. As shown in Table 5.10, the overall inter-rater agreement was found to be fair according to Altman's (1991) interpretation (unweighted $\kappa = .25$, 95 per cent CI .247–.255). Inter-rater agreement for the physician participants was .27 (.270–.287) and for the nurses was .23 (.223–.236). The strongest agreement was achieved in ATS categories one and five ($\kappa = .49$ and .30, respectively); the poorest agreement was achieved in ATS categories two and four ($\kappa = .07$ and .09, respectively).

Table 5.10

Inter-Rater Agreement for the Participants—Unweighted Kappa

	Physicians	Nurses	Nurses and Physicians
Overall kappa (κ)	.27	.23	.25
(95 per cent CI)	(.270–.287)	(.223–.236)	(.247–.255)
Kappa for each ATS category			
Category 1	.53	.46	.49
Category 2	.09	.06	.07
Category 3	.16	.08	.11
Category 4	.09	.08	.09
Category 5	.32	.29	.30

Weighted kappa was calculated for six pairs of randomly selected participants. Table 5.11 presents weighted kappas and provides a comparison between the weighted and unweighted kappa scores of the selected participants. Inter-rater agreement was found to be poor to fair: weighted kappa ranged from .03 to .40 (mean = .26) and unweighted kappa from .1 to .31 (mean = .18).

Table 5.11

Weighted and Unweighted Kappa for Six Pairs of Randomly Selected Participants

Selected Pairs (participants' code)	Weighted Kappa	Unweighted kappa
1 (25 and 19)	.03	.01
2 (74 and 10)	.29	.31
3 (42 and 24)	.40	.27
4 (103 and 26)	.31	.26
5 (72 and 89)	.27	.10
6 (94 and 67)	.24	.14

5.3.5.3 Accuracy of nurses' and physicians' urgency ratings.

The ratings of the participants for each scenario were examined and compared with the expected triage category that was identified by the expert panel. For each triage rating, there are three triage outcomes: expected triage, overtriage and undertriage. Expected triage occurs when the participants' triage allocation matches the triage category that was identified by the expert panel. Overtriage refers to a patient who is triaged into an acuity category greater than expected. Undertriage happens when a patient is allocated to a triage category that is less than the expected triage category.

As shown in Table 5.12, 38.7 per cent of the triage episodes ($n = 1,575$) allocated for the 15 scenarios were in concordance with the expected triage categories. Overtriage occurred in 54.5 per cent of the triage episodes. Undertriage occurred in 6.8 per cent of the triage episodes. The greatest frequencies of expected triage were achieved in ATS categories one and five (90.5 per cent and 35.2 per cent, respectively), while category two had the lowest expected triage category (19.6 per cent). Overtriage occurred in more than 60 per cent of the scenarios in the ATS categories two, three, four and five. The greatest undertriage decisions occurred in category three (11.0 per cent), while the lowest frequency of undertriage decisions occurred in triage category four (5.7 per cent).

Table 5.12

Distribution of Expected and Allocated Triage Categories ($N = 1,575$) by Triage Level

ATS Categories	Patient Scenarios (N)	Triage Ratings (N)	Expected Triage (%)	Over-triage (%)	Under-triage (%)	Total (%)
1	3	642	90.5	-	9.5	100
2	3	311	19.6	72.4	8.0	100
3	3	307	28.0	61.0	11.0	100
4	3	181	20.3	74.0	5.7	100
5	3	134	35.2	64.8	-	100
Total	15	1575				

Table 5.13 reports the frequency of agreement between the participants' (physicians and nurses) acuity allocations and the expected triage category. The participants' agreement with the expected triage code varied from 15.2 per cent in scenario one to 94.3 per cent in scenario three. In the physicians' group, the agreement with the expected triage category varied from 8.5 per cent (in scenario 1) to 97.9 per cent (in scenario 3). In contrast, the nurses' agreement with the expected code varied from 15.5 per cent (in scenarios 4, 8 and 12) to 93.1 per cent (in scenario 13).

Table 5.13

Agreement between Expected Triage and Physicians' and Nurses' Acuity Allocation

Scenario No:	Expected Code	Physicians percentage of agreement	Nurses percentage of agreement	Total percentage of agreement
1	2	8.5	20.7	15.2
2	3	23.4	29.3	26.7
3	1	97.9	91.4	94.3
4	5	19.1	15.5	17.1
5	4	21.3	24.1	22.9
6	1	91.5	82.8	86.7
7	4	21.3	17.2	19.0
8	2	23.4	15.5	19.0
9	5	25.5	32.8	29.5
10	3	38.3	32.8	35.2
11	2	29.8	20.7	24.8
12	4	23.4	15.5	19.0
13	1	87.2	93.1	90.5
14	3	10.6	31.0	21.9
15	5	57.4	60.3	59.0

In addition, the participants were asked to write the actual time that a case similar to the one presented in the scenario usually must wait in their EDs. Only 28 participants completed all the scenarios (n = 15). As shown in Table 5.14, more than

38 per cent did not answer this question. The majority of the participants (33.1 per cent) believed that patients with conditions similar to those in the simulation scenarios are currently waiting less time than the ATS's timeframe. In comparison, 18.5 per cent of the participants reported wait times similar to that recommended in the ATS, and 10.2 per cent believed that the waiting time is more than the expected code's timeframe.

Table 5.14

Participants' Responses to the Actual Time for Each Case Scenario (n = 15)

No of Scenarios	Percentage agreement with expected code's time	Percentage seen in less than expected code's time	Percentage seen in more than expected code's time	Percentage of participants did not answer	Total percentage
	18.5	33.1	10.2	38.2	100

5.3.6 Participants' Agreement on Treatment Area

After the selection of the ideal triage category for each scenario, participants were subsequently requested to decide the area to which this patient should be sent. The participants were asked to either select from the provided areas or suggest another area. The areas provided to the participants were waiting area, un-monitored bed, monitored bed, resuscitation, or other area.

As shown in Table 5.15, there was great variability in agreement among the participants in relation to the appropriate treatment area. No one scenario was sent to the same treatment area by all participants. In 40 per cent of the scenarios, the selections were spread across five treatment areas. In more than half of the scenarios (53.3 per cent), selection was spread across four treatment areas, and in one scenario, responses included three areas (6.7 per cent). The inter-rater agreement between the participants in regard to where to send the patient in each scenario was calculated to be fair ($\kappa = .28$, 95 per cent CI = .27–.28, see Table 5.16).

Table 5.15

Descriptive Statistics of Distribution of Responses for Treatment Area for All Scenarios

Scenario No.	Waiting area		Un-monitored bed		Monitored bed		Resuscitation		Other	
	N	(%)	N	(%)	N	(%)	N	(%)	N	(%)
1	0	(0.0)	4	(3.8)	71	(67.6)	30	(28.6)	0	(0.0)
2	6	(5.7)	28	(26.7)	62	(59.0)	8	(7.6)	1	(1.0)
3	0	(0.0)	2	(1.9)	13	(12.4)	90	(85.7)	0	(0.0)
4	59	(56.2)	20	(19.0)	18	(17.1)	2	(1.9)	6	(5.7)
5	20	(19.0)	49	(46.7)	34	(32.4)	0	(0.0)	2	(1.9)
6	1	(1.0)	3	(2.9)	31	(29.5)	70	(66.7)	0	(0.0)
7	13	(12.4)	50	(47.6)	27	(25.7)	0	(0.0)	15	(14.3)
8	0	(0.0)	6	(5.7)	56	(53.3)	41	(39.0)	2	(1.9)
9	49	(46.7)	33	(31.4)	9	(8.6)	0	(0.0)	14	(13.4)
10	10	(9.5)	58	(55.2)	33	(31.4)	2	(1.9)	2	(1.9)
11	1	(1.0)	4	(3.8)	68	(64.8)	32	(30.5)	0	(0.0)
12	32	(30.5)	35	(33.3)	27	(25.7)	0	(0.0)	11	(10.5)
13	1	(1.0)	3	(2.9)	32	(30.5)	10	(9.5)	59	(56.2)
14	1	(1.0)	12	(11.4)	74	(70.5)	16	(15.2)	2	(1.9)
15	72	(68.6)	7	(6.7)	0	(0.0)	0	(0.0)	26	(24.8)

Table 5.16

Unweighted Kappa for the Participant's Agreement on a Treatment Area

Overall Kappa	Standard error	95 per cent CI
.28	.001	.273–.280

5.3.7 The Associations between Participant Characteristics and Inter-Rater Agreement in Triage Ratings

The effect of the participants' demographic characteristics on agreement level was examined. The characteristics that were examined in this study were the

participants' profession (physicians and nurses), type of qualification, professional work experience and ED work experience. As shown in Table 5.17, the overall agreement for all groups was calculated to be fair, with kappa scores ranging from .23 to .25. In addition, no significant association was found between the inter-rater agreement level and the participants' characteristics (profession, qualification, total work experience and ED experience), p value > 0.05 .

Table 5.17

Associations between the Participants' Characteristics and Agreement in Triage Ratings

Demographic Characteristics	Overall Kappa (95 per cent CI)	Standard Error	P-Value
Profession			
Physician	.27 (.270–.287)	0.004	
Nurse	.23 (.223–.236)	0.003	0.10
Qualification			
< Bachelor Degree	.23 (.224–.241)	0.004	
≥ Bachelor Degree	.26 (.257–.270)	0.003	0.12
profession work experience			
< 5 Years	.23 (.223–.239)	0.004	
≥ 5 Years	.27 (.265–.279)	0.003	0.16
ED work experience			
< 1 Year	.25 (.227–.266)	0.01	
≥ 1 Year	.25 (.245–.255)	0.002	0.18

5.4 Discussion

The first study aimed to explore current triage practice in MOH (public) EDs in Saudi Arabia. It also aimed to examine the consistency and accuracy of triage decisions among ED nurses and physicians working in public hospitals. To my knowledge, this is the first study that explored current triage practice in public EDs in the KSA.

5.4.1 Current Triage Organisation in the KSA

The most noteworthy finding of this study is the high level of variability in response to current triage practice. Fifty- three (50.5 per cent) participants responded that no triage system existed in their EDs. This variability suggests that triage practice in public EDs in Saudi Arabia is not systematic and therefore reliability of triage practice is questionable.

Another significant finding is the great variability in the triage scales used and in triage personnel among the participants who claimed to have a triage system in operation in their EDs. Less than half of the participants (42.5 per cent) believed that the scale used in their ED is a five-level triage scale. The majority of respondents had a variety of triage scales, ranging from two levels to four levels. This variation in the triage scale used would result in EDs attending to patients with similar health problems in different ways. For example, when a patient is categorised as category two in a five-level triage scale, he will be seen in 10 or 15 minutes; however, when the same patient is categorised as category two in a three-level triage scale, the treatment might be delayed, which could place the patient at risk. In addition, when public EDs utilise different criteria to define the patients' urgency, data benchmarking is not possible.

Variability also was found in the clinician responsible for performing triage. The majority of the participants (59.6 per cent) responded that triage is currently performed by ED physicians, and only 19.2 per cent of the study participants believed that triage is conducted by nurses. The participants' responses in regard to who performs triage varied considerably among participants from the same ED and between nurses and physicians. Most of the physician participants responded that triage is a physicians' role, whereas nurses' responses included physicians, nurses,

ward clerks and both nurses and physicians. This variation may be a result of inappropriately defined roles and ignorance of MOH hospital policies. It is not clear if ignorance of policy existed. If this is the case, then the confusion is understandable. If the participants were aware of an MOH triage policy, then their responses indicate that they act in direct contradiction of it. As there is no audit of policies implemented by the MOH, ED staff may not feel obligated to adhere to MOH directives.

It has been argued that to ensure safety and efficiency of triage, EDs should have a single point of entry in which all ED patients are seen and prioritised for care (Richardson, 2009). In some EDs, the triage process includes two entries: one for patients transferred by ambulance and the other entry for walking, wheelchair and stretcher patients (Göransson, Ehrenberg & Ehnfors, 2005). In this study, the majority of the participants (72.2 per cent) claimed that they have a designated area in which all ED patients are seen, while the remaining participants (24.8 per cent) denied the existence of such a place in their EDs. It is worth saying that the presence of a designed area does not necessarily indicate the existence of a triage system. However, the presence of a designated area where all ED patients present is encouraging. Such an area ensures that all patients arriving to the ED are at least visually screened. In addition, this area can be used as a triage area when implementing a formal triage system.

Prioritising ED patient care based on the urgency of clinical condition is the most important function of any triage system. However, this function seemed not to be operating in these EDs. The majority of the study participants (84.8 per cent) believed that the ED patients are seen and prioritised based on the obviousness of their illness or injuries. Only 3.8 per cent said that the patients' clinical conditions are the bases for the decision of which patient should be seen first. Literature has shown that triage decisions for patients who are obviously ill or injured and for patients who are obviously not ill or injured are relatively easy (Göransson, Ehrenberg, Marklund, et al., 2005). Many studies have reported high levels of accuracy and consistency in triage decisions when the patient category is one or five (immediate and non-urgent, respectively) (Aljohani, 2006; Göransson, Ehrenberg, Marklund, et al., 2005; Ruger et al., 2007). However, unfortunately, the majority of ED patients do not fall at these two extremes (obviously ill or injured or obviously

not ill or injured) (McNair, 2005; Ruger et al., 2007). This finding has important implications for patient safety and equity of access to ED care. The majority of patients who presented with unobvious but urgent conditions may be overlooked. This, in turn, may delay treatment and can affect health care outcomes.

5.4.2 Consistency of Triage Ratings

In this study, the participants (N = 105) were asked to allocate triage codes for 15 patient scenarios using the Australasian Triage Scale. It must be noted that the participants had not had any training on the use of the ATS prior to or during the study. A brief description of the ATS categories and timeframe were provided to the participants. A total of 1,575 triage episodes were completed.

The most noteworthy finding in this part of the study was the high level of variability in triage allocation among the participants. Not one patient scenario was triaged into the same ATS category by all 105 participants. The triage allocations were distributed over five, four, or three ATS categories. In the physicians' group, only one scenario was distributed across only two ATS categories. The majority of the scenarios (66.7 per cent) were scattered across five categories, 20 per cent across four categories and 13.3 per cent across three categories. The finding that not one patient scenario was triaged into the same category is similar to the findings of other studies (Aljohani, 2006; Dilley & Standen, 1998; Göransson, Ehrenberg, Marklund, et al., 2005). In addition, the spread of triage allocations across three categories or more is comparable to findings by Aljohani, Dilley and Standen and Göransson et al. However, this study reported higher levels of spread of triage allocations across five categories (66.7 per cent) than the other studies did (Aljohani, 2006; Dilley & Standen, 1998; Göransson, Ehrenberg, Marklund, et al., 2005). This finding indicates that the ED nurses and physicians in this study seemed to understand urgency in different ways. This inconsistency in allocating triage codes highlights issues related to patient safety. Patients with similar health conditions might be allocated to different triage categories based on who sees them in the triage area.

Moreover, the participants' agreement on a model triage category (most common category) was low. In less than half of the patient scenarios, agreement on a model category was greater than 50 per cent (ranged from 59 per cent to 94 per cent). In all these scenarios, the selected model category was ATS one, except one scenario

where the selected triage category was ATS five. In 70 per cent of the selected model category, the triage codes were in concordance with the expected triage category, while in 30 per cent the participants tended to overtriage. This finding is consistent with the notion that identifying patients in the two extremes is relatively easier than identifying category two, three and four patients (Aljohani, 2006; Altman, 1991; Göransson, Ehrenberg, Marklund, et al., 2005; Ruger et al., 2007). Further, the finding can be explained by the fact that obviousness of illness or injury is the most common criteria (84.8 per cent) used by the participants to determine patients' priorities for care.

The inter-rater agreement level among the study participants is another important finding in this study. The overall level of agreement in allocating triage acuity codes was calculated to be fair: unweighted kappa was .25, and weighted kappa was .26. These findings is comparable to those of Aljohani (2006) and Dilley and Standen, (1998), who attained an unweighted kappa of .26 and a weighted kappa of .25. In contrast, this study reported a lower agreement level than those reported in studies conducted by Göransson, Ehrenberg, Ehnfors, et al. (2005), Olofsson et al. (2009), Van der Wulp et al. (2009) and Storm-Versloot et al. (2009), which found an unweighted kappa of .46, .61, .48 and .46, respectively. In addition, the reported weighted kappa in this study is lower than the weighted kappa recommended by the ACEM of at least .60 (Australasian College for Emergency Medicine, 2005). In comparison to studies that have reported weighted kappa, this study reported a lower inter-rater agreement level, weighted kappa .26 (Beveridge et al., 1999; Considine et al., 2004; Göransson, Ehrenberg, Marklund, et al., 2005; Khanal et al., 2005; Manos et al., 2002; Storm-Versloot et al., 2009; Worster et al., 2004).

The agreement level was found to be highest in ATS categories one and five ($\kappa = .49$ and $.30$, respectively), whereas the participants' agreement level in ATS categories two, three and four was poor ($\kappa = .07$, $.11$ and $.09$, respectively). This finding is consistent with the findings of a study conducted in Saudi Arabia by Aljohani (2006) and other studies in Sweden (Göransson, Ehrenberg, Marklund, et al., 2005) and the USA (Ruger et al., 2007). Taking into consideration that formal triage is not a common practice in the study setting and that the participants were not familiar with using the ATS, the findings suggest that identifying patients in middle categories (ATS 2, 3 and 4) is a major problem. Knowing that the majority of ED

patients are in category 2–4, failure in identifying patients who need urgent medical attention may lead to serious complications or even death among this group. The inconsistency in triage allocation also suggests that the study participants understand urgency in different ways. This has important implications for future implementation of a formal triage system in the study settings. It is evident that using a reliable triage scale alone is not sufficient to obtain safe and efficient triage practice. Therefore, it is important for ED clinicians to understand urgency prior to undertaking a triage role.

5.4.3 Triage Accuracy

According to the literature, triage decisions can be divided into expected triage, overtriage and undertriage (Considine et al., 2004; Göransson, Ehrenberg, Marklund, et al., 2005). In this study, the expected triage category for each scenario was identified by an expert panel in the *Triage Education Resource Book* (Gerdtz et al., 2002).

Among the noteworthy findings of this study is lack of accuracy of triage ratings among the participants. Indeed, less than half of the triage decisions were accurate. The participants were most likely able to identify the expected triage outcome in ATS categories one and five. The participants tended to overtriage more than undertriage. Overtriage occurred in 54.5 per cent of the total triage decisions, whereas undertriage occurred in only 6.8 per cent of the total triage episodes (n = 1575). In addition, overtriage occurred in more than 60 per cent of ATS categories two, three, four and five. The participants' tendency to overtriage may be attributed to the uncertainty associated with triage decision making; therefore, the participants triaging patients into a 'safe' direction. Although it might be argued that overtriage is safer than undertriage, overtriage is unfavourable as it may increase the waiting time for other patients who need urgent care and may lead to serious consequences, especially when the resources are limited (Considine et al., 2004; Göransson, Ehrenberg, Marklund, et al., 2005; Wuerz et al., 2000).

The variation in the accuracy of acuity ratings in this study mirrors that of Aljohani's (2006) study. Aljohani (2006) suggested that the variation may be attributed to the lack of physiological discriminators to help triage clinicians correctly identify triage urgency level. In the current study, the absence of physiological descriptors remains a possible cause for the variation in the accuracy of

triage decision making. However, the most important explanation for the variability in triage consistency and accuracy is the lack of a standardised reliable and valid triage system that supports ED clinicians in making accurate and consistent triage decisions.

In addition, the present study reported a lower level of accuracy in selecting expected triage and undertriage, while it reported a higher level of overtriage decisions than other studies that utilised the ATS and the CTAS (Considine et al., 2004; Considine et al., 2000; Göransson, Ehrenberg, Marklund, et al., 2005). Considine et al. (2000) and Considine et al. (2004) found that 58 to 61 per cent of the decisions were the expected triage outcomes and 21 per cent were overtriaged. Göransson, Ehrenberg, Marklund, et al. (2005) also reported higher expected triage outcomes (75.7 per cent) and fewer overtriage outcomes (28.4 per cent) than the present study. In contrast, the present study reported fewer undertriage outcomes compared to these previous studies. However, comparing the accuracy of triage in this study with that of other studies utilising a five-level urgency scale should be undertaken with caution. The previous studies included different numbers of triage scenarios (ranging from 10 to 30) and different numbers and types of participants (ranged from 10 to 168 triage nurses). These differences may have played an important role in the level of accuracy.

5.4.4 Comparison between the Nurses' and Physicians' Acuity Ratings

Triage consistency and accuracy were compared between the two groups (nurses and physicians) to identify any differences in triage decisions. The data revealed that variability in acuity ratings was present in both groups. Both nurses (n = 58) and physicians (n = 47) failed to allocate any scenario to the same ATS category. The nurses' group allocated 60 per cent of the triage scenarios across five categories and 20 per cent across three and four categories. In the physicians' group, the majority of the scenarios (46.7 per cent) were allocated across four categories and 26.6 per cent across five categories. These findings may indicate that both nurses and physicians had similar variability in triage decision making. However, the physicians' group had a narrower distribution of triage rating across five categories (26.6 per cent) than the nurses' group (60 per cent). The data also indicated that in 47 per cent of the scenarios, more than 50 per cent of both nurses and physicians agreed

on a model category. The agreement level on a model category reported in the present study for both nurses and physicians is lower than the agreement level reported by Aljohani (2006). Aljohani reported that in 65 and 55 per cent (respectively) of the scenarios ($n = 20$), nurses and physicians agreement on a model category was more than 50 per cent.

In terms of inter-rater agreement, both nurses and physicians had a fair agreement level. Unweighted kappa was .23 (95 per cent CI = .223–.236) for nurses and .27 (95 per cent CI = .270–.287) for physicians. Inter-rater agreement was found to be moderate for nurses and physicians in ATS category one (nurses = .46 and physicians = .53) and fair in ATS category five (nurses = .29 and physicians = .23). For both groups, the agreement level was found to be poor in ATS categories two, three and four (unweighted kappa < .17). This result indicates that both nurses and physicians had the same difficulties in triaging patients in middle categories. It also indicates that both groups equally contributed to the overall level of agreement on urgency ratings. The result that both nurses and physicians had a similar inter-rater agreement is comparable to other studies (Bergeron et al., 2002; Beveridge et al., 1999; Goodacre et al., 1999). However, two studies reported a higher inter-rater agreement level than the present study. Beveridge et al. (1999) reported excellent agreement levels ($\kappa = 80$) for both nurses and physicians, and Bergeron et al. (2002) reported moderate agreement levels for nurses ($\kappa = .45$) and physicians ($\kappa = .42$).

In terms of triage accuracy, both nurses and physicians were most likely to select the expected triage category when the expected triage category was ATS one. In one out of three scenarios, more than 50 per cent of the nurses and physicians were able to identify the expected triage category. Generally, both nurses and physicians tended to overtriage in category five. For the middle ATS categories, nurses' percentage of agreement with the expected category ranged from 15.5 per cent to 32.8 per cent, while physicians agreement ranged from 8.5 per cent to 38.3 per cent. Again, this finding indicates that identifying urgent but not obviously ill patients is problematic.

In response to the actual time that a patient who presents with a condition similar to the one presented in the simulation scenarios would normally wait before being seen by an ED physician, the majority of the participants (38.2 per cent) did

not answer this question. This may be a consequence of uncertainty among the participants. The uncertainty in reporting the actual time for these cases might be attributed to the lack of formal triage system and education in most of the participating EDs. Therefore, the participants' decisions may vary from time to time, even when the patients' conditions are the same.

5.4.5 Participants' Agreement on Treatment Area

McMahon (2003) claimed that triage can help ED clinicians determine the appropriate treatment location and resources. The study participants were asked to determine the appropriate treatment location for each scenario. The participants (N = 105) completed the treatment area for all scenarios (n = 15). In this study, the aim of determining a treatment area was to identify the consensus level among the participants on where to send the triaged patients and by implication what resources are required. The accuracy of these decisions was not the focus in this study. For each triage scenario, the participants were asked to select one of the following treatment locations: waiting area, un-monitored bed, monitored bed, resuscitation, or other areas, if they preferred.

The study findings revealed great variability among the participants in regard to the appropriate treatment location for the 15 scenarios. Not one patient scenario was allocated to the same treatment area by all participants. The inter-rater agreement level for the all participants was calculated to be fair only (unweighted kappa was .28, 95 per cent CI = .27–.28). In 67 per cent of the scenarios, agreement on a model treatment location (common answer) was more than 50 per cent. The participants' agreement was higher when the expected categories were ATS one and five. This finding is consistent with the study findings that the participants were able to make consistent and accurate decisions when the patient is obviously ill or injured or when the patient is obviously not ill or injured.

The findings suggest that patients in the middle categories (ATS 2, 3 and 4) are at risk of being sent to inappropriate treatment locations with inappropriate resources. The participants were recruited from different EDs, where patient management varies. ED policy may affect the decision of where to send the patient. However, patient safety mandates the need to allocate patients to the appropriate treatment location regardless of the ED patient flow protocols. For instance, a patient

with acute cardiac problems cannot be safely sent to a waiting area or to an unmonitored bed.

5.4.6 Association between the Participants' Characteristics and Agreement Level

The participants' characteristics that were investigated were profession (nurses v. physicians), level of education, professional work experience and work experience in EDs. To measure the unweighted kappa for each group, kappa statistics were stratified according to the participants' demographic characteristics.

Notably, the data revealed that agreement levels were not affected by the participants' demographic characteristics. The agreement levels remained fair in all participant demographic groups, with unweighted kappa ranging from .23 to .25. Similar to previous studies (Aljohani, 2006; Considine et al., 2001), this study did not find a statistically significant association between the inter-rater agreement level and the participants' qualifications and experience ($p = 0.12$ and 0.18 , respectively).

5.5 Conclusion

The aim of this study was to gain an understanding of current triage practice in public EDs in Saudi Arabia. The findings revealed that formal triage is not practiced in most of the reviewed EDs. In addition, for those using an ED triage system, triage practice greatly varied from one ED to another. The variation included using different triage scales to prioritise patient care (2–5 levels) and different ED clinicians to perform the triage role.

In addition, this study found that the concordance and accuracy of triage decisions were low among the study participants. The participants in this study tended to overtriage more often than they selected the appropriate category or even to undertriage. This tendency might be linked to a poor understanding of urgency and a lack of confidence due to the paucity of clinical criteria that help the ED nurses and physicians in making the right triage decisions.

Chapter 6: Study Two: Analysis of Key Documents

6.1 Introduction

The key to successful implementation of any clinical system is the support of the organisation and in some cases the government. Primarily, support should be a combination of administrative and educational backing. Administrative support is in the form of written policies and procedures, and educational support is training programmes run by central or local organisations/agencies (Lezine & Reed, 2007; Mei, Andrew, & David, 2007). In nursing matters, the hospital education department usually takes responsibility for education required for the implementation of any new system.

The issues raised in the literature review highlighted the fact that in the KSA, in EDs where triage is practiced, implementation is flawed and patient care is potentially compromised. A common practice in Saudi Arabia is to implement a clinical system that works in other cultures; critically, such systems have not been tested or modified for the KSA. This in itself creates problems, as the practice does not take into consideration the nature and culture of the health system into which the system is to be added. It is not enough just to develop a triage system for the KSA; the supporting structures for the system must also be examined for utility. In Australia, New Zealand, Canada and the UK the respective triage systems have been successfully implemented nationally with the support of a national education programme and a Commonwealth policy on its use that is further supported locally by individual hospital policy (Australasian College for Emergency Medicine, 2006; Beveridge et al., 1998).

Prior to the development or modification of administrative and educational factors, current practice and documents need to be examined. This chapter will discuss the analysis of the key documents in regard to policy, procedure and education from four institutions in Saudi Arabia. It is interesting to note that the Ministry of Health has a policy document to support triage in emergency departments across the Kingdom; however, the lowest uptake of triage practice occurs in Ministry hospitals. The documents to be analysed in this chapter are the Ministry document and documents from three non-Ministry (de-identified) hospitals.

The first section of this chapter will discuss the aim and method of analysis, the second section the results and the third section will provide a brief discussion of the findings.

As this research was being conducted, it became evident that just developing the triage scales for use in Saudi Arabia was not sufficient to enable successful implementation. However, the nature of the Saudi health system is fragmented and self-governing; therefore, gaining documents was difficult due to the level of distrust within the system as a whole. Consequently, this section of the research will provide limited insight into understanding the current policy, procedures, and education programmes that support current triage practice in the Saudi EDs. This study further provides direction for the development of appropriate policy procedure and education for the new Saudi Arabian Triage System (SATS).

6.2 Method

The aim of this study was to explore the current triage policy and procedures as well as education programmes that currently support the ED triage practice in both public and non-public EDs in Saudi Arabia.

6.2.1 Research Questions

- What triage policy and procedures are in place in public and non-public EDs to support triage?
- What triage training and education preparations are currently used to support the implementation of triage in both public and non-public EDs?

The use of documents for this type of research is supported in the literature (Bow, 2002; Creswell, 2003; Grbich, 1999). Documents are a very useful source of information for researchers (Grbich, 1999). Analysis of documents can be either qualitative or quantitative (Creswell, 2003; Sarantakos, 2003). As Bow (2002, p. 273) states, 'if there is a need to gain understanding of the official policies of the setting the researchers are studying; this can be achieved by reading the documents which are produced by the organisation or setting'. Moreover, Grbich (1999, p. 146) stated that using documentation as a source of data 'can provide sources of comparison for field data, can be analysed by process of either theory testing or theory generation and provide insight and an earlier view of subjective experience'.

A qualitative approach developed specifically for this study was used for the document analysis. Access to documents was requested from six institutions; however, only the Ministry of Health and three institutions responded. This low rate of response may be a reflection of the level of distrust in the Saudi health system. The lack of documents may relate to a number of issues, one being the level of suspicion of how the documents will be used and if this will have an effect on the reputation of the hospital. Other hospitals did not have a process in place when such documents were requested; therefore, they did not know how to respond to the request. Given this small number of documents, a selective qualitative method was used.

It became evident that the processes suggested for a large number of documents might result in a flawed analysis when the number of available documents is small. A consequence of the limited number of documents is that triage supporting documents from other hospitals are not included. However, it must be noted that the MOH policy and procedure document should apply to all MOH EDs (n = 231 hospitals), 57 per cent of the total number of hospitals in Saudi Arabia. Therefore an examination of how these documents could be constructed provided the guide for deconstruction and analysis. The Department of Health [New South Wales, Australia] (1998) has provided a guideline for the development of a policy this will be used to identify the essential elements of policy. From this starting point, each document was deconstructed, looking for the following elements:

- The purpose of the policy
- The scope of the policy
- Who the policy affects
- How implementation is to be achieved
- Breakdown of the elements of implementation
- Definitions
- References or support for the policy

Specifically the policy and procedure documents were examined looking for the following:

- Policy purpose
- How triage was defined

- What triage equipment or materials are recommended
- What triage scale is used
- The time to triage and re-triage
- Who is doing triage
- What qualifications and experience are needed
- Who is responsible for observing the triage waiting area
- What educational preparations are required
- What the documentation standards are
- What evidence or references are used in the policy and procedure documents

In regard to education, the documents were deconstructed using the basic components of a curriculum document issued under scrutiny, including:

- A statement of purpose
- Learning objectives
- Programme materials
- Teaching modality
- Content
- Assessment
- Evaluation

6.3 Data Collection

Six hospitals, in addition to MOH, were approached to provide access to the required documents. Four organisations—the MOH and three tertiary hospitals—supplied the documents shown in Table 6.1. Absence of a document does not indicate that a document does not exist, but only that it was not made available for the purpose of this research.

Table 6.1

Documents Provided for Analysis

	Policy	Procedure	Education
Ministry of Health	✓	✓	
Hospital A	✓	✓	✓
Hospital B	✓	✓	✓
Hospital C	✓	✓	

6.4 Data Analysis

Content analysis is a method that can be used with qualitative and quantitative data (Elo & Kyngäs, 2008) Qualitative content analysis was employed in this study. The documents were examined for common content with similar meanings and intent in context to the whole document.

In this study, the documents were categorised according to the type of the document (policy, procedure, or education) and the sources of the document (MOH or non-MOH). Data analysis was conducted by reading the documents completely to be familiar with the data (Lemiengre, Dierckx, Denier, Schotsmans & Gastmans, 2008). The units of analysis were expanded from words to phrases. All documents were read until no more data were obtained (Grbich, 1999; Williamson, Burstein & McKemish, 2002).

6.5 Results

The findings from the policy, procedures and education will be presented in this section. The documents collected from the MOH will be called ‘MOH documents’. The remaining organisations will not be named; instead, the pseudonyms hospital A, B and C will be used.

6.5.1 Policy

The policy and procedure document that was obtained from the MOH consisted of three pages. This policy and procedure document was developed by the MOH and distributed to all public hospitals. Therefore, this document should provide a framework for 231 hospitals (57 per cent) in the Kingdom (Ministry of Health, 2008). The hospital A triage policy and procedure was integrated in a complete policy for the management of patients presenting to the ED. The document consisted of 14 pages. The policy and procedure documents obtained from hospitals B and C consisted of five pages each and only applied to triage practice.

The triage policy and procedure documents revealed variation in the purpose of the triage policy. In some documents, the focus was more on the purpose of the policy itself (i.e. why the policy and procedure exist and why it was designed). In contrast, the focus of other documents was on the purpose or the benefits of the triage as a process, see Table 6.2.

In the MOH and hospital B documents, the purpose of the triage policy was to prioritise patient care to identify patients who need immediate care and to ensure proper management of the EDs. Hospital B, however, added determining the appropriate treatment area and providing information to patients and family regarding waiting times to the purpose of the policy. The purpose of the triage policy in hospital A was to define the policy and procedure of the management of ED patients, including triage. In hospital C, the purpose of triage policy and procedure was to introduce the triage policy and procedure and to define the role and responsibility of the ED staff.

Definition of triage was provided in all the policy and procedure documents with exception to the hospital A, where no triage definition was given. Triage was defined as prioritising patients according to their clinical needs. In two policy and procedure documents (MOH and hospital B), equipment and materials were stated. The MOH document included access to the following equipment: oxygen, airways, cervical collars, ECG machines, urinary catheters, splints for fractures and suction machines. The hospital B document recommended keeping the following materials and references available at all times: the adult and paediatric Canadian Triage and

Acuity Scale (CTAS), the obstetric triage, the triage algorithm and the manual for emergency nursing reference.

The triage scales varied from three to five levels. As shown in Table 6.2, the MOH policy introduced a three-level triage scale. These levels were described as emergent, urgent and management, and response times were not specified. For each level of the triage scale, the MOH policy suggested some clinical descriptors: for category one (emergent), these included cardiac arrest and cervical spine injury; for category three, (management), these included chronic lower back pain and routine medical refills; and for category two (urgent), no clinical descriptors were provided. In hospitals A and B, the policies stated that the CTAS should be used to prioritise ED patients' care. As shown in Table 6.2, the CTAS consisted of five urgency categories; no modifications were made to the CTAS category descriptions or timeframes.

As shown in Table 6.2, in hospital C, a five-level triage scale was recommended by the policy and procedure. Colour codes were used for triage categories one through four. Time was specified for categories one, two and three only. According to the policy and procedure documents, triage is performed for all patients on arrival to ED regardless of the arrival mode (walking or stretcher). However, the MOH policy and procedure document did not indicate if all patients should be triaged or not.

The MOH's policy indicated that triage is undertaken by a triage nurse. The policy, however, did not recommend any qualification or experience for nurses in order to perform triage in any public EDs. In the other hospitals (B and C), triage is undertaken by an ED physician and ED nurse. In hospital A, the required experience was not specified; however, the triage nurses must pass a competency test and satisfy certain performance criteria to be able to perform triage. These criteria include interpersonal skills, psychomotor skills and critical thinking skills. Hospital B required that nursing staff have a minimum of 12 months of ED experience, complete the probationary period and pass a triage competency test before engaging in triage activities.

In hospital C, the nursing staff must have 2 to 3 years of ED work experience in general and a minimum of 6 months in the hospital ED. In the hospital B and C

triage policies, qualifications or experience for physicians to be able to perform triage was not specified.

As can be seen in Table 6.2, the time for triage, re-triage, and the clinician responsible for monitoring patients during waiting times were not specified in the MOH's policy and procedure document. In the hospital A and C policy and procedure documents, time to triage were not specified, but a re-triage timeframe was specified. In hospital B, all patients must be triaged within 10 minutes of arrival, and re-triage time is not specified. Further, observing the waiting area in hospital B is a responsibility of the ED nursing staff.

None of the policy documents recommended triage-education-related activities; however, hospital B's triage policy recommended that triage nurses should have training and annual recertification. The MOH triage policy and procedure required the triage nurse to document all procedures the patient received from arrival to handover to the primary nurse. In hospital B, the policy recommended the documentation of all the relevant subjective and objective data such as triage time, method of arrival, level of consciousness, vital signs, physical appearance and degree of distress. Hospital A policy did not suggest documentation requirements, whereas hospital C policy required triage physicians and nurses to use a specific triage form.

The MOH policy does not include a date of construction or date of revision, and no references were used. However, the MOH policy and procedure was presented in a manual dated 2003. The CTAS guidelines were used as a reference in the hospital A and B triage policies.

Table 6.2

Summary of Policy and Procedure Findings

Themes	Ministry of Health	Hospital A	Hospital B	Hospital C
The purpose of the policy	<p>To classify different illness and injuries</p> <ul style="list-style-type: none"> • To ensure proper management of the emergency • To prioritise patients in need of immediate treatment • To stabilise and provide critical treatment and transfer to appropriate setting 	<p>Define the P&P related to the management of patients presenting for medical assistance in the ED</p>	<ul style="list-style-type: none"> • Identify patient with urgent or life-threatening conditions • Determine the most appropriate treatment area • Provide logical mechanism for ongoing patient assessment • Provide information to patient and family regarding the expected waiting time 	<ul style="list-style-type: none"> • State the ED triage policy • Define the role and responsibilities of the ED staff who are involved in patient care • Document the procedure to be followed in order to provide a safe environment for ED patients
Triage definition	Determine the patients that need immediate care and the patients that can safely wait.	Not stated	Identifying patients' needs, setting priorities and implementing or initiating the appropriate treatment	An operational service within the ED to assess and prioritise all patients presenting in the ED

Table 6.2

Summary of Policy and Procedure Findings (continued)

Themes	Ministry of Health	Hospital A	Hospital B	Hospital C
Triage equipment and materials	<ul style="list-style-type: none"> • Oxygen, airway • Cervical collar • ECG machine • Urinary catheter • Splints for fractures • Suction machine 	Not specified	<ul style="list-style-type: none"> • CTAS • CTAS for paediatric • Obstetric triage • Immediate triage algorithm 	Not specified
Triage scales	<p>3 levels of urgency</p> <ul style="list-style-type: none"> • Emergent (immediate action) • urgent (stable with conditions requiring intervention within a few hours) • management (chronic or minor injuries) no time response 	<ul style="list-style-type: none"> • Canadian Triage and Acuity Scale (CTAS) 	<ul style="list-style-type: none"> • Canadian Triage and Acuity Scale (CTAS) 	<p>5 categories</p> <ul style="list-style-type: none"> • Immediate at once • Urgent (Yellow) within 15–30 mins • Semi-Urgent (Green) within 30–60 mins • Non-Urgent (Blue) delayed (NS) • Family Medicine - Redirected

Table 6.2

Summary of Policy and Procedure Findings (continued)

Themes	Ministry of Health	Hospital A	Hospital B	Hospital C
Time to triage and re-triage	Not specified	Time to triage is not specified Time to re-triage: <ul style="list-style-type: none"> • Category 2, every 15 mins • Category 3, every 1hr • Category 4 and 5, every 2 hrs 	All patients must be triaged (at least visually) with 10 mins of arrival Re-triage: not specified	Time to triage is not specified Re-triage made every 15–30 mins for all patients
Triage clinician	Triage nurse	Nurses	Nurse and/or physician	<ul style="list-style-type: none"> • Triage physicians • Qualified triage nurses
Qualification and experience of triage clinician	Not specified	Pass a triage competency test	Nursing staff should have: <ul style="list-style-type: none"> • A minimum of 12 months ED experience • Completed their probationary period • Pass triage competency 	Nurses must have: 2–3 years ED work experience in general and minimum of 6 months in the hospital ED

Table 6.2

Summary of Policy and Procedure Findings (continued)

Themes	Ministry of Health	Hospital A	Hospital B	Hospital C
Who attends waiting area	Not specified	Not specified	The nursing staff	Physicians re-assess patients every 15–30 mins
Education preparation	Not specified	Not specified	<ul style="list-style-type: none"> • Specialist knowledge • Training • Pass the triage competency test • Annual re-certification 	Not specified
Documentation	Document all the procedures in the nurse's notes	Not specified	subjective and objective data such as triage time, method of arrival, level of consciousness, vital signs, physical appearance and degree of distress need to be documented in a specific triage form	Use a specific triage form
Evidence for policy (references)	None	CTAS guidelines	CTAS guidelines	None

6.5.2 Procedure

The procedure in the context of this research refers to the process of transferring the policy into action. Triage procedure, according to the MOH triage policy and procedure, consisted of many actions. Reviewing these actions revealed that the triage nurse is required to engage in patient bedside care. The triage nurse is required to assess and categorise ED patients according to priority using the three-level scale (emergent, urgent and management). The stabilisation of the patient is also included as a component of the triage procedure. The MOH triage procedures also recommend performing a head-to-toe assessment, carrying out diagnostic and laboratory tests, conducting ECG monitoring and looking for suspected fractures. All the above procedures must be documented.

The triage procedures were found to be similar in the three non-MOH hospitals. Every patient presenting to the ED is triaged by a triage nurse and/or physician. Triage officers should assess the patient's condition and assign one of the triage acuity levels used in the institution. Triage officers should have access to the waiting area. Reassessment is conducted on a regular basis, and the patient is re-triaged if necessary. Triage officers must document all the relevant data (based on the hospital triage documentation standards). The difference between the three hospitals was in regard to the treatment area for each triage category and other issues related to patient eligibility for treatment.

6.5.3 Education

Searching for triage education programmes in public hospitals (MOH hospitals) for the purpose of analysis in this study proved difficult, as no such programmes exist. Hospitals A and hospital B did have a triage education programme to prepare triage nurses. In hospital C, no specific triage education was given; however, ED nurses received limited information about triage during the orientation period.

The triage education in hospital A was as follows:

A. The programme objectives:

Help triage nurse to:

1. Assess, analyse and decide the appropriate triage category using the CTAS based on patient vital signs, pain assessment, perfusion assessment, serum Lab values and medications, critical look of the patient and patient history.
2. Describe the appropriate care according to the clinical condition (medical or traumatic)

B. The programme materials:

1. Reading materials to overview:
 - a. The definition of ED triage.
 - b. The purpose of ED triage.
 - c. Description of the triage scale (CTAS) and the clinical descriptors for each triage category
2. Education materials: The programme utilised paper-based simulation scenarios. Learners were asked to identify:
 - a. The assessment needed for each case and its rationales
 - b. The appropriate triage acuity category based on the CTAS

C. Teaching mode:

1. PowerPoint presentations (lectures)
2. Workshops

D. Evaluation: Pre- and post-test using simulation scenarios. Triage nurses are required to rate urgency for simulation scenarios prior to taking the education programme materials. After completing the programme, triage nurses are also required to re-rate the scenarios.

In hospital B, a triage process self-directed module document was found. This document was constructed by the nursing education department as continuing education materials.

- A. The document material consists of:
 - 1. Introduction and background
 - 2. Triage goals
 - 3. Role of triage personnel including:
 - a. Triage guidelines
 - b. Triage process
 - c. Documentation standards
 - d. Qualifications of the triage nurse
 - 4. Definition of the triage acuity scale including the clinical descriptions of the CTAS
 - 5. Paediatric considerations
 - 6. Setting up the triage area
- B. **Mode of teaching:** self-directed
- C. **Evaluations:** Test consists of case scenarios and assessment questions. However, no evidence shows that these scenarios were validated.

6.6 Discussion

Current ED triage policy, procedure and education documents that support the implementation of triage in Saudi EDs are not standardised and consequently are fragmented. Although the focus of this study is on public MOH EDs, documents from these institutions were not made available. Key triage documents were obtained from non-MOH hospitals. It can be argued that obtaining these documents was appropriate as it is the non-MOH hospitals that have implemented a triage system. Forming an understanding of how triage functions in Saudi Arabia provides this research a starting point to evaluate the effectiveness of current practices and to identify areas where change would result in improving the overall system. The following section provides a brief discussion of the policy and procedure documents as well as the education programmes.

6.6.1 Policy and Procedure

Policy and procedure can provide direction for institutions in line with government policy. In addition, policy and procedure can reduce conflict in the working environment and amongst employees (Alsharqi, 2006). Given the

fragmented nature of the Saudi health system, it was not surprising that the analysis of the policy and procedure documents revealed that there was no consistent approach to triage practice. The purposes of the policies, for example, were not consistent: in some documents, the purpose is referred to as the objectives (aims) of ED triage practice, while in other documents the purpose referred to the aim of the document itself (i.e. why the policy and procedure was constructed). If the underlying purpose of the documents is confused, then it is reasonable to assume that the application within the system may be flawed due to lack of understanding.

The most noteworthy finding in this study is the variation in the triage scales used to categorise ED patients. Triage scales varied from three to five urgency categories, despite clear evidence in the literature that a five-category system is superior (Fernandes, Tanabe, Bonalumi, et al., 2005; Travers et al., 2002; Wuerz et al., 1998). The Ministry of Health policy is the only organisation that recommends using a three-level urgency scale to prioritise patient care. The absence of a date on the MOH document may explain why the three-category system is recommended. If this document has not been recently reviewed, then current research has not been considered. As an example, Gilboy (2005) argued that the three-level triage scale is poor because it lacks universal definition for each triage category. Moreover, no professional organisation currently supports and recommends a three-level triage system (Zimmermann & McNair, 2006).

The MOH policy and procedure document states in the procedures section that in case of a disaster, the triage nurse must categorise the patients according to the following field and disaster triage scale: red (emergent), yellow (immediate), green (urgent), blue (fast track) and black (dead or progressing rapidly towards death). Including the disaster triage scale within the ED triage policy might be a source of confusion, especially, for novice triage nurse.

The non-MOH hospital documents include sections that do not appear in the MOH document; for example, the MOH document does not specify a timeframe for each triage category in which the patients must be seen by an ED physician, yet this is a critical factor in the other systems. Leaving the timeframe unspecified is risky and could result in varying waiting times for patients with similar health problems, depending on ED workload or triage nurses' judgments. In contrast, the

non-MOH hospitals' (A, B and C) policies recommended five-level urgency scales. In two hospitals (A and B), the Canadian Triage and Acuity Scale (CTAS) was adopted. The timeframes specified in the CTAS remained unchanged. However, the effectiveness of the CTAS in these hospitals is not known because there is no formal protocol for reporting to management or to the government. In hospital C, the ED uses a different five-level triage scale.

Hospital C's policy and procedure differed from that of hospitals A and B; for example, the categories from one to three included a description and timeframe for each category, but in category four (non-urgent), timeframe was not specified. In addition category five in hospital C is described as 'family medicine', and patients assessed into this category can be triaged away from the ED and directed to the family medicine clinics. Non-MOH hospitals are staffed by expatriates from Western countries who may have some familiarity with five-level triage scales. Therefore, adopting a Western triage scale cannot be generalised into MOH hospitals due to the differences in the hospital systems and staff backgrounds.

In ministry hospitals there appears to be a lack of awareness that a ministry policy exists upon which they can base their own triage practice. Interestingly, the MOH policy and procedure document includes materials and equipments such as oxygen, airway, ECG machine, urinary catheter and suction machine. This statement appears out of place as such equipment is usual in any ED, although possibly the inclusion of this equipment may only be for the triage nurse. If this is the case, then there are other pieces of equipment more critical to the role such as equipment to measure blood pressure and blood glucose, which are not mentioned. Information concerning how this equipment is to be used and by whom is absent. This, in turn, causes further confusion about the role and responsibilities of the triage nurse.

A significant difference between the document analysis and the reliability of the Australasian Triage System (ATS) is activities that a triage nurse should perform. The MOH triage policy and procedure document suggests that after allocating an urgency code, the triage nurse should stabilise the patient and initiate fluid replacement. The triage nurse then is required to conduct a head-to-toe assessment, diagnostic and laboratory testing and ECG monitoring. The whole purpose of an ED is to diagnose and stabilise patients and send them to the

appropriate treatment area within the hospital. However, the meaning of ‘stabilise the patient’ is not clear and may be interpreted differently. All these activities suggest that the triage nurse role, according to the policy and procedure, is not limited to setting priorities and providing first aid but also includes other activities that triage nurses usually do. In the ATS, the function of the triage nurse is limited to assigning a category, basic first aid, referral, and transfer to the appropriate section within the ED (Australasian College for Emergency Medicine, 2005). However, it can be argued that the MOH policy engages the triage nurse in care that prolongs the triage time and may delay triage of another patient who may need urgent evaluation and treatment. This, in turn, may increase patient dissatisfaction and causes some patients to leave before being seen by a triage nurse or a physician (McMahon, 2003).

In contrast, the equipment and materials that are recommended in hospital B’s policy and procedure are required only to perform triage in accordance with the hospital policy. These materials included the CTAS (adult and paediatric), obstetrical triage and the triage algorithm. The hospital A and C policy and procedure documents did not recommend any materials or equipment for the triage area.

The time to triage ED patients is also varied. The MOH and hospital A documents did not specify a time in which an ED patient should be seen by a triage nurse. This may be risky as patients may wait for a long time to be triaged, which could affect patient safety and treatment options. In contrast, hospital B policy required that all patients must be triaged, at least visually, within 10 minutes of arrival in the ED. Whereas a timeframe for re-triaging patients in waiting areas is not specified in the MOH or hospital B policies, hospital A policy required that patients in category two be reassessed every 15 minutes; category three, every 1 hour; and categories four and five, every 2 hours. Hospital C policy required that a physician must re-assess all patients in the waiting area every 15 to 30 minutes. This reassessment appears to be excessive for a triage nurse, especially if category three patients should be seen by a doctor within 30 minutes. The documents are not clear if it is the triage nurse or the primary nurse who is responsible for this reassessment.

In regard to the clinician responsible for performing triage, the MOH and hospital A policy documents recommend that triage is conducted by a registered nurse, policies consistent with the international direction of ED triage (Australasian

College for Emergency Medicine, 2006; Beveridge et al., 1998; Göransson, Ehrenberg & Ehnfors, 2005; Göransson, Ehrenberg, Marklund, et al., 2005; Le Vasseur et al., 2001). Research has clearly demonstrated that nurses are able to make reliable and valid triage decisions (Bergeron et al., 2002; Vance & Sprivulis, 2005). In addition, a study conducted in one Saudi Arabian ED did not find any significant difference in the inter-rater agreement level in triage ratings between nurses and physicians (Aljohani, 2006).

However, the triage policies in hospitals B and C recommend that triage is undertaken by a registered nurse and/or a physician. Assigning a physician to this role changes the triage dynamic. In hospitals B and C, the inclusion of a physician can be explained by the fact that eligibility for treatment is taken into consideration in these hospitals when performing triage. A patient with a non-urgent condition and not working in the organisation would not be eligible for treatment and can be triaged away from the ED. According to ED policy in hospitals B and C, the decision to triage a patient away from the ED must be made by a physician; therefore, a physician must be available all the time to make such decisions. However, this problem may be managed by establishing clinic areas within the ED to deal with non-urgent problems.

Another noteworthy finding is the variation in the qualifications or experience required of triage clinicians. The MOH's policy and procedure did not indicate any qualifications or experience required for the triage nurses can to make a safe and efficient triage decision. In the non-MOH hospitals (hospitals B and C), the triage policy required that the triage nurse have 1 to 3 years of ED work experience prior to taking on a triage role. In hospitals A and B, the nurse should pass a competency test before performing triage. However, it is not stated whether these competencies were based on international standards or local standards. In Western countries, triage is considered a senior position within the department (Almeida, 2004; Hohenhaus, Travers & Mecham, 2008).

Although many triage studies failed to find a significant relationship between triage decisions and triage clinicians' qualifications and experiences (Aljohani, 2006; Considine et al., 2001; Jelinek & Little, 1996), the importance of qualifications and experience of the person responsible for triage cannot be overlooked. The

Australasian College for Emergency Medicine (2006) recommended that triage is undertaken by a trained and experienced registered nurse, with experience typically expressed in the form of years that a person has spent in a certain area of care (Considine et al., 2007). However, no agreement exists on the minimum experience level that is needed to perform a safe and efficient triage; studies have found that recommended experience varies from 3 months to more than 2 years (Kelly and Richardson, 2001; Ritchie et al., 2002).

Education of triage nurses has been seen as a critical element in accurately triaging patients within any triage system (Fernandes, Tanabe, Bonalumi, et al., 2005). In addition, researchers have advocated that the triage nurse must have adequate education and training before commencing the triage role (McNair, 2005), although *adequate* is not defined. In relation to triage education preparation, the MOH policy and procedure document did not indicate any required educational preparation prior to performing triage. Consequently, triage nurses may receive inappropriate education or may not get any educational preparation at all before performing triage, which could affect the quality of triage decisions. In contrast, the hospital B policy and procedure pointed out that the triage nurse should have special knowledge and training before performing triage, though this knowledge and training was not specified or validated. Triage policy and procedure in hospitals A and C did not indicate triage education preparation for the triage nurses; however, hospital A does have a competency standard attached to the policy and procedure document, requiring a specific triage education in order to perform triage.

It may be argued that triage education is an individual decision for each hospital, and therefore it is not important to mention triage education preparation in the triage policy and procedure. This argument is flawed for two main reasons. First, the rapid, accurate assessment of a patient requires a certain level of skill and knowledge (Considine et al., 2007; Ritchie et al., 2002); therefore, developing consistent triage education preparation minimum standards and competencies is important. These standards can then be measured, reported, and compared against patient outcomes. Second, having a standardised system, including education, provides the patients presenting with consistent care regardless of the individual triage clinician. Without an appropriate education in triage, clinicians cannot be confident in and capable of making safe and/or appropriate triage decisions.

In regard to triage documentation, the MOH's policy and procedure suggests documenting all the procedures done to the patients from triage time to handover. This can be time-consuming because writing everything is not always feasible. For example, if an ED is crowded and many cases have reported with urgent conditions, triage nurses will not be able to find the time to document everything performed on the patients. Therefore, it might be more practical to suggest minimum documentation standards, as is the case with hospital B policy and procedure or the use of a designated form like in hospital C. In Western hospitals, triage is primarily computer-based and because triage is a limited role, the time required for documentation is minor (Aronsky et al., 2008).

The MOH's triage policy and procedure document has no date of issue, date of revision, evidence, or references. This same document was presented in a MOH policy and procedure manual distributed in 2003 (Qureshi, 2010); however, the date of development of the triage policy was not stated. Therefore, it is difficult to know when the policy was constructed or on what evidence it was developed. The policy and procedure documents from hospitals A, B and C included dates of issue and revision, showing that the policies were 3 to 5 years old. The CTAS guidelines were used as a reference for the policy and procedure in hospitals A and B. It is critical that the policy, procedure and education be aligned with current evidence; therefore such documents and policies should be revised on at least a triennial basis (Monash University, 2003).

6.6.2 Triage Education and Training

The MOH hospitals represent 57 per cent of the total hospitals in Saudi Arabia. The search for triage education materials in the public hospitals (MOH hospitals) in Saudi Arabia resulted in no documents being available for analysis. The majority of public EDs in Saudi Arabia do not have formal triage (Aljohani, 2006; Qureshi, 2010). Therefore, it is unlikely that research would turn up any special triage education programmes that prepare triage clinicians to undertake the triage role. In addition, the triage policy and procedure that was constructed by the MOH did not necessitate any education or training requirements for the triage clinicians prior to taking on the triage role.

Only two triage education programmes were available for analysis in this study. The teaching materials in these programmes were adopted from the CTAS; therefore, it is reasonable to assume that these programmes had an adequate level of reliability and validity. However, this statement is tempered by the fact that there has been no research in the KSA to establish that using these materials in this country is appropriate.

The education programmes in both hospitals provided reading materials for triage nurses. The reading materials included theoretical and practical information pertaining to triage such as definition of triage, purpose of triage, description of the triage scale (CTAS), explanation of the triage process, documentation standards and paediatric and mental patient considerations. Case scenarios were used to provide working examples for learning purposes. The types of information provided in these programmes were similar to those in the *Triage Education Resource Book* and the Emergency Triage Education Kit (Gerdtz et al., 2002; Gerdtz, Considine, et al., 2007). However, cultural and religious issues were not addressed.

The triage education programme in hospital A appeared to be more comprehensive than that in hospital B. It used different teaching methods and provided more triage case scenarios to help triage nurses develop critical thinking skills. However, it cannot be asserted that the hospital B triage programme was limited to the self-directed module. Since hospitals A and B were using the CTAS, both hospitals used the triage education materials that accompany the CTAS.

It seems that the mode of teaching in hospitals A and B was fixed to self-directed learning, lectures and workshops. Self-directed learning has a significant limitation because it is dependent on the commitment of the staff member involved. If there is no testing and no theoretical or competency basis for the self-directed programme, then the adequacy of the education is questionable. The mode of teaching is an important element that contributes to the success or failure of any education programme. An education programme for triage nurses should be flexible so it can suit each person's and each department's needs. McNally (2006) stated that:

It is recommended that the completion of triage education should not be done as a matter of course for every nurse at the same stage of experience since nurses will access triage education with differing motivations. It is for this

reason that triage education needs to be multi-faceted, with flexible modes of study. (p. 308)

6.7 Conclusion

The aim of this study was to explore the current policy, procedures, and education programmes that support the implementation of ED triage in the MOH EDs in Saudi Arabia. The study included documents from public hospitals (operated by the Ministry of Health) and other hospitals operated by other governmental organisations.

The findings revealed that triage practice in the public EDs in Saudi Arabia is not well supported. As far as can be ascertained, the public EDs (operated by MOH) do not have formal triage education programmes to support triage implementation. In relation to the policy and procedures, the MOH recommended a three-level triage scale. Although the reliability and validity of this scale was not reported, using a three-level triage system is not supported or recommended internationally. In fact, many countries such as the USA have realised the weakness of the three-level triage system and subsequently have moved to replace it with a valid and reliable five-level triage system (American College of Emergency Physicians, 2003; McMahon, 2003). In addition, the study found that no standardised triage scale is used in Saudi EDs. All the reviewed non-MOH EDs were utilising five-level triage scales, while the MOH EDs were using a 3-level triage scale. These discrepancies highlight an issue of patient safety because the priority for care depends on which ED the patient attends.

Chapter 7: Study Three: Development of a Triage System

7.1 Introduction

A theoretical premise of this research has been that the practice of implementing a system from one culture to another should only occur when there has been due consideration of the impact of the differences between the cultures. Saudi Arabia is a relatively new nation; only 78 years old, its rapid modernisation and development have resulted in the implementation of some systems prior to consideration of their social and economic impacts. In Saudi Arabia the practice in health care is to adopt Western practices, usually with little consideration for utility within the culture and health system. Triage is typical of such decisions.

The health system in the KSA has matured to a point where many of the current systems can be re-examined for utility within the context of the Saudi health system and altered to benefit patient care. This central component of the research uses validated triage systems and a panel of Saudi emergency experts to deconstruct Western systems (ATS, CTAS and MTS) and then reconstruct the findings into a new Saudi system.

It could be argued that triage has not been appropriately implemented due to its apparent complexity and the skills required to fulfil the triage role. It is apparent from the previous chapters that there has been a fundamental misunderstanding of the triage role. That is, in Western health care, triage sorts, categorises and transfers patients after primary first aid is provided; in comparison, in the KSA the triage position requires a significant amount of primary care, usually the responsibility of the primary nurse/ physician.

This chapter describes the development of a triage scale and descriptors suitable for MOH hospitals in the KSA and is divided into three sections. The first section provides a discussion of the method, Delphi. It also discusses the selection of the expert panel, panel size, data collection process and data analysis. The second section presents the findings from this study, and the third section provides discussion for the findings in this section of the research.

7.1.1 Purpose

The aim of Study 3 is to develop a Saudi Arabian emergency department triage system.

7.1.2 Research Questions

This study aims to answer the following main question: What are the elements of a triage system that can be implemented in Saudi Arabian emergency departments?

The main question was deconstructed into six sub-questions:

1. How many urgency categories should the Saudi triage include?
2. What is the description of each urgency category?
3. What is the time ‘to treat’ for each urgency category?
4. What are the clinical indicators for each triage category?
5. What barriers might influence the implementation of a triage system in Saudi Arabia?
6. What religious and/or cultural issues need to be considered when implementing a triage system in Saudi Arabia?

7.2 Method

The Delphi method is a method of consensus (Hsu & Sandford, 2007), usually of experts in a particular field—in this case triage. The premise behind Delphi is that by gathering together a group of experts, their combined knowledge and experience is able to inform the research question. In this component of the research, emergency physicians and nurses were deemed appropriate. A more detailed discussion of the method will follow.

7.2.1 Theoretical Underpinning of the Delphi Method

The Delphi method is a ‘systematic solicitation and collation of judgments on a particular topic through a set of carefully designed sequential questionnaires

interspersed with summarized information and feedback of opinions derived from earlier responses' (Delbecq, Van de Ven & Gustafson, 1975, p. 10).

The Delphi technique was originally developed by the RAND Corporation in the USA in the 1950s in an attempt to study future information to seek social and technological predictions using a systematic method (Dalkey & Helmer, 1963; Windle, 2004). Gradually, the technique was developed and used in mainstream research (Williams & Webb, 1994). The Delphi technique is a way of determining the extent to which consensus exists among a group of people who are experts in a particular area or issue. This can be completed through a series of questionnaires or rounds (Meuleners, Lee, Zhao & Intrapanya, 2004).

According to Linstone and Turoff (1975), Delphi can be classified into three types: conventional, real-time and policy. In conventional Delphi, the study team constructs the first questionnaire, which then can be sent to a large respondent group. The returned questionnaires are analysed, and based on that, the team develops the second questionnaire and send it to the respondents. The respondents are usually given the opportunity to re-evaluate their original answers in light of the group's answers. Real-time differs from conventional in that it is not a long process but can be conducted through a meeting or conference. Policy Delphi works towards discovering the strongest argument for and against various determinations for a specific policy issue. This type of Delphi does not produce a consensus (Stitt-Gohdes & Crews, 2004). This study utilised conventional Delphi.

7.2.2 Advantages and Disadvantages of the Delphi Method

According to Linstone and Turoff (1975) the main advantage of the Delphi method is the achievement of consensus in a given area of uncertainty or lack of imperial evidence, which is the case in Saudi Arabia concerning triage. In addition, it was noted that this method reduces group conflict or group domination by one member. Additionally, the authors indicated that this method facilitates opinion honesty and reduces peer pressure (Keeney, Hasson & McKenna, 2001; Stitt-Gohdes & Crews, 2004). This technique does not require a face-to-face meeting between participants; therefore, it is useful to conduct surveys with qualified individuals over a wide geographic area. Further, the Delphi method has been described as relatively inexpensive and quick (Bowles, 1999; Powell, 2002; Ruth, 1996; Williamson, 2002).

It is relatively low cost because it does not involve travel costs as it is usually conducted via regular mail or email (Williamson, 2002).

However, the cost is not always low as it relates to the scale of the survey, the complexities involved in the processing of the questionnaires and the number of rounds (Jairath & Weinstein, 1994; Williams & Webb, 1994). In the current study, for example, to adequately conduct the Delphi method travel to different cities and hospitals to distribute and collect the questionnaires was required. Thus, much time and resources were expended during this study.

Further, Williamson (2002) argued that the Delphi method is time consuming and requires high commitment from the participants. Moreover, bias by the researcher in the interpretation of the findings can be an issue (Williams & Webb, 1994). The participants' commitment was a main concern in this study. Therefore, the expert panel members were carefully selected based on their interest in emergency department triage in order to increase the commitment level and decrease withdrawal during the study. Another disadvantage of the Delphi method is that agreement on the definition of 'expert' as well as the size of the panel does not exist (Keeney et al., 2001; Ruth, 1996).

7.2.3 Application of the Delphi Method to the Study

The Delphi method has been widely used in research in different areas with different degrees of success. It has been used as a way to forecast trends in education, technology and other fields (Stitt-Gohdes & Crews, 2004). Within health research, the Delphi method has been used in different areas, including surveys of clinical research guidelines (Bond & Bond, 1982), defining nursing workload (Procter & Hunt, 1994), developing course curriculum (Alahlahi & Burge, 2005), exploring the changing role of emergency departments (Meuleners et al., 2004), identifying review criteria for quality improvement (Hearnshaw, Harker, Cheater, Baker & Grimshaw, 2001) and designing a self-reporting triage survey tool (Fry & Burr, 2001).

Linstone and Turoff (1975) have suggested the following criteria that help to determine the appropriateness of using the Delphi method:

- When the problem does not lend itself to precise analytical techniques but can benefit from subjective judgments on a collective basis.

- When the individuals who need to contribute to the examination represent diverse backgrounds with respect to experience or expertise.
- When more individuals are needed than can effectively interact in a face-to-face exchange.
- When the time and cost make group meetings unfeasible.
- When disagreements are so severe or politically unpleasant that the communication process must be refereed and/or anonymity assured.
- When the heterogeneity of the participants must be preserved to assure validity of the results and to avoid domination by the strength of certain personalities.
- When a supplemental group communication process can help the efficiency of face-to-face meetings. (p. 59)

The aim of this study meets all the above criteria with the exception of the one referring to severe disagreements or politically unpleasant situations, which is not relevant to the subject under study in Saudi Arabia. Given that all the remaining criteria were met and because of the need to have consensus on an emergency department triage system that can be used in Saudi Arabia, a modified Delphi method were used in this study.

Modification to the classical Delphi method is common (Alahlafi & Burge, 2005; Baker, Lovell, Harris & Campbell, 2007; Fry & Burr, 2001; Lee, 2007; Lindahl, Barrett, Peterson, Zheng & Nedrow, 2005). Modification usually comes in the form of providing pre-existing information to the participants in the first questionnaire for ranking or response instead of asking open-ended questions.

7.2.4 Study Design

This study is a two-stage modified Delphi. It aims to generate consensus amongst a panel of 31 public MOH emergency department nurses and physicians in Saudi Arabia.

Achieving consensus has been interpreted by different methods. Setting a percentage for inclusion of an item is common. Some studies have sought

100 per cent agreement for items to be accepted (Crews & Ray, 1998; Williams & Webb, 1994). In comparison, other Delphi studies have set consensus as low as 55 per cent (Orton, 1976 as cited in Williams & Webb, 1994). In addition, questionnaires with Likert-type scale central tendency (mean, median and mode) and level of distribution (standard deviation) have been used to decide when consensus is achieved (Hasson, Keeney & McKenna, 2000; Hsu & Sandford, 2007). Hsu and Sandford (2007) stated that 'the use of median score, based on Likert-type scale, is strongly favoured' (p. 4).

In this study, cut-off values to achieve consensus were set in advance. Consensus was achieved if at least 75 per cent of the modified Delphi expert panel's rating was 4 or higher on a 5-point Likert scale (1 strongly disagree and 5 strongly agree), and the median had to be 4 or higher. The level of consensus selected in this study is consistent with other studies (Alahlafi & Burge, 2005; Meijer, Ihnenfeldt, Vermeulen, De Haan & Van Limbeek, 2003) and slightly higher than others (Grant & Kinney, 1992; Lindahl et al., 2005) in which consensus was set at 70 per cent. The researcher assumed that 75 per cent consensus was enough, based on previous studies, and achievable within a reasonable timeframe (12 weeks). Since the first round questionnaires in each stage included pre-existing reliable and valid information from the review of literature, slight disagreements were deemed acceptable.

To further clarify, consensus was not set at 100 per cent for the following reasons:

- The nature of the collected data is clinically based; therefore the perception of urgency (in a triage context) might vary considerably due to the participants' professional backgrounds and the characteristics of ED (old or new, small or large).
- A formal triage system is not common in the study settings; therefore disagreement is expected.

7.2.5 Panel Selection

The effective selection of panel members maximises the quality and utility of responses and enhances the credibility of the study results. Streveler, Olds, Miller, and Nelson, (2003) suggested that:

Proponents of the Delphi method recognize human judgment as a legitimate and useful input in generating forecasts and therefore believe that the use of experts, carefully selected, can lead to reliable and valid results. (p. 2)

Although there is no agreement on the definition of *expert* in the literature, many researchers have defined expert as the person who possesses the necessary knowledge and experience in a particular area or issue (Clayton, 1997; Hasson et al., 2000; Meuleners et al., 2004). There are no specific criteria for selecting panel members (Hsu & Sandford, 2007). However, Ruth (1996) suggested that selection criteria should be clearly articulated prior to commencing a Delphi study. In this study, experts were selected based on their emergency clinical experience. As the nature of this study is clinically based (triage), participants in this study are considered experts if they possess 5 or more years of clinical emergency work experience.

The participants were selected purposively. Emergency department clinicians including nurses and physicians working in public EDs were invited to form the expert panel (Appendix I). The participants were recruited from two administrative regions in Saudi Arabia and were selected based on professional background, work experience and recommendation by other panellists. Participants had to satisfy all of the following selection criteria to be included in the panel: Participants had to be an emergency nurse or physician; they had to have 5 or more years of work experience in a Saudi Arabian ED and still be working; and they had to currently perform a clinical role.

Selecting ED nurses and physicians to participate in this study is appropriate based on the shared responsibility of prioritising ED patient care in Saudi Arabia, in the absence of a formal triage system. Keeney et al. (2001) stated that participants 'willing to engage in discussion are more likely to be affected directly by the outcome of the process and are also more likely to become and stay involved in the

Delphi' (p. 196). Further, according to Goodman (1987), recruiting participants who have knowledge and an interest in the study topic may help to increase the content validity of the Delphi.

7.2.5.1 Recruitment

The experts were nurses and physicians working in different public MOH EDs from two health regions (Makkah and Almadinah), which cover 32 per cent of the total Saudi population and 17 per cent of MOH hospitals. The potential participants were either nominated by other participants or self-selected. Letters of invitation were sent to potential participants. Each invitee was invited to participate and asked to nominate other potential participants with expertise in ED. Contact was made by sending invitation letters via individual e-mails, by delivering invitations personally by the researcher, or through other nominators. Non-public hospitals that had adopted Western triage systems were not included in this study to avoid any possible bias to the results of the study. Clinicians in hospitals that have adopted the CTAS, for example, may select the CTAS without critical thinking.

7.2.6 Panel Size

Panel size is a critical element in a successful Delphi method; therefore, it is important to have an adequate number. A panel that is too small may not provide reliable results, but a panel that is too large makes it difficult to handle the large dataset generated. Panel size is variable; the literature shows the size of expert panels ranging from 10 to 1,685 (Powell, 2002). According to Delbecq et al. (1975), panel size varies according to the scope of the problem and the availability of resources. Researchers have suggested that panel size could be between 10 and 50, and a reliability correlation coefficient reaching 0.9 was found with a group of 13 (Delbecq et al, 1975). According to Stitt-Gohdes and Crews (2004), 10 to 15 may be enough if the experts are selected from a heterogeneous population. In contrast, if the participants are coming from a homogeneous population 15 to 30 is considered adequate for the study (Clayton, 1997). Research has found that reliability and validity of the Delphi method does not improve significantly with more than 30 participants. Dalkey and Helmer (1963) claimed that reliability increases as the panel gets larger; however, this increase is slight once it reaches 30 participants. In this study, the researcher recruited 31 participants from a heterogeneous population: ED

nurses and physicians. The panel size of 31 used in this study fits within the recommended guidelines for the modified Delphi method.

7.2.7 Data Collection Process

In this study, the modified Delphi method consisted of two stages (Figure 7.1).

Stage One: A two-round modified Delphi method. This stage aimed to identify the triage acuity scale. The panellists were asked to identify the number of urgency categories and to assign a description and response time to each category (time interval to see a physician).

Stage Two: A three-round modified Delphi method. This stage aimed to identify the clinical descriptors (usual presentations) for each of the triage categories determined in the first stage.

The Delphi method was conducted electronically via email; however, participants reported problems with inconsistent access to the Internet. To avoid any delay due to the mode of distributing and collecting the questionnaires, the researcher decided to distribute and collect the questionnaires personally from the panel members who did not have consistent access to the Internet. The researcher was aware of the potential bias stemming from personal distribution of the questionnaires. Therefore, communication with the panel members was kept to a minimum. No discussion regarding the study took place between the researcher and the panel members.

The first round questionnaire along with the explanatory statement for the participants was sent to each potential participant. In addition, the participants were provided with a seven-page briefing paper prior to the beginning of the first round (see Appendix J). The briefing paper included a brief literature review; the aim of this paper was to have each participant conversant with current literature on triage scales. A summary of the briefing paper was also included in both English and Arabic.

7.2.8 Instrument Design and Implementation

This study was divided into two stages. The first stage consisted of two rounds, while the second stage consisted of three rounds.

7.2.8.1 Stage one—Round I

The instrument for Round I (see Appendix K) was developed from information found during a review of the triage literature. An extensive literature review revealed that there are four well-recognised and reliable triage systems (scales): the ATS, the CTAS, the MTS and the ESI. The ESI differs from the other scales as it does not specify response times for each triage category. The description and response times of the ATS, CTAS and MTS were included as information in the first round questionnaire.

In Round I, the expert panel was asked to either select from the pre-existing information or to suggest new statements. In each triage category, multiple descriptions and responses were offered. The panel members could select only one description and response time or write a new one.

Participants were requested to complete the questionnaire within 10 days. A mobile phone reminder message was sent to the participants after 5 days. After the completion of the first questionnaire, data were analysed. Then, all the new statements from Round I were added to the instrument for Round II and sent to the expert panel.

7.2.8.2 Stage one—Round II

The Round II questionnaire (see Appendix L) included a selection of the statements from Round I. In this round, the expert panel was asked to rate each statement using a 5-point Likert scale, where 1 was strongly disagree and 5 was strongly agree. The description and timeframe for each triage category included more than one choice; therefore, all statements were rated. For example, in triage category one, the descriptions of this category included 1) immediately life-threatening, 2) resuscitation and 3) immediate with red colour; the panel members were requested to rate each statement with the rating that best reflected their own preferences. The panel members were reminded of their answers in the previous round and then were instructed to keep their answer or change it if they preferred to do so. The target consensus level was reached in this round, and no further rounds were required.

7.2.8.3 Stage two—Round I

The aim of this stage was to identify the clinical descriptors for each category of the new triage scale that were determined in stage one. This stage also sought to identify the potential barriers to implementing a triage system in Saudi Arabia as well as the impact of religion and culture in the implementation of a triage system.

The questionnaire for Round I (Appendix M) was developed from information found in the review of literature. Related clinical descriptors from the ATS and CTAS were included as exemplars in the Round I questionnaire. The expert panel was asked to accept, reject, modify, or shift to a different triage category each clinical descriptor. The aim of this questionnaire was not just to comment on the pre-existing information, but also to encourage the expert panel to add more descriptors. At the end of the questionnaire, the panel members were asked to respond to the following open-ended questions:

1. In your opinion, what could be the barriers to a successful implementation of a formal triage system in public emergency departments in Saudi Arabia?
2. What are the cultural and/or religious aspects that need to be considered in the implementation of the triage system in Saudi Arabia?

After completion of Round I, an analysis of the descriptors was conducted. Subsequently, the Round II questionnaire was designed by compiling all the clinical descriptors that did not receive 75 per cent consensus in Round I, the descriptors that were modified in Round I and the newly added descriptors. The Round II questionnaire was then sent to the expert panel.

7.2.8.4 Stage two—Round II

The Round II questionnaire (Appendix N) consisted of the statements modified by members of the expert panel in Round I. This round also consisted of all statements that obtained less than 75 per cent consensus as well as the newly added descriptors. The expert panel was requested to accept or reject modifications, re-evaluate their answer and accept, reject, modify, or shift the new clinical descriptors. A rejection of a suggested modification meant that the original clinical descriptor remained unchanged. All statements generated from Round I and Round II

were included in the Round III questionnaire that was sent to the expert panel for rating and ranking.

7.2.8.5 Stage two—Round III

Round III questionnaires (Appendix O) included all the statements that were accepted, modified, shifted, or newly added during Rounds I and II. The clinical descriptors were presented in random order. Expert panellists were asked to rate all the clinical descriptors using a 5-point Likert Scale, with 1 being strongly disagree and 5 being strongly agree. In addition, the panel members were asked to rank the importance of potential barriers to implementation and the religious and cultural issues on a Likert scale of 1 to 5, with 1 being not at all important and 5 being very important. The targeted consensus was achieved in this round.

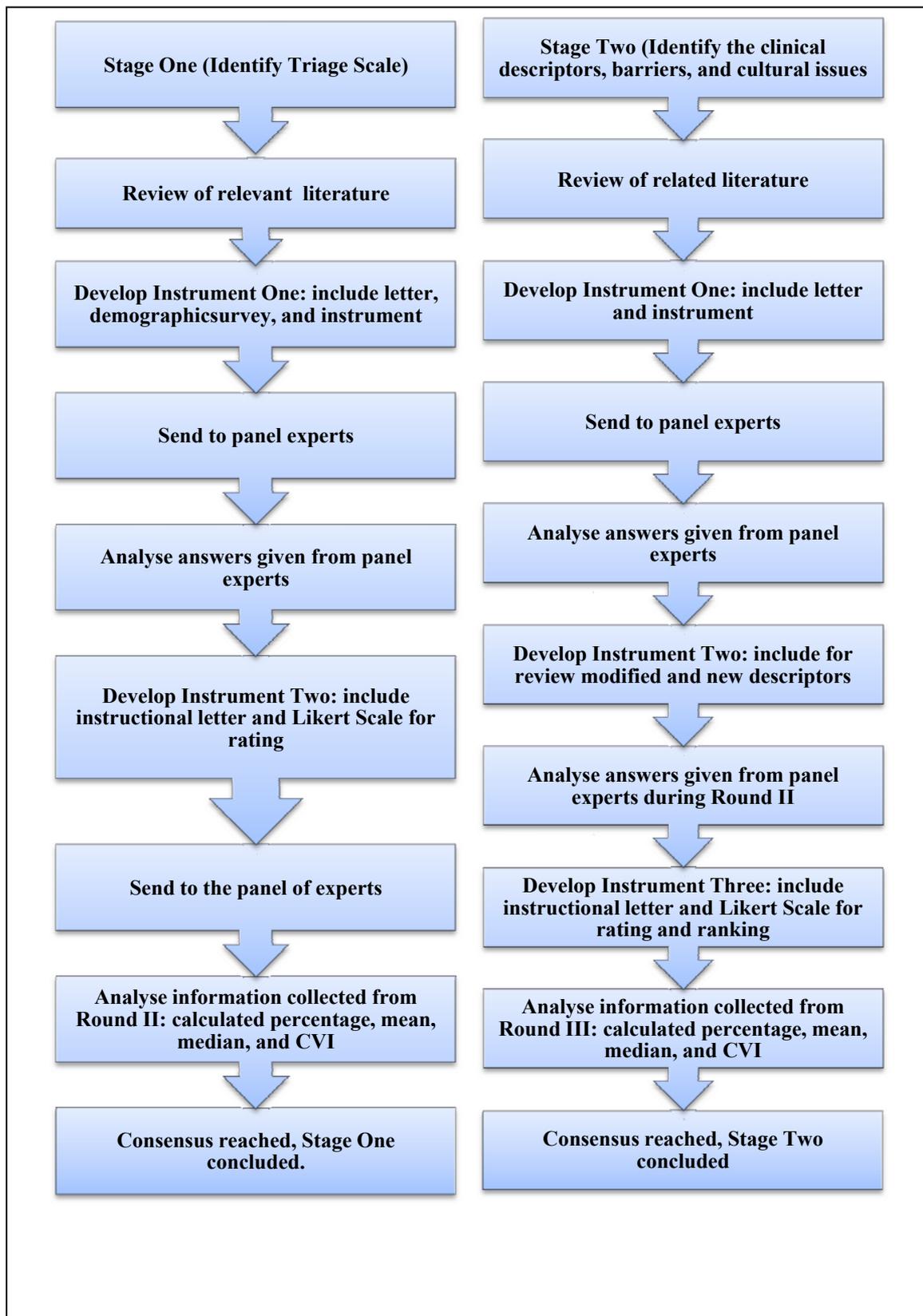


Figure 7.1. Data collection and data analysis process.

7.2.9 Analysis Technique

The method of data analysis in Delphi studies varies according to the study purpose, the structure of the round, the type of questions and the number of participants (Powell, 2002). In the classical Delphi method, the first round usually is qualitative, and content analysis is utilised to identify the major themes. Second and subsequent rounds are usually quantitative in nature; therefore the generated data are analysed using rating or ranking techniques (Jairath & Weinstein, 1994; Powell, 2002).

The raw data obtained from the questionnaires in each round were entered into Statistical Package for Social Science software (SPSS, version 15) for analysis. This study utilised pre-existing information in the Round I questionnaire. The analysis in the first and subsequent rounds employed both qualitative and quantitative techniques. Qualitative analysis included content analysis. The quantitative analysis included descriptive analysis (percentage, mean and median). In this study percentage, mean and median were used to judge whether consensus was reached. When at least 75 per cent of the expert panel's ratings were 4 or higher on a 5-point Likert scale and the median was 4 or higher, then consensus was achieved.

7.2.9.1 Stage one analysis

Data analysis for the first stage questionnaires was conducted at the completion of each round. This was done to use the generated information to construct the subsequent questionnaire and to examine the consensus level. Once the predefined consensus level was achieved, the first stage was completed.

The first questionnaire's data analysis included descriptive analysis (frequency distribution) to explore the participants' demographic characteristics. In addition, it included a percentage for each item from the list provided as well as the newly added statements. Selection percentages for each item were provided to the panel members in the second questionnaire. Panellists were asked to rate all the items in each urgency level. Items that achieved 100 per cent consensus ($n = 2$) in the first round were not included for rating; however, these items were reported to the panellists, and they were asked to comment. Round II data analysis included calculating percentage, mean and median.

7.2.9.2 Stage two analysis

A descriptive analysis (frequency) was employed in stage two—Round I. the percentage of each item was calculated. In addition, in this round qualitative content analysis was performed for the panel members' responses to the open-ended questions. The panel members' statements were reviewed many times and allocated into groups. The statements in each group were reworded to create one statement.

In Round II, the analysis included using frequency distribution (percentage) for each item. In the final round (Round III), descriptive analysis was conducted. This included calculating the percentage, mean and median for each item.

7.2.10 Validity and Reliability

Validity and reliability are important in instrument development in any research study. *Validity* refers to the extent to which an instrument measures what it was designed to measure, whereas *reliability* refers to the extent to which the instrument produces the same results on repeated measures (Schneider et al., 2003).

In regard to validity, Hasson et al. (2000) stated that 'The Delphi is based upon the assumption of safety in numbers (i.e. several people are less likely to arrive at a wrong decision than a single individual)' (p. 1013). It can be argued that using an expert increases the content validity of the Delphi, whereas the use of successive rounds of questionnaires helps to increase the concurrent validity (Goodman, 1987; Hasson et al., 2000). In addition, Ruth (1996) claimed that high face validity and high concurrent validity are achieved when consensus is achieved. Therefore, validity was enhanced in this study by ensuring that only people considered experts in the topic were selected for participation. Additionally, consensus was achieved in both stages, which increased the face and concurrent validity of the study.

In regard to reliability, the Delphi method has been criticised as lacking evidence of reliability; in other words, would the same result be attained if the same information were given to another expert panel? However, Creswell (2003) suggested that reporting the researcher's position, the selection of the participants, and the central assumptions increase the odds of being able to replicate the study in another setting. To enhance reliability in the study, the assumptions, instrument

constructions, selections and implementation processes were documented, as suggested by Creswell (2003).

7.3 Results

7.3.1 Introduction

The purpose of Study 3 was to develop a Saudi Arabian emergency department triage system and to identify the potential barriers to successful implementation of such a system. To achieve this, a two-stage modified Delphi method was used. The first stage encompassed two rounds, while the second stage included three rounds. The following section will communicate the findings in this component.

7.3.2 Characteristics of the Panel Members

The expert panel consisted of 31 members from two administrative regions in Saudi Arabia: Makkah and Almadinah. As shown in Table 7.1, the expert panel consisted of 61.3 per cent nurses and 38.7 per cent physicians. The majority of the panel members (64.5 per cent) had 5 to 10 years of work experience, and only 16.1 per cent of the participants had more than 20 years of work experience.

Work experience in emergency departments among the panel members was as follows: 80.6 per cent had worked in an ED for 5 to 10 years, 12.9 per cent had worked in an ED for 11 to 15 years and 6.0 per cent had worked for more than 15 years in EDs (Table 7.1).

In regard to qualifications, the participants' responses showed that 83 per cent of the physicians had a bachelor's degree in medicine while only 17 per cent of the physicians had a Master's degree in medicine. Among the nurses, more than half (58 per cent) of the panel members had a nursing diploma from a health institute, 10 per cent had an associate university degree and 32 per cent held bachelor's degrees (Table 7.1).

Table 7.1

Summary of Demographic Characteristics of the Expert Panel

<i>(N = 31)</i>	Number	Percentage
Profession		
Physicians	12	38.7
Nurses	19	61.3
Work experience		
5–10 years	20	64.5
11–20 years	6	19.4
More than 20 years	5	16.1
ED work experience		
5–10 years	25	80.6
11–15 years	4	12.9
More than 15 years	2	6.5
Qualification		
Physicians		
Bachelor of Medicine and Surgery	10	83.0
Master of Medicine	2	17.0
Nurses		
Health Institute Diploma	11	58.0
Associate University Degree	2	10.0
Bachelor Degree	6	32.0

7.3.3 Stage One

The aim of this stage was to identify the triage urgency category numbers, a description of the categories and response times for each triage category. As shown in Table 7.2, the response rate in stage one was 100 per cent for both rounds.

Table 7.2

Response Rate for Stage One (Two Rounds)

Stage 1	Questionnaire sent	Response rate (%)
Round I	31	100
Round II	31	100

7.3.3.1 Round I

Round I began with development of a questionnaire (see Appendix K) that included pre-existing information from the literature. The panel members were provided with a briefing paper (Appendix J). The questionnaire in Round I started with a question about whether the expert panel member agreed with the use of a five-level triage scale; if not, the panellist was asked to provide an explanation of why they thought that a five-level scale should not be used. All the panel members (N = 31) agreed with the use of a five-level urgency scale.

In this round, the panel members were asked to provide descriptions for each triage category. The panel members could select from the provided description list or write new ones. The majority of the panel members selected a description from the provided list. Only three members of the panel (9.6 per cent) provided new descriptions for triage category two; no new descriptions were suggested for the remaining categories.

As shown in Table 7.3, more than half of the panel members (58 per cent) suggested that ‘immediately life threatening’ was the best description for the first triage urgency category. Ten of the panel members (32.3 per cent) selected ‘resuscitation’ to describe category one, and 9.7 per cent of the panel members described this category as ‘immediate’ with a red colour code.

In the second triage category, the panel members’ responses were distributed over five descriptions. Less than half of the panel members (41.9 per cent) selected ‘Imminently life-threatening or Important time-critical treatment or very severe pain’ as the best description for category two. Of the remaining respondents, 25.8 per cent selected ‘emergent’, 22.6 per cent selected ‘very urgent’ with an orange colour code,

6.5 per cent suggested 'top urgent' as a new description and one member (3.2 per cent) selected 'very urgent' without a colour code (see Table 7.3).

As shown in Table 7.3, 45.2 per cent of the panel members selected 'Potentially life-threatening or situational urgency or humane practice mandates the relief of severe discomfort or distress within 30 minutes' as a description for the third triage category. The remaining panel members selected 'urgent' (32.3 per cent) and 'urgent' with a yellow colour code (22.5 per cent).

In the fourth triage category, well over half of the panel members (54.8 per cent) selected 'less urgent' to describe the category. Eight panel members (25.8 per cent) selected 'Potentially serious or situational urgency significant complexity or severity humane practice mandates the relief of discomfort or distress within 1 hour', and 19.4 per cent selected 'standard' with a green colour code as the best description for triage category four (Table 7.3).

In regard to the fifth triage category, more than half of the panel members (54.9 per cent) selected 'non-urgent' to describe this triage category. Another 29 per cent of the panel members selected 'less urgent or clinico-administrative problems', and 16.1 per cent selected 'non-urgent' with a blue colour code (Table 7.3).

Table 7.3

Panel Members' Responses for the Description of Triage Categories

Triage category description	31 participants	
	N	%
Category 1		
Immediately life-threatening	18	58.0
Resuscitation	10	32.3
Immediate [Red Colour]	3	9.7
Category 2		
Imminently life-threatening or Important time-critical treatment or Very severe pain	13	41.9
Emergent	8	25.8
Very urgent [Orange]	7	22.6
Other		
Top urgent	2	6.5
Very urgent (without a colour code)	1	3.2
Category 3		
Potentially life-threatening or situational urgency or humane practice mandates the relief of severe discomfort or distress within 30 minutes	14	45.2
Urgent	10	32.3
Urgent [Yellow]	7	22.5

Table 7.3

Panel Members' Responses for the Description of Triage Categories (continued)

Triage category description	31 participants	
	N	%
Category 4		
Potentially serious or situational urgency significant complexity or severity humane practice mandates the relief of discomfort or distress within one hour	8	25.8
Less urgent	17	54.8
Standard [Green]	6	19.4
Category 5		
Less urgent or Clinico-administrative problems	9	29.0
Non-urgent	17	54.9
Non-urgent [Blue]	5	16.1

This round also allowed the panel members to suggest an ideal timeframe for a patient in each triage category to be seen by an ED physician. The panel members were asked to select a suitable time for each triage category, either by choosing from the suggested timeframe list or by recording a new timeframe. The majority of the panel members (96.8 per cent) selected timeframes from the provided list. Only one member (3.2 per cent) suggested a new timeframe for categories three, four and five.

As shown in Table 7.4, the panel member had a consensus of more than 67 per cent on the timeframe for each triage category from the first round. All the panel members (100 per cent) agreed that the time to see an ED physician for triage category one is 'immediate'. For triage category two, 67.7 per cent of the panel members agreed that the time to see a physician is within 10 minutes, while 32.3 per cent of the panel members selected 15 minutes as the appropriate time for category two.

Table 7.4 shows that more than 80 per cent of the panel members selected 30 minutes for category three, 60 minutes for category four and 120 minutes for category five. Only one member (3.2 per cent) suggested new timeframes for

category three (15 minutes), category four (20 minutes) and category five (30 minutes).

Table 7.4

Panel Members' Responses to the Ideal Timeframe for Each Triage Category

Triage categories	31 participants	
	N	%
Category 1		
Immediate	31	100
Other	0	00
Category 2		
10 min	21	67.7
≤15 min	10	32.3
Others	0	00
Category 3		
15 min	1	3.2
30 min	28	90.3
60 min	2	6.5
Category 4		
20 min	1	3.2
60 min	25	80.6
120 min	5	16.1
Category 5		
30 min	1	3.2
120 min	26	83.9
240 min	4	12.9

7.3.3.2 Round II of the modified Delphi method

Analysis of the data from Round I revealed that all the panel members (N = 31) agreed on using a five-level triage scale. In Round II of this study, all the suggested items and the newly added items from Round I were included in a new questionnaire (see Appendix L), except the timeframe for category one (100 per cent

agreement was achieved in Round I). Round II of this study allowed the panel members to rate each item from Round I including the pre-existing and the added ones. The rating process used a 5-point Likert scale. The classification of the scale was as follows: (1) strongly disagree, (2) disagree, (3) neutral, (4) agree and (5) strongly agree. In this study, consensus among the panel members was deemed to be achieved when 75 per cent or more of the panel members selected the same item and the mean and median were 4 or 5.

As shown in Table 7.5, the predefined consensus level was achieved in this round. In triage category one, the majority of the panel members (87.1 per cent) agreed or strongly agreed to describe the triage category one as 'immediately life-threatening'. In triage category two, 80.6 per cent of the panel members described this category as 'Imminently life-threatening or important time-critical treatment or very severe pain'. In addition, more than 80 per cent of the panel members agreed to describe triage category three as 'Urgent'. For triage category four, 93.5 per cent of the panel members agreed to describe this category as 'Less urgent'. The majority of the panel members (93.9 per cent) agreed or strongly agreed that 'Non-urgent' is the appropriate description for triage category five.

Table 7.5

Expert Panel's Ratings for Triage Category Descriptions (Round II)

Triage category description	Frequencies (N = 31)					Percentage of agreement	Mean	Median
	1*	2	3	4	5			
Category 1								
Immediately life-threatening	0	0	4	5	22	87.1	4.58	5
Resuscitation	2	12	10	3	4	22.6	2.84	3
Immediate [Red Colour]	6	13	9	2	1	9.7	2.32	2
Category 2								
Imminently life-threatening or Important time-critical treatment or very severe pain	3	1	2	3	22	80.6	4.29	5
Emergent	3	15	3	6	4	32.2	2.77	2
Very urgent [Orange]	10	8	7	4	2	19.3	2.35	2
Top urgent	8	9	9	4	1	16.1	2.39	2
Very urgent (without a colour code)	11	8	9	1	2	9.6	2.68	2

*1= Strongly Disagree, 2= Disagree, 3= Neutral, 4= Agree, 5= Strongly Agree

Table 7.5

Expert Panel's Ratings for Triage Category Descriptions (Round II) (continued)

Triage category description	Frequencies (n = 31)					Percentage of agreement	Mean	Median
	1*	2	3	4	5			
Category 3								
Potentially life-threatening or Situational urgency or Humane practice mandates the relief of severe discomfort or distress within 30 minutes	3	15	7	1	5	19.3	2.68	2
Urgent	0	1	5	6	19	80.6	4.39	5
Urgent [Yellow]	7	14	3	6	1	22.6	2.35	2
Category 4								
Potentially serious or Situational urgency significant complexity or Severity humane practice mandates the relief of discomfort or distress within one hour	7	10	6	3	5	25.8	2.65	2
Less urgent	1	0	1	10	19	93.5	4.48	5
Standard [Green]	9	12	4	3	3	19.3	2.52	2
Category 5								
Less Urgent or clinico-administrative problems	5	14	7	1	4	16.1	2.52	2
Non-urgent	0	2	3	3	23	83.9	4.52	5
Non-urgent [Blue]	14	7	4	4	2	19.3	2.13	2

*1= Strongly Disagree, 2= Disagree, 3= Neutral, 4= Agree, 5= Strongly Agree

In regard to a timeframe for each triage category, targeted consensus was also achieved in this round. All the panel members agreed in Round I that the time to see an ED physician for a patient in category one is 'immediate'. In Round II, this selection was given to the panel members and they were asked if they would like to reject or comment on the result. None of the panel members rejected, modified, or commented on this finding.

As shown in Table 7.6, the panel members agreed or strongly agreed that the following are the appropriate timeframes in which a patient should be seen by an ED physician: immediate for category one (100 per cent), 10 minutes for category two (90.3 per cent), 30 minutes for category three (93.5 per cent), 60 minutes for category four (93.5 per cent) and 120 minutes for category five (100 per cent).

Table 7.6

Expert Panel's Ratings for Triage Category Timeframes (Round II)

Timeframe	Frequencies (N = 31)					Percentage of agreement	Mean	Median
	1*	2	3	4	5			
Category 1								
Immediate	100 per cent consensus was achieved in Round 1							
Category 2								
10 min	0	2	1	2	26	90.3	4.68	5
≤15 min	4	13	6	4	4	25.8	2.71	2
Category 3								
15 min	30	0	0	1	0	3.2	1.10	1
30 min	0	0	2	2	27	93.5	4.81	5
60 min	6	17	5	2	1	9.6	2.19	2
Category 4								
20 min	30	0	0	1	0	3.2	1.10	1
60 min	0	1	1	5	24	93.5	4.68	5
120 min	7	14	5	2	3	16.1	2.35	2
Category 5								
30 min	30	0	0	1	0	3.2	1.10	1
120 min	0	0	0	2	29	100	4.94	5
240 min	9	12	4	4	2	19.3	2.29	2

*1= Strongly Disagree, 2= Disagree, 3= Neutral, 4= Agree, 5= Strongly Agree

Listed items or added items that did not achieve more than 50 per cent agreement or a mean of 3 on the 5-point Likert scale were excluded. In Round II all remaining statements did not obtain a mean of 3; therefore, no further rounds were required. Table 7.7 summarises the panel members' agreement on the selected triage scale in stage one (two rounds).

Table 7.7

Summary of the Expert Panel's Responses for the Final Triage Scale (Two Rounds)

Cat.	Description	R1 %	R2 %	Time	R1 %	R2 %
1	Immediately life-threatening	58.1	87.1	Immediate	100	100
2	Imminently life-threatening or Important time-critical treatment or Very severe pain	41.9	80.7	10 min	67.7	90.4
3	Urgent	32.3	80.7	30 min	90.3	93.6
4	Less urgent	54.8	93.6	60 min	80.6	93.6
5	Non-urgent	54.8	83.9	120 min	83.9	100

7.3.4 Stage Two

Stage Two of this study aimed to 1) identify the clinical descriptors for each triage category, 2) identify the potential barriers that may hinder implementation of a triage system in Saudi Arabia and 3) identify the cultural and religious issues that need to be considered when implementing a new triage system in Saudi Arabia.

Thirty-one panel members were invited to participate in this stage, and 27 of the stage one panel members agree to take part. As shown in Table 7.8, all members completed and returned the questionnaire within the timeline in Round I. In Round II, one participant did not return the questionnaire; consequently, this participant was excluded from the following round.

Table 7.8

Response Rate for Stage Two of the Modified Delphi Method (Three Rounds)

Round	Questionnaire sent	Response rate (%)
I	27	100
II	27	96.3
III	26	100

7.3.4.1 Round I

The questionnaire in Round I (see Appendix M) consisted of examples of related clinical descriptors from the review of the literature. For each suggested clinical descriptor, the panel members could keep, reject, modify, or shift it to another category. The panel members were asked open-ended questions related to the potential barriers to successful implementation of a triage system in the Saudi public EDs. In addition, panellists were asked about the cultural and religious issues that should be taken into account when implementing a new triage system.

The majority of the panel members, over 78 per cent, suggested keeping most of the clinical descriptors. Table 7.9 summarises the clinical descriptors in Round I and the percentage of experts who suggested that each descriptor be kept, rejected, modified, or shifted to another triage category. Refer to Appendix P for more details of the expert panel responses to each clinical descriptor.

Table 7.9

Summary of the Participants' Responses to the Suggested Clinical Descriptors in Round I

Triage Category	No. of clinical descriptors	Accepted %	Rejected %	Modified %	Shifted to other category %
1	11	85.6	0.3	2.0	12.1
2	24	80.3	0.31	2.3	17.1
3	23	78.7	0.64	1.9	18.8
4	19	86.5	0.77	0.77	12.0
5	11	96	0.70	1.0	2.35

The panel members suggested modifying some of the clinical descriptors before including them in the new triage system. Table 7.10 shows the original clinical descriptors that were suggested during Round I and the proposed modifications. The modification to the clinical descriptors included adding parameters such as blood pressure and the Glasgow Coma Scale (GCS) or adding more explanation.

Table 7.10

Modifications Made to Clinical Descriptors from Round I to Round II

Triage Category	Original clinical descriptor	Modified clinical descriptor
1	Systolic BP < 80 (adult) or severely shocked child/infant	Systolic. BP < 80 (adult) or severely shocked child/infant—children BP \leq 70
1	Altered mental state (unconscious or delirious)	Altered mental state (unconscious or delirious) with unstable vital signs (GCS 3–6)
2	Altered mental state (lethargic, drowsy, agitated GCS < 13)	Altered mental state (lethargic, drowsy, agitated GCS < 13) with unstable vital signs
2	Significant sedative or other toxic ingestion	Significant sedative or other toxic ingestion—hemodynamically unstable
2	Abdominal pain (age > 50 y) with visceral symptoms	Abdominal pain (age > 50 y) with visceral symptoms—hemodynamically unstable
2	Temperatures 38.0 in children under 3 months	Temperatures 38.0 in children under 3 months—with history of febrile convulsion

Table 7.10

Modifications Made to Clinical Descriptors from Round I to Round II (continued)

Triage Category	Original clinical descriptor	Modified clinical descriptor
2	Diabetic hypoglycaemia or hyperglycaemia	Diabetic hypoglycaemia or hyperglycaemia or diabetic ketoacidosis
2	Vomiting or diarrhoea, suspicion of dehydration	Infant and old age with vomiting or diarrhoea, suspicion of dehydration
3	Seizure (now alert)	Seizure (now alert)—with history of frequent attack on the same day
3	Persistent vomiting	Persistent vomiting –hemodynamically unstable
3	Dehydration	Dehydration—hemodynamically unstable
3	Acute vaginal bleeding with normal vital signs	Acute vaginal bleeding related to pregnancy—with normal vital signs
4	Vomiting or diarrhoea without dehydration	Vomiting or diarrhoea without dehydration—mild (non persistent)
5	Chronic abdominal pain	Chronic abdominal pain—with stable vital signs
5	Known patient with chronic psychiatric symptoms	Known patient with chronic psychiatric symptoms—not agitated or showing signs of violence towards self or others

The total number of new clinical descriptors suggested in Round I were 14. Some of the new descriptors were suggested by more than one panel member but with different wording. As shown in Table 7.11, new clinical descriptors were suggested for triage categories one, two and three only. Fifty per cent of the new descriptors were suggested in triage category one and 36 per cent in triage category two.

Table 7.11

New Clinical Descriptors Suggested during Round I

New Clinical Descriptor	Triage Category
Severe chest pain –cardiac related	1
Palpitation with dizziness	1
Near drowning with respiratory distress	1
Hypoglycaemia with loss of consciousness and/or seizures	1
Choking with foreign body aspiration	1
Bulging fontanel	1
Sudden loss of vision	1
Oral drug overdose	2
Animal/ snake bite	2
Stings (scorpion)	2
Corrosive ingestion	2
Croup	2
Gun shots	3
Sexual assault	3

In this round, the panel members were asked to write the perceived potential barriers and the cultural and/or religious issues that may affect the implementation of the new triage system. The panel members' statements were thematically analysed and statements that had the same meaning were grouped and presented in one statement.

Tables 7.12 and 7.13 present the panel members' responses to these questions. Seven possible barriers to the successful implementation of a new triage system and four cultural issues were identified by the panel members.

Table 7.12

Important Potential Barriers Identified by the Panel Members in Round I

N	Potential Barriers
1	Lack of qualified emergency staff (especially nurses) to perform triage due to the lack of proper education and training for the role of triage in university-level and in-service training programmes
2	Emergency department building structure in some MOH hospitals does not allow for modifying the ED to have the triage area and waiting area in the main ED entrance
3	Unavailability of a written national policy from the MOH to guide and control the implementation of the triage system
4	Confidence in nurses to carry out the triage role
5	Difficulties in observing or re-assessing female patients in the triage waiting area while waiting due to cultural and religious considerations (for example covering face and separation between male and female)
6	Public acceptance of waiting times (up to 2 hours)
7	Insufficient staff to perform triage

Table 7.13

Important Cultural Issues Identified by the Panel Members That Need to be Addressed

N	Cultural Issues
1	Female patient cannot be examined in exposed triage area, especially if the examination includes the face
2	Separation between male and female patients should be maintained throughout the patient's care, including in the waiting area
3	It is preferable to assign a female triage physician or nurse to assess female patients
4	Overcome any language barriers by assigning a triage physician or nurse who can speak Arabic

7.3.4.2 Round II

In Round II, a new questionnaire was constructed and sent to the panel members. This round allowed the panel members to re-evaluate statements that did not reach the 75 per cent or higher cut in Round I. In addition, in this round panel members were asked to comment on the suggested modifications and the added clinical descriptors from Round I.

The majority of the panel members accepted the clinical descriptor 'headache, with pain scale 8–10/10' to be used in triage category two. Moreover, more than 76 per cent of the panel members accepted all the modifications to the clinical descriptors suggested in Round I (Appendix Q). As shown in Table 7.14, of the new clinical descriptors that were suggested in Round I (n = 14), 86 per cent were accepted, and for 14 per cent, panellists suggested shifting the indicators to triage category three.

Table 7.14

The Panel Members' Responses to the Newly Suggested Clinical Descriptors from Round I

Newly suggested clinical descriptors	Category	Accept %	Reject %	Modify %	Shift to other category %
Severe chest pain–cardiac related	1	92.3	0	0	7.7
Palpitation with dizziness	1	76.9	7.7	7.7	7.7
Near drowning with respiratory distress	1	88.5	3.8	3.8	3.8
Hypoglycaemia with loss of consciousness and/or seizures	1	92.3	3.8	0	3.8
Choking with foreign body aspiration	1	92.3	3.8	0	3.8
Infant with bulging fontanel	1	69.2	0	11.5	19.2
Sudden loss of vision	1	69.2	11.5	3.8	15.4
Oral drug overdose	2	30.8	0	0	69.2 (cat 3)
Animal/ Snake bite	2	84.6	0	0	15.4
Stings (Scorpion/ spiders)	2	34.6	0	0	65.4 (cat3)
Corrosive ingestion	2	88.5	0	3.8	7.7
Croup	2	92.3	3.8	0	3.8
Gun Shots	3	76.9	3.8	3.8	11.5
Sexual assault	3	80.8	3.8	3.8	11.5

7.3.4.3 Round III

In Round III the panel members rated all the clinical descriptors that were accepted and modified in Rounds I and II as well as the potential barriers and the cultural issues generated during Round I. The rating process used a 5-point Likert

scale. For the clinical descriptors, the panel members were asked to rate the items 1 to 5 on a 5-point Likert scale, where 1 represented strong disagreement and 5 represented strong agreement. In addition, the panel members were asked to rank the potential barriers and the cultural issues according to the following: 1) not at all important, 2) not important, 3) neutral, 4) important and 5) very important.

Table 7.15 shows that the targeted consensus (75 per cent or more and mean and median of 4 or more) was reached in this round. In triage category one, 75 per cent of the clinical descriptors achieved over 90 per cent consensus while only one descriptor obtained 76.9 per cent consensus. In triage category two, the majority of the clinical descriptors (67 per cent) obtained a consensus of more than 90 per cent. In triage category three, 41 per cent of the suggested clinical descriptors obtained over a 90 per cent consensus level. Only one clinical descriptor achieved 73 per cent consensus; however, its median was 5 and mean 4.35 and only one disagreement was recorded. Therefore consensus was considered to be present. In triage category four, the majority (82 per cent) of the clinical descriptors obtained consensus of greater than 80 per cent. More than 70 per cent of the clinical descriptors suggested for triage category five achieved a 90 per cent consensus among the panel members; for more details refer to Appendix R.

Table 7.15

Summary of the Participants' Consensus Levels on the Triage Clinical Descriptors

Triage Category	Clinical Descriptors	Percentage agreement	Mean (Range)	Median (Range)
1	16	76.9–100	4.15–5.00	4.50–5.00
2	28	76.9–100	4.15–4.96	4.00–5.00
3	27	76.9–100	4.08–4.88	4.00–5.00
4	17	76.9–96.2	4.19–4.65	5.00
5	10	88.5–96.2	4.65–4.85	5.00

As shown in Tables 7.16 and 7.17, the panel members' agreed on the importance of the potential barriers and cultural issues that were identified in Round I and ranked them according to their importance.

Table 7.16

Rankings of Importance for the Potential Barriers to Triage Implementation

N	Potential Barriers	Consensus (%)	Mean	Median
1	Lack of qualified emergency staff (especially nurses) to perform triage due to the lack of proper education and training for the role of triage in university-level and in-service training programmes	96.2	4.81	5.00
2	Insufficient staff to perform triage	100.00	4.77	5.00
3	Emergency department building structure in some MOH hospitals does not allow for modifying the ED to have the triage area and waiting area in the main ED entrance	92.3	4.62	5.00
4	National policy from the MOH to guide and control the implementation of the triage system not readily available	96.2	4.58	5.00
5	Public acceptance of the waiting times (up to 2 hours)	96.2	4.58	5.00
6	Confidence in nurses to carry out the triage role	92.3	4.58	5.00
7	Difficulties in observing or re-assessing female patients in the waiting area due to cultural and religious considerations	77.0	4.23	5.00

Table 7.17

Expert Panel's Rankings of Importance of Cultural and Religious Issues

N	Cultural Issues	Consensus %	Mean	Median
1	Overcome any language barriers by assigning a triage physician or nurse who can speak Arabic	96.2	4.77	5.00
2	Female patients cannot be examined in exposed triage areas especially if the examination includes the face	96.2	4.73	5.00
3	It is preferable to assign a female triage physician or nurse to assess female patients	96.2	4.69	5.00
4	Separation between male and female patients should be maintained throughout the patient's care, including in the waiting area	96.2	4.62	5.00

7.4 Discussion

In Saudi Arabia, MOH emergency departments are coping with increasing presentations and an expectation by the public of immediate attention regardless of the patient's clinical condition. The increasing burden on EDs is complicated by ineffective practices that are not in line with the available evidence. Current triage practice is not fulfilling the internationally recognised aim of triage, which is the rapid assessment and transfer of a patient to the most suitable clinical area. Further, the Saudi health care system is not conforming to the international trend of using five-level triage systems to prioritise patient care. In MOH hospitals, the triage nurse also assumes the role held by a primary nurse in Western emergency departments.

Study 3 aimed to develop a triage scale with categories and descriptors that have utility in Saudi Arabia and that is clinically and culturally appropriate. In addition, Study 3 aimed to identify the potential barriers to the successful implementation of the triage system in public EDs in the KSA. Further, it aimed to identify significant cultural and religious issues that need to be considered prior to introducing any triage system in Saudi Arabia.

7.4.1 Stage One—Triage Scale Development

The first stage of Study 3 sought to answer the following questions:

1. How many acuity categories should the Saudi triage scale include?
2. What is the description of each urgency category?
3. What is the time 'to treat' for each urgency category?

The panel members in this study were provided with information (descriptions and response times) from three reliable triage systems (ATS, CTAS and MTS). The panel members were allowed to select from the provided list or to add new descriptions or response times for the categories of the new triage scale. Descriptors were obtained from the ATS and CTAS. No descriptors were used from the MTS as the MTS is based on algorithms to help determine the triage category.

This stage has successfully developed a five-level triage scale. The decision to use five levels of urgency to prioritise ED patient care in Saudi Arabia was supported by all the panel members (N = 31). The new triage scale is consistent with the international direction of triage. Literature has documented that five-level triage scales provide greater discrimination between ED patients' acuity, and studies have shown that these scales have high levels of reliability and validity (American College of Emergency Physicians, 2003; Fernandes, Tanabe, Gilboy, et al., 2005; Zimmermann & McNair, 2006). Thus, it is likely that the new triage scale will demonstrate a good level of reliability and validity in Saudi EDs.

The panel members' consensus on the new triage scale was reached in Round II. The majority of the panel members chose items from the provided list. The new triage scale shared some features with the ATS, CTAS and MTS. These features include using five levels of urgency, ranking acuity levels in descending order and specifying response times for each triage category. These results have important implications for the future implementation of a new triage scale in Saudi Arabia. Given that the majority of the health workforce in Saudi Arabia, including ED nurses and physicians, are expatriates from different countries, using a triage scale that shares principles and features with the most commonly used and supported triage scales is expected to ease implementation. Clinicians who previously have used a five-level triage scale may need little preparation before using the new triage scale.

The panel achieved consensus on the following descriptions for the five categories of the new triage scale:

- triage category one, 'immediately life threatening';
- triage category two, 'imminently life-threatening or important time-critical treatment or very severe pain';
- triage category three, 'urgent';
- triage category four, 'less urgent' and
- triage category five, 'non-urgent'.

Examining the consensus level on the final triage scale showed that all the statements that attained the highest agreement level in Round I had received the

target consensus level in the final round (Round II), except the description of category three. In this category, 32.3 per cent of the panel members in Round I and 80.7 per cent in Round II selected 'urgent' to describe the third triage category. The increase in the agreement level between Rounds I and II might be explained by the 22.3 per cent of the panel members who selected 'urgent' with a colour code to describe triage category three. However, some of the panel members suggested that using colour codes for the new triage scale could be confused with the current disaster triage scale used in the KSA. Possibly this idea led some of the panel members to change their selection in Round II.

The new triage scale developed in this study is informed by the ATS and the CTAS. The descriptions of the triage categories one and two are similar to the ATS descriptions, and the descriptions of triage categories three, four and five are similar to the CTAS descriptions. Though no major differences are apparent in the descriptions of the triage categories among the ATS, CTAS and MTS, the expert panel selected descriptions that were most applicable to the Saudi context. For instance, the majority of the panel members preferred to describe category one as immediately life-threatening instead of resuscitation. This might be related to the use of the term 'resuscitation' in emergency departments in Saudi Arabia, where it almost exclusively relates to patients with cardiac or respiratory arrest.

The panel members agreed on the timeframe for the new triage scale by which patients in each triage category must be seen by an ED physician. The timeframe was as follows: triage category one, immediately; triage category two, within 10 minutes; triage category three, within 30 minutes; triage category four, within 60 minutes; and triage category five, within 120 minutes. The recommended times for triage category one through five are identical to those of the ATS. However, both the ATS and CTAS suggest similar response times with the exception of category two, which is 10 minutes in the ATS and 15 minutes in the CTAS.

7.4.2 Stage Two

In stage two of the modified Delphi method, 27 of the expert panel members from stage one (n = 31) agreed to continue working on the project. Stage two sought

to answer the following questions: 1) What are the clinical indicators for each triage category? 2) What barriers might influence the implementation of a triage system in Saudi Arabia? 3) What religious and/or cultural issues need to be considered in implementing a triage system in Saudi Arabia?

In the first round questionnaire, the panel members were provided with examples of clinical descriptors to assist them in crafting new indicators or modifying an existing one and to initiate the brainstorming process. These clinical descriptors were used in the ATS and CTAS.

7.4.2.1 Clinical descriptors

This study aimed to develop a list of usual presentations that can be used as indicators of urgency within the new triage scale. These clinical descriptors are designed to help triage nurses and physicians make appropriate decisions and to be used for education purposes.

All the clinical descriptors provided in Round I were accepted by the panel members, though some were accepted only after modification. Acceptance of all the clinical descriptors was not surprising as most of these clinical descriptors had been previously based on research data and expert consensus (Australasian College for Emergency Medicine, 2005). Modification to existing clinical descriptors included adding parameters such as blood pressure or GCS or adding more details. For example, in triage category one the panel members added ‘unstable vital signs and GCS 3–6’ to the original clinical descriptor ‘Altered mental state (unconscious or delirious)’.

Further, new clinical descriptors were identified in triage category one, two and three. Most of these descriptors are solely based on clinical urgency. However, other descriptors such as ‘gun shots’ and ‘sexual assault’ are general and can be categorised into category one through five based on the actual urgency of the case. The common thing about these descriptors is that both are medico-legal conditions for which time is critical.

In Round III, the expert panel reached consensus on 16 clinical descriptors for triage category one, 28 for category two, 27 for category three, 17 for category four and ten for category five. The number of clinical descriptors identified in triage categories two and three is relatively higher than for categories one and five. This is consistent with the finding that a large number of the patients who present to EDs are in the middle categories (McNair, 2005; Ruger et al., 2007).

7.4.2.2 Potential barriers and cultural issues

Seven possible barriers and four cultural issues were identified. The panel were asked to rank these statements based on their perceived importance. The possible barriers can be classified into groups: barriers related to staffing, barriers related to guidelines, barriers related to stakeholders (authorities and client) and barriers related to the culture.

The panel members agreed that lack of qualified ED clinicians, particularly nurses, to undertake the triage role is the most important barrier that may face the implementation of the new triage system. The panel members attributed the lack of qualification to the absence of triage education and training in educational institutions and at the hospital level. Although the definition of qualification was not specified in this study, triage research supports that educational preparation for triage clinicians is crucial to the successful implementation of any triage system (Fernandes, Tanabe, Bonalumi, et al., 2005; McNair, 2005). In addition, reliance on expatriates in the Saudi health system may be linked to the lack of qualified ED clinicians to perform triage. More than 60 per cent of the nurses and physicians working in public hospitals in Saudi Arabia are from foreign countries, with different professional education levels and cultural backgrounds (Ministry of Health, 2008). Preparing these clinicians to work in Saudi Arabia requires a great deal of effort and time. After gaining familiarity with the Saudi health system and culture, it is common for expatriate clinicians to return to their home countries. This issue affects the continuity of care in Saudi Arabia and makes preparing clinicians to carry out activities that require specific skills and knowledge such as triage very difficult.

Introduction of a new role needs sufficient staff to carry out the responsibilities of that role. Saudi nurses comprise only 36 per cent of the nursing workforce in the KSA, and the majority of them are diploma holders (Abu-Zinadah, 2006; Ministry of Health, 2008). Given the nursing shortage in Saudi Arabia and elsewhere (Elmobasher, 2007), the panel members agreed that insufficient staff (nurses) to perform triage is a potential problem that needs a solution. This problem becomes significant in the triage context because of the characteristics required of nurses to perform triage. New nurses or those with less ED experience are not recommended to perform triage. Thus, not every ED nurse will be suitable to perform triage, exacerbating the nursing shortage. Although no agreement exists on the level of experience that a triage nurse should have before performing triage, triage literature commonly reports minimum experience levels of between 3 and 18 months. In Saudi Arabia, where triage is not common practice, it is expected that nurses will require more experience before engaging in triage activities. This lack of preparation can be linked to education, as triage education may be absent or not readily accessible in public EDs or in nursing schools.

Several studies have recommended that EDs have a single point of entry and that the triage area allows for visual access to the ED patients, including those in the waiting area (Nelson, 1983; Richardson, 2009). However, the panel members identified this as a potential problem in Saudi Arabia. The panel members agreed that not all public EDs allow for modification to meet triage requirements. Although this problem might be significant for some EDs, it can be handled on a case-by-case basis. Some EDs may employ strategies such as assigning nurses to patients in the waiting area or using a TV system to monitor patients from the triage area.

Another important barrier was related to triage policy. The panel members identified the lack of a national triage policy as a problem that could hinder the implementation of the new triage system. Researchers and triage personnel have viewed the introduction of a national triage policy as central to successful implementation on a national level. In many developed countries such as Australia and Canada, ED triage was introduced and supported by national triage policies and guidelines (Australasian College for Emergency Medicine, 2006; Beveridge et al.,

1998). Lack of a national triage policy could lead to triage or the triage scale being implemented and applied differently in different hospitals.

In addition, panel members identified public acceptance and respect for waiting times in Saudi Arabia as a potential problem. This issue requires that the implementation of triage be accompanied by a public campaign to promote the advantages of triage to patient safety.

Lack of authority and public confidence in nurses to carry out the triage role is another potential barrier identified by the panel members. Although no evidence was found to support this finding, it seems that the expert panel reached this conclusion based on their experience in the Saudi Arabian public EDs.

Finally, the expert panel reached consensus that observation and monitoring of female patients in waiting areas is difficult for triage clinicians. This problem was reported by Bond (2001) in an ED in Saudi Arabia. Most female patients in the KSA cover their faces. Therefore, a female patient may deteriorate while waiting without being detected.

The panel members seemed to identify these barriers based on their observation and judgment of current triage practice in public EDs in Saudi Arabia. The expert panel indicated that these barriers are currently present and expected to affect future implementation of a triage scale in Saudi public EDs. Therefore, it is important that the MOH explore these barriers and find strategies to overcome them.

In regard to cultural and religious issues that need to be considered when implementing the new triage system, the expert panel members reached consensus on four issues. Three of these issues are related to female patients and one is related to communication. The panel members agreed that it is very important that the clinician in the triage area speak and understand Arabic. According to MOH statistics, the majority of physicians (80 per cent) and nurses (64 per cent) working in public hospitals in Saudi Arabia are expatriates, mainly from non-Arabic countries; therefore, communication with ED patients might not be effective.

In addition, the panel members reached consensus on three issues related to female patients that should be taken into account when planning to implement the

new triage system. First, female patients cannot be examined in a triage area without full privacy, especially if the examination includes the patient's face. Second, it is preferable that female clinicians perform triage on female patients. Third, female and male patients should have separate waiting areas.

7.4.3 Testing the New Triage Scale

After developing the new scale, the next step was to test it in public EDs for reliability, validity and utility. Testing the new scale was not possible for several reasons. Current triage policy and procedure recommends a three-level triage scale. Therefore, implementing the new triage scale that is based on five levels of urgency required approval from the MOH; this approval was not granted. However, another request to consider the implementation of the new triage scale will be submitted to the MOH that will include testing the scale in three EDs for 6 month before full implementation. Further, it is difficult to alter current ED management practices, especially in EDs that do not use a triage system. These difficulties include resistance to the new triage system from both the public and ED managers.

7.4.4 Conclusion

This was a modified Delphi study that aimed to develop a Saudi national triage system. The study recruited a panel of expert ED nurses and physicians from public hospitals. The study consisted of two stages. In stage one, the panel members (N = 31) reached the predefined consensus on a five-level triage scale. The new scale was based on two reliable triage scales (the ATS and CTAS). In each triage category, the panel members agreed on the category description and response time.

In stage two, the panel members identified 98 clinical descriptors to be used with the new triage scale. These clinical descriptors represented indicators of urgency for usual presentation in each triage category. Although this list cannot be used exclusively to prioritise patient care, it can be used to promote consistent application of the new triage system and for education purposes. In addition, the panel members agreed that there are significant barriers that need to be considered before implementation. All of these potential barriers were ranked as important or very important by all the panel members (n = 26). Identified barriers are expected to

negatively influence the implementation of the new triage system. Further, this stage included identifying cultural issues that must be considered when the new triage system is implemented.

Chapter 8: Discussion

8.1 Introduction

The practice of formal, evidence-based emergency triage in Saudi Arabian public hospitals does not exist. The consequences of the lack of a formal system are that patient care and outcomes are at risk. The basic understanding of what constitutes triage in Saudi Arabia does not fit within the current evidence available in the literature. As a result, this study investigated emergency department triage in public hospitals in Saudi Arabia. The aims of this study were twofold: to explore and describe current triage practice in public EDs and then to develop a Saudi Arabian triage system that is in line with current evidence.

In order to achieve these aims, this research was divided into three studies. Studies 1 and 2 focused on understanding current triage practice in public EDs. Study 1 explored current triage practice in public EDs in the KSA and then examined the consistency and accuracy of triage decision making among ED nurses and physicians using a standardised triage scale. Study 2 sought to gain an understanding of current triage policy, procedure and education programmes in the KSA that support the implementation of triage.

The final study developed a five-level triage system that meets the needs of the Saudi Arabian population. This study included developing a triage scale and identifying clinical descriptors consistent with the culture and context of the Saudi population. Finally, Study 3 identified potential barriers and cultural and religious issues that might prevent the successful implementation of the new triage system.

This chapter links and discusses the three studies to provide a direction for triage practice in the KSA. In brief, this chapter discusses the difficulties that arise from a multicultural workforce, misconceptions about triage practice and the lack of standardised education and policy. In addition, the implications of the new system will be discussed along with limitations and recommendations.

8.2 Current Triage Practice

Current practice in Saudi emergency departments to effectively manage patients is not evidence-based and is not systematic in the manner of sorting patients according to medical priority. This haphazard system can be attributed to three factors: the lack of a national standardised system that is culturally safe, the absence of policy that makes triage practice mandatory in all EDs and the lack of Ministry of Health follow-up to ensure EDs are compliant with the recommended triage system. The findings from this study provide research-based evidence that triage is not standardised or even does not exist in most public EDs. Further, the study revealed that triage in public EDs is not appropriately supported by local policies, procedures and education programmes nor does it even meet the standards set in the MOH policy and procedures.

8.2.1 Triage Policy, Procedure and Education

To understand ED triage in Saudi Arabia as an entity, documents that support triage in public and non-public hospitals were investigated. Surprisingly, the MOH had a policy on triage, but there was a global lack of awareness of its existence. As a minimum standard, the MOH policy supports that triage is a necessary component of emergency care. This is a critical point as it acknowledges the need to sort patients in order of clinical needs. This fact is critical in this discussion, as it demonstrates the MOH's problems ensuring the implementation of the policy. It is not the lack of will to improve the triage system that hinders the implementation of triage; it is more the fragmentation of the health care system and the complexity of MOH policies.

The MOH policy and procedure document, although dated, states clearly that a three-level system is to be implemented by nurses, yet this does not occur because triage is mainly considered to be a physician role (Study 1). Analysis of the documents accessed showed a lack of consistency in the policy, procedures and education programmes that support ED triage in both public and non-public EDs. Since hospitals appear not to base their documents on the MOH policy, EDs are employing different processes to prioritise patient care. This, in turn, may lead to different health outcomes for patients with similar health problems.

Despite the documented limitations of three-level triage systems in identifying urgency and resource utilisation (Gilboy, 2005; Travers et al., 2002; Wuerz et al., 1998), the MOH triage policy recommends using a three-level triage scale to prioritise patients care in all public EDs. If this policy had been utilised in practice, at least triage would have some level of consistency. Improved consistency may have resulted in improved outcomes as patients would be seen based on medical need.

The MOH triage policy and procedure document has been in place since 2003 (Qureshi, 2010), and it appears that it has not been revised since then. In addition, no evidence indicated that the MOH triage policy was based on current literature and practice. Rather, the MOH triage policy and procedures are out-dated. Given the depth and breadth of current evidence from the mid 1990s that a five-level system improves patient outcomes, the MOH policy needs revision. Some policy bodies recommend revisiting policy and procedures every three years to determine whether they are still consistent with best practices and to evaluate the level of policy compliance (Monash University, 2003).

Triage assessment should be rapid. In Western countries, triage is usually completed within 2 to 5 minutes (Zimmermann, 2001). However, this is not the case with triage in KSA public EDs, as the MOH triage policy and procedures requires that the triage nurse engage in clinical activities beyond allocating urgency level and providing first aid. According to the policy and procedures, triage nurses are required to stabilise patients, initiate an intravenous line (IV) and perform a head-to-toe assessment. These activities require substantial time and thus delay the triage process and treatment for ED patients. This practice does not conform to the international understanding of the triage role, and no evidence supports that these actions in any way improve throughput or patient outcomes.

The MOH triage policy was developed to be used across all the public EDs in the KSA. However, most hospitals have not complied with the recommended three-level triage scale. Some public tertiary hospitals such as King Fahad Medical City and Riyadh Complex individually adopted five-level triage systems (CTAS) (Qureshi, 2010). The decision to adopt a certain triage scale might stem from ED directors who have studied in Western countries. The adoption of various triage

scales within the public EDs along with the variations found in current triage practice (Study 1) indicates poor compliance with the current MOH triage policy.

The individual adoption of five-level triage systems in some MOH EDs might result from personnel in these EDs having recognised the limitations of the current policy and the recommended triage scale; thus, they have adopted a reliable triage system. However, adoption of five-level triage systems in individual EDs will not improve triage practice at the national level. Indeed, this kind of practice might weaken the drive for a standardised triage practice in the KSA. In order to promote a standardised triage practice in the KSA, all the EDs should collaboratively implement one valid and reliable triage system. Doing so will ensure that patients will be seen based on the same criteria regardless of which ED they visit.

It should be noted that the adoption of any triage system in Saudi Arabia is without supporting research to validate its reliability in the country. Critically the systems in place in Saudi Arabia are from systems where Western culture is prevalent. The fact that Saudi hospitals are based on a Western model does not mean that the system is working in the best interest of the population. Unfortunately there is no evidence to support this statement either way, as there has been no research in this area; however, cultural and social issues are believed to play an important role when implementing a triage system adopted from different countries (Twomey et al., 2007).

In contrast, triage policies in the non-public EDs studied recommended using different five-level triage scales. In two EDs, the CTAS is used. The degree of success in the adoption of the CTAS in these two EDs has not been established due to the lack of research into the internal and external reliability and validity of the CTAS in a Saudi Arabian context. Though the non-public EDs seem to have implemented a foreign triage system with moderate success, transferability of this experience to public EDs is questionable. The environments in these non-public hospitals and those in the public hospitals in the KSA differ. Non-public hospitals in the KSA were primarily based on a Western model of care with greater autonomy and budget flexibility. Further, a large proportion of the hospital staff (including nurses) come from Western countries and probably have had experience with Western triage systems. Therefore, Western-qualified staff have an understanding of

a five-level triage system, yet the context of practice in the KSA has not been taken into consideration. In contrast, the majority of the staff working in public hospitals are locals or from Asian countries, such as the Philippines and India, and probably had minimal experience with ED triage systems. Therefore, implementation of a five-level triage system in public EDs requires more time and effort than might be needed in the non-public EDs.

Though educational preparation for triage nurses is essential for making safe and efficient triage decisions (Fernandes, Tanabe, Bonalumi, et al., 2005), this study failed to find any triage training or education programmes that prepare triage nurses for the triage role in the MOH EDs. This finding suggests that appropriate triage education or training does not exist. In addition, the MOH policy and procedure document did not indicate the need for educational preparation of triage nurses before performing triage. In the two non-public EDs that used the CTAS, the triage education programmes were adopted from the CTAS education package. Lack of educational preparation for triage nurses negatively affects patient safety and can be stressful for the triage nurses. Triage nurses need all available resources, including triage education, to help in making safe triage decisions.

Triage is a stressful role in the ED, and stress increases if the triage nurses are not confident or competent about their decisions due to poor understanding and knowledge about triage decision making. The evidence in the literature is compelling: to ensure a safe and accurate triage decision, triage nurses should receive adequate triage training and education before performing triage (Fernandes, Tanabe, Bonalumi, et al., 2005; McNair, 2005). Successful triage education should provide the nurses with assessment skills such as pain assessment, critical-thinking skills, documentation skills and clinical-based skills for various populations such as paediatric and mental patients in order to effectively perform the triage role (McNair, 2005).

8.2.2 Triage System in Public EDs

The MOH is responsible for formulating health-related policies, with the aim of ensuring that the quality of the health care meets MOH standards (Al-Yousuf et al., 2002). It should be noted that MOH policy sets minimum standards to be met—not necessarily gold standards or standards consistent with international best practices.

However, the ability of the MOH to monitor implementation of its triage policy is not evident anywhere in ministerial reports or the literature. In fact, it seems that the MOH policy has no impact or power over current triage practice. Although the MOH triage policy and procedure was meant to be implemented in all MOH EDs, the findings from Study 1 showed that more than 50 per cent of the respondents denied the implementation of a triage policy in their EDs. This indicates that the MOH did not perform a follow-up to know how the public EDs responded to the triage policy.

Considerable diversity was identified in the participating public EDs in Saudi Arabia in relation to triage practice. The ED clinicians' responses varied from no triage (the majority) to using multiple unreliable triage systems. This variation might be expected in a health system where triage practice is solely at the discretion of individual EDs and/or their directors. Given the MOH policy, which stated that ED patients must be classified by an ED nurse according to their clinical urgency based on a three-level triage scale, there should be at least some consistency in public EDs.

In contradiction or in ignorance of the policy, Study 1 revealed that more than half of the surveyed EDs denied the existence of a triage system. It may be argued that a primitive form of sorting always exists in EDs. For example, Study 1 found that the majority of public EDs prioritise patient care according to the obviousness of the illnesses or injuries. Staff 'triaging' in these circumstances might be a physician, a nurse, or even a ward clerk. However, this practice is not a formal triage process and lacks the necessary standards of care that prioritise patients in a systemic and consistent way and therefore is likely to have a significant negative effect on patient outcomes. To prioritise patient care effectively and efficiently, ED clinicians require a framework for sorting the patients on arrival based on clinical urgency using a standardised triage scale (Zimmermann, 2001).

The study also revealed significant variability among the participants who claimed to have a triage system. Although the MOH policy recommended using a three-level triage scale, only 27 per cent of the participants responded that their EDs are using a three-level triage scale, and it could not be ascertained whether the three-level scale is the same scale recommended by the MOH policy. The remaining EDs used acuity scales with two, four and five levels.

It should be pointed out that Saudi is not the only country with triage issues. The diversity of scales reported in this study is consistent with findings from a survey in Swedish EDs (Göransson, Ehrenberg & Ehnfors, 2005). Göransson, Ehrenberg and Ehnfors (2005) reported that the scales used in Sweden varied from three to five levels of acuity, whereas in this study, the used scales used varied from two to five levels of acuity. In many countries such as Australia, Canada and the UK, triage is a nursing role (Australasian College for Emergency Medicine, 2005; Considine et al., 2001; Göransson, Ehrenberg, Marklund, et al., 2005; Le Vasseur et al., 2001). Similarly, the MOH's triage policy recommended that triage be undertaken by ED nurses. The study findings, however, contradict the MOH policy recommendation: the majority of the participants (59.6 per cent) stated that triage is undertaken by physicians, while only 19.2 per cent said that triage is performed by nurses.

Study 1 found significant differences between nurses and physicians in relation to who performs triage ($p = 0.002$). More than 80 per cent of the physicians believed that triage is undertaken by physicians while only 30 per cent of the nurses believed that triage is performed by nurses. It should be noted that the participants in this study were asked about who is currently undertaking the triage role not who *should* perform triage. Caution is therefore needed when interpreting this result: it does not mean that there is physician resistance to nurses performing triage in public EDs. Instead, the reasons why nurses are not performing the triage role appear to be linked to a lack of understanding and more importantly a lack of preparation for the role.

Despite the MOH triage policy recommendations, nurses do not perform triage in most public EDs in the KSA. There are two likely reasons for this discrepancy. Firstly, nurses and physicians might not be aware of the MOH policy recommendations, which give nurses the right to perform triage. Secondly, nurses may lack the confidence to carry out the triage role. The general public may also be resistant to nurses fulfilling this role. It is a normal practice in public EDs in Saudi Arabia that decisions are made by physicians; therefore, the public may be suspicious about critical decisions made by any other ED clinicians including nurses, particularly when the decision may involve delaying treatment as is the case with triage. Being unaware of triage directing documents was reported in a survey in

Sweden. The survey found that more than 77 per cent of the respondents were not aware of the standards, guidelines and legislation about ED triage on a national level (Göransson, Ehrenberg & Ehnfors, 2005). In addition, confidence in nurses to effectively carry out the triage role was identified in Study 3 as a potential barrier to the successful implementation of a national triage system in public EDs in the KSA. However, Study 1 and Aljohani's (2006) study found that nurses and physicians made similar triage decisions. No significant differences were found between nurses and physicians in the consistency and accuracy of the triage decisions made in public EDs in Saudi Arabia. Both nurses and physicians obtained fair inter-rater agreement (unweighted kappa = .23 and .27). This finding is consistent with Aljohani's (2006) finding that inter-rater agreement of nurses and physicians in one public ED in the KSA was fair (unweighted kappa = .26 and .27, respectively).

Study 1 found that only 3.8 per cent of the participants (N = 105) believed that ED patient care is provided according to the patient's clinical condition. Instead, the majority of the participants (84.8 per cent) believed that ED patients in public EDs in Saudi Arabia are seen and prioritised based on the obviousness of their illness and injuries. Studies have shown that identifying patients presenting with obvious illnesses or injuries or patients who are obviously not ill or injured is relatively easy, yet very deceptive (Göransson, Ehrenberg, Marklund, et al., 2005). The challenge to clinicians lies in identifying patients who are not at either of these two extremes. Research shows that a significant number of ED presentations are patients with urgent but not obvious illnesses (McNair, 2005; Ruger et al., 2007). Thus, in the absence of a formal triage system in Saudi Arabia, patient safety in public EDs is questionable. Patients who present with urgent but not obvious conditions may be overlooked or appropriate care may be delayed.

Given that more than half of the surveyed public EDs do not use a formal triage system, patient safety is being compromised. To evaluate current triage decisions, the participants were asked to rate urgency for 15 patient scenarios using a standardised triage scale (ATS). The results showed varying degrees of accuracy and consistency of the triage decisions. Although some of the scenarios were obviously urgent, the nurses and physicians as a whole failed to allocate even one scenario to the same urgency level. This indicates that urgency is understood in different ways by the participants—a concerning finding, as what is urgent in the judgment of one

clinician is not necessarily the same in another's without protocols to follow. Inconsistency in defining urgency can be attributed to many factors including the absence of a reliable and valid triage scale that defines urgency in a systemic and consistent way and the lack of formal triage education. In addition, participant agreement on the triage ratings was only calculated to be fair (weighted kappa = .26). This level of agreement is lower than the recommended inter-rater agreement (.60 weighted kappa) (Australasian College for Emergency Medicine, 2005).

In addition, the results showed that the participants tended to overtriage rather than selecting the appropriate triage category. This tendency may be linked to the lack of confidence by nurses and physicians in triage decision making. It could be argued that overtriage is safer for the patient; however, overtriage is not without risk. Overtriage can increase waiting times for other patients who may need urgent attention, and it wastes ED resources (Considine et al., 2004; Göransson, Ehrenberg, Marklund, et al., 2005). Inappropriate triage decisions found in this study likely result from the lack of triage-related education and the absence of a standardised national triage system in public EDs in the KSA.

Presumably, because the MOH has an existing triage policy, nurses in public EDs in the KSA should be conducting triage using a three-level scale. However, the participants' responses were not consistent with the MOH policy recommendations. Reasons for non-compliance with the MOH policy are out of the scope of this study. However, ignorance of the existence of the MOH triage policy is a possible explanation for this non-compliance. This claim was supported by the expert panel in Study 3, who identified the lack of a national triage policy as a possible barrier to standardised triage practice in public EDs. Lack of availability of a policy and procedure does not necessarily indicate that it is not exist. Access to such a policy may be limited or hospital personnel may lack the motivation to investigate such a policy. Policy and procedures in the health system in Saudi Arabia have been criticised for not being consistent or for not existing in many health organisations (Alsharqi, 2006). Although explanations for such guidelines are not clear, Alsharqi (2006) commented that health policy and procedures in Saudi Arabia need to be improved to achieve better patient outcomes. Absence of and/or inconsistent policy and procedure is likely to result in great variations in practice that lead clinicians to manage situations in different ways within the same health system.

The lack of standardised triage practice in the KSA has implications for patients and EDs. Equity and justice in access to ED services are the principles underpinning ED triage (Richardson, 2009). However, this not possible in EDs where triage is not standardised or not practiced according to internationally accepted standards. In these situations patients with similar health problems may get different medical attention based on where and to whom they present. This lack of consistency may place the patient at risk and may affect healthcare outcomes (Göransson, Ehrenberg & Ehnfors, 2005). For example, Study 1 showed that some EDs did not have a triage system or employed ad hoc clinical criteria to prioritise care. In such EDs, it is difficult for the triage clinicians to make valid decisions about which patient should get medical attention first.

The lack of formal standardised triage practice in public EDs in the KSA prevents benchmarking and surveillance, which are critical for patient safety. Fernandes, Tanabe, Gilboy, et al. (2005) argued that benchmarking between EDs and surveillance of public health, including the patterns and types of presentations, contribute to improved practices. Public EDs in the KSA are unable to benchmark between each other due to the variability in defining and classifying urgency. For example, some EDs classified patients into three levels of urgency while others classified them into four levels. These variations make the comparison between the severity of conditions and acuity ratings in different EDs impossible to determine. Staff mobility could also be affected by this ad hoc system. If a triage nurse changes work locations, he or she will need time and education to adjust to the new triage system, which could increase the risk to patient safety (Göransson, Ehrenberg & Ehnfors, 2005). Lack of standardisation likely contributes to variations in practice and patient outcomes.

The findings from Study 1 and Study 2 identified several weaknesses in current triage practice in public EDs in Saudi Arabia.

1. Formal triage practice does not exist in most public EDs.
2. No standardised triage scale is used in public EDs where triage is claimed to exist.
3. The MOH triage policy and procedure were not observed.

4. The MOH policy recommended a three-level triage scale to prioritise patient care.
5. No education programmes prepare triage nurses for the triage role.

The first two studies have clearly established the need for a national Saudi triage system to both formalise and standardise triage practice. The proposed outcomes of establishing a standardised triage system include:

- improved patient outcomes by correctly allocating resources and medical acuity,
- more efficient throughput within a department,
- improved flexibility of staff when changing hospitals and
- the ability to provide quality assurance and benchmarking.

Consequently the aim of Study 3 was to develop the practical component of the system that is both medically appropriate and culturally safe for the Saudi population.

8.3 The New National Saudi Arabian Triage System (SATS)

In Study 3, consensus on a national triage system was achieved with minimal effort. The expert panel agreed to triage descriptors and waiting times that varied little from other five-level systems. This increases the validity for the Saudi triage system. Further, the panel members identified a list of clinical descriptors that work as indicators for urgency.

Significantly, this third study was the first attempt by any researcher to identify the cultural issues and potential barriers to appropriate triage practice in the KSA. The panel members agreed on a number of barriers that may prevent the successful implementation of a standardised triage system. In addition, some complex cultural issues were identified. Attention to these issues is believed to increase the likelihood of success of the new triage system.

8.3.1 Triage Scale

A triage scale is a major component of a comprehensive triage system. A triage scale alone is not adequate to claim a formal triage system (McNair, 2005). However, a reliable and valid triage scale remains the cornerstone for the successful

implementation of triage in any setting. Triage literature has reported four reliable and valid five-level triage scales including the ATS and the CTAS. These systems (scales) were developed and implemented in emergency departments in developed countries. However, the ability to successfully implement these systems in less developed or developing countries has not been established (Qureshi, 2010; Twomey et al., 2007).

A triage scale or system successful in one country may not work effectively in other countries when there are significant variations in culture, economic/social structure and reporting mechanisms (Twomey et al., 2007). Therefore, it is important to select or develop a triage scale that is suitable for the health settings. Twomey et al. (2007) clearly articulated the need for the development of a 'local tool that is meaningful in the local context' (p. 478).

Expert nurses and physicians from public EDs in Saudi Arabia were recruited to develop the new triage scale. The expert panel members reached the target consensus on a five-level triage scale. The new scale categorises ED patients based on acuity into the following:

- category one: 'Immediately life-threatening', and the patients must be seen by an ED physician 'immediately',
- category two: 'Imminently life-threatening or important time-critical treatment or very severe pain', patients must be seen by an ED physician within 10 minutes,
- category three: 'Urgent', patients must be seen within 30 minutes,
- category four: 'Less urgent', patients must be seen with 60 minutes and
- category five: 'Non-urgent', patients must be seen by an ED physician within 120 minutes.

These rankings are consistent with ranking of the existing five-level triage scales (Fernandes, Tanabe, Gilboy, et al., 2005). Being consistent with the ranking order of urgency with international triage scales has important implications for ED clinicians in the KSA. This consistency is in fact a form of validation for the five-level scale. Additionally, the expert panel made it clear that a five-level scale is preferred by the ED clinicians who would be using the system. In Saudi Arabia, Western expatriates who staff hospitals would most likely be familiar with

a five-level system and consequently would have little trouble in conceptualising the scale and would only need to learn the local variations and cultural issues.

Although the current MOH triage policy recommends using a three-level triage scale, all expert panel members (N = 31) agreed that the new scale should include five levels of urgency. This result indicated that the panel members recognised the limitations of the three-level triage system. In fact, no professional organisation currently supports the use of three-level triage worldwide (Zimmermann & McNair, 2006). In comparison, using the five-level triage scale has been supported and recommended in the literature (Almeida, 2004; American College of Emergency Physicians, 2004; Australasian College for Emergency Medicine, 2005; Canadian Association of Emergency Physicians, 2002).

In the KSA, gaining national agreement to use the new Saudi Arabian Triage System (SATS) could be problematic. The barriers to implementation indicate that establishing the system nationwide will not be easy. However, as previously stated, if supported at the appropriate level, these issues may begin to resolve. In addition, if a public media programme with a Royal warrant were to coincide with the new system's introduction, acceptance of the new system may develop.

In addition, the descriptions of the new triage categories were based on the ATS (categories 1 and 2) and CTAS (categories three, four and five). Although there is no explanation for selecting descriptions for the triage categories from two different triage scales instead of one scale (i.e. from the ATS only or the CTAS only), presumably the selected descriptions were better understood by ED clinicians. This assumption can be accepted or rejected when the new triage scale is tested in the Saudi public EDs. The timeframe in which patients in each category are seen based on the new triage scale is identical to the ATS response times. All ED patients should be seen by an ED physician from immediately (0 minutes) to a maximum time of 120 minutes. In general, both the ATS and CTAS use similar response times with exception of the second category (10 minutes with the ATS v. 15 minutes with the CTAS, Australasian College for Emergency Medicine, 2005; Beveridge et al., 1998).

Although the new triage scale is based on two reliable and valid triage scales (ATS and CTAS), it still must be tested for reliability and validity in public EDs in Saudi Arabia. However, it can be argued that being based on reliable and valid triage

scales increases the probability that the new triage scale will be reliable and valid, too. Similarly, because it was based on the National Triage Scale (NTS)—a scale with proven reliability and validity—researchers were proven correct in expecting the CTAS to show similar reliability and validity.

8.3.2 Clinical Descriptors

Triage decision making is a great challenge for triage clinicians. Time constraints and uncertainty are the norm in triage assessment (Considine et al., 2002; Worster et al., 2004). To ease this problem, many triage systems such as the ATS and CTAS use strategies to help in triage decision making. One such strategy is the use of clinical descriptors (indicators). Developing clinical descriptors that cover all patient presentations are neither feasible nor evident in the recognised triage systems. However, clinical descriptors provide a list of the usual presentations in each triage category to help the triage nurse in making the right triage decision (Australasian College for Emergency Medicine, 2005; Considine et al., 2002).

As part of developing a new Saudi triage system, Study 3 used expert consensus to develop a list of clinical descriptors. The expert panel members agreed on some usual presentations to be used as indicators for the urgency level. As is the case with other triage systems, these clinical descriptors are intended to be used as indicators only and cannot replace the triage nurse's experience (Australasian College for Emergency Medicine, 2005).

A total of 98 clinical descriptors were identified (Appendix R). The majority were for triage category two and three. The majority of the clinical descriptors were related to trauma and disease, possibly because trauma- and injury-related presentations in the Saudi public EDs represented 13 per cent of the total visits (16 million) in 2008, while disease-related presentations represented 83 per cent (Ministry of Health, 2008). The clinical descriptors for each category did vary slightly to those found in the ATS and CTAS. Issues such as an infant with a bulging fontanel, sudden loss of vision and croup were added, while oral drug overdose and stings (Scorpion/Spiders) were moved to another level. In addition, the panel members modified some of the pre-existing clinical descriptors by adding parameters such as GCS and vital signs. Adding such parameters is expected to help triage nurses in making appropriate triage decisions.

In this study, clinical descriptors were developed to support the implementation of the new triage system in Saudi Arabia. Given that triage is not common in most of the public EDs in Saudi Arabia, it is expected that nurses will demonstrate a low level of knowledge about formal triage. Hence, it is anticipated that providing clinical descriptors based on expert consensus will help triage nurses when commencing the triage role. Clinical descriptors help guide triage decision making and provide a consistent research-based approach for triage education (Australasian College for Emergency Medicine, 2005; Beveridge et al., 1998; Considine et al., 2002).

8.3.3 Potential Barriers

To ensure the successful implementation of any system or idea, it is important to identify any possible challenges prior to implementation. Study 1 of this project indicated that current triage practice in public EDs in Saudi Arabia seems to be ad hoc at best. Transition from ad hoc to best practices requires that the limitations of the current practice be identified and that the new practice be well supported. Study 3 used expert nurses and physicians to identify the possible barriers that might influence the implementation of the new triage system. These barriers may have contributed to the weakness of current triage practice and are likely to affect the implementation of any new triage system if not addressed. For example, unavailability of a national triage policy is a current problem that will negatively affect the implementation of the new triage system if it is not addressed. Therefore, these barriers can also be called improvement opportunities to ensure effective and safe triage practice.

The panel identified seven major barriers to the successful implementation of the new triage system. These barriers can be divided into issues that are local and those that have a cultural basis. These barriers impact the way an ED is perceived by the public, which can influence patient behaviour.

The panel members agreed that the most important barrier is the lack of qualified nurses to undertake the triage role in public EDs. This was attributed to the lack of proper training and education at the nursing school level and hospital level. This finding is consistent with the challenges of developing and introducing ED triage in Saudi Arabia previously identified by Qureshi (2010). The importance of

education for effective and safe triage practice has been extensively reported in the triage literature (Fernandes, Tanabe, Bonalumi, et al. 2005; McNair, 2005; Smart et al., 1999). While it cannot speak to the absence of triage education at the academic institution level, Study 2 found that triage training and education is absent at the hospital level. Additionally, nursing education in the KSA is still in its infancy; therefore, it is unlikely that KSA institutions offer advanced and specialised courses in ED triage.

In addition, the panel members agreed that the public and hospital authorities do not have confidence that nurses can carry out the triage role. The expert panel identified this issue as a potential barrier to nurse-led triage. The lack of qualified nurses to carry out the triage role in public EDs in Saudi Arabia probably accounts for the panel's consensus on this issue. This claim is somewhat true. Current MOH policy recommends that triage be undertaken by nurses. However, Study 1 revealed that this is not happening. The study found that in the majority of MOH EDs, triage is undertaken by physicians.

Saudi public hospital buildings represent another possible barrier. In some MOH hospitals, the ED does not allow for physical modifications to meet the recommended standards (Qureshi, 2010). International best practices recommend that EDs should have a single point of entry and that the triage area should be close to the waiting area so the triage nurse will have visual access to all patients in the waiting area (Richardson, 2009). However, this is not always possible, particularly in old buildings. Although it is impossible to modify the structure of some EDs, these recommendations have implications for new hospitals. For older buildings, this barrier might be overcome by using different observation strategies, such as assigning a nurse to the waiting area or using a TV system to observe the patients.

Lack of guidelines was identified as a potential barrier to a successful triage system. Research shows that a triage system encompasses more than simply using a reliable scale (McNair, 2005). A comprehensive triage system must be supported in many ways, including through a national triage policy. In Australia, Canada and the UK triage has been endorsed by national policies (Australasian College for Emergency Medicine, 2006; Göransson, Ehrenberg, Marklund, et al., 2005). However, in Saudi Arabia no national triage policy exists, which likely has

contributed to the absence of standardised ED triage practice within the Kingdom. A national triage policy serves two needs. First, it makes triage practice mandatory. Second, it presents the new triage practice to the public, which reduces the burden on individual EDs of having to introduce triage practice to their patients. If the triage system is introduced by individual EDs, public resistance to the new practice could be higher.

Lack of national guidelines also can be linked to other barriers identified by the expert panel. The panel members agreed that public acceptance of the waiting time (up to 2 hours according to the new triage scale) is a potential problem. Currently, no standardised criteria are used for prioritising ED patient care in most of the public EDs. Therefore, other than patients with obvious injuries or illness, it is likely that ED services are provided based on arrival time. The lack of understanding of triage principles and the nature of ED work might explain the public's behaviour. The general public in Saudi Arabia expects to get immediate care, even for the most minor of complaints without consideration of others and their clinical needs. Qureshi (2010) suggested that public awareness programmes compatible with the country's culture and values are needed prior to implementing an ED triage system in Saudi Arabia. Special emphasis should be given to how patients are prioritised for care based on severity rather than any other factors (Qureshi, 2010).

In addition, insufficient appropriate nursing staff to perform triage is a potential barrier to the successful implementation of the new triage system. Performing a new task such as triage might require additional staff members. However, the health system in Saudi Arabia and elsewhere currently is experiencing a nursing shortage (Al-Omar, 2004). Shortage of nurses does not necessarily mean that the total number of nurses is not sufficient to perform basic nursing care. Instead, sometimes there are not enough skilled nurses to perform complex roles such as triage. The majority of nurses in Saudi Arabia were recruited from developing countries where the standards of education and health care may be at minimal levels. Thus, not all nurses working in EDs are ready to undertake the triage role. This fact is especially significant in light of the fact that current MOH triage policy includes no competency-based triage statement.

Finally, the panel members agreed that observing or re-assessing female patients in waiting areas is a challenge. Due to cultural and religious considerations, females cover their faces at all times while in the waiting area. Moreover, most of the time, females have a separate waiting area. As a result, more than one nurse may be needed to monitor the waiting areas and to re-assess waiting patients. This need for an extra staff member may place an additional burden on nurses.

8.3.4 Cultural Considerations

Successful adoption of any triage tool is attributed to its ability to identify the clinical and cultural needs of the new setting (Twomey et al., 2007). Full adoption of a triage system that works in a Western country, for example, might not work in a country like Saudi Arabia. According to the triage guidelines in many Western countries, triage nurses should have visual access to patients in the waiting area (Australasian College for Emergency Medicine, 2005; Beveridge et al., 1998; Richardson, 2009). However, this is not possible in the Saudi EDs due to cultural considerations. Society in Saudi Arabia is conservative and religious (Alamer, 2010). Hence, the majority of females in Saudi Arabia cover their faces with veils in the presence of foreigners. This makes it impossible sometimes for the triage nurse to observe female patients from the triage area. Thus, a female patient may deteriorate while waiting without being noticed. This problem has been reported previously by Bond (2001) in one non-public ED in the KSA that had adopted the CTAS.

In order to develop a triage system that is culturally sensitive, the expert panel members were asked to identify the most important cultural and religious issues that need to be considered in triage practice in the KSA. The panel members reached consensus on four issues: three pertinent to female patients and one related to communication. In recognition of these culture issues, the implementation plan for the new triage system should take into consideration that triage nurses will not be able to ask most of the female patients to uncover their faces if the triage area is in an open space. Therefore, it is important to design the triage area in a way that provides adequate privacy for female patients so they can uncover their faces freely. While not essential, the expert panel believed that it is preferable to assign a female triage nurse to perform triage for female patients. Further, the panel suggested that waiting areas for male and female patients should be separated. Doing so could have staffing

implications, so this should be considered carefully when implementing the new triage system.

Finally, because the majority of health workers in public EDs in Saudi Arabia are expatriates (Ministry of Health, 2008), many from non-Arabic speaking backgrounds, communication can be a problem. Triage assessment is short and comprehensive (Cioffi, 1999; Worster et al., 2004); therefore it is critical that the triage nurse and the patient understand each other. The panel members agreed that assigning a triage nurses who can speak Arabic is important to enhance patient safety and to decrease the triage assessment time.

8.3.5 Future Implementation of the New Triage System

The current triage practice in public (MOH) EDs in Saudi Arabia is not standardised. The lack of understanding of the principles of a standardised triage system and the lack of support from the MOH may be responsible for the diversity of triage practice in the KSA. Evaluation of current triage practice in public EDs revealed that the problem is not limited to the use of less reliable triage scales but included the application process as a whole. Current triage practice lacks triage guidelines and protocols as well as education and training programmes.

It is evident that implementation of a new triage system in public EDs in Saudi Arabia will not be successful unless attention is given to the current weaknesses in triage practice. Using a valid five-level triage scale alone is not enough to implement a standardised triage system. A comprehensive triage system must address many factors such access to healthcare and patient flow through the ED system (Emergency Nurses Association, as cited in McNair, 2005) as well as policy, procedures, and education that support triage implementation.

This research study employed consensus among a group of expert ED nurses and physicians working in Saudi Arabian public EDs to develop a national triage system. The aim of this system was to replace current triage practice. However, successful implementation of this system depends greatly on the commitment to, preparation for and support for the new system.

Implementation of a standardised triage system needs to be supported and introduced by the highest authority in the health system. Implementation of a triage

system at the hospital level without legislative support from the higher authorities might lead to the failure of the system. In Saudi Arabia, the MOH is the governmental body that is responsible for all health-related issues. In addition to its follow-up and monitoring role for the entire health system, the MOH directly operates nearly 60 per cent of the hospitals in the Kingdom. Further, introduction of any new practice should be approved first by the MOH. Therefore, MOH permission and support is crucial for implementing the new triage system. It is critical that the MOH develop a method of auditing and enforcing a standardised policy for triage, but this takes political will. In an absolute monarchy, the decision needs approval by the King to carry any weight with the relevant ministries.

MOH support for the new triage system can include developing a national triage policy that backs the introduction of the new five-level triage scale (SATS) in all the public EDs ($n = 231$). Further, support could include modifying current triage policy and procedure, and developing standardised triage education programmes and competency standards for the triage nurses.

In sum, prior to implementing the new triage system, it is important to develop the adequate guidelines and protocols that direct and control the implementation process. It is important also to improve the triage nurses' knowledge and skills to ensure they are confident enough to carry out the triage role.

In many countries, local triage implementation is supported by computerised systems. The aim of these systems is to help triage nurses make quick and efficient triage decisions (Aronsky et al., 2008). Zimmerman and Clinton (1995) claimed that computerised triage systems provide a structural approach to triage. Thus, the implementation of the new triage system should be supported by a computerised system that aids in registering patients, making triage decisions and tracking patients.

To build public trust in the new triage system, a public information campaign is needed. Panel members in Study 3 identified public acceptance of waiting times as a potential problem. Therefore, public knowledge about triage principles should be improved. Although no conflicts exist in Saudi Arabia between the sociocultural traditions and the triage model, a culturally sensitive public awareness programme is fundamental. This programme should promote the health-related outcomes of the new triage system (Qureshi, 2010).

8.4 Conclusion

The triage area represents the first contact for patients in need of emergency medical care. The emergency department (ED) is a highly specialised area with staff trained in rapid assessment and management of trauma and other life-threatening/impacting situations. Consequently, decisions of which patient should be seen first should be based on clinical urgency. The literature clearly articulates that triage is necessary to ensure equity and justice in access to ED services; moreover, triage studies have suggested that formalising a standardised triage system enhances patient safety and equity of access to ED services (Fitzgerald, 2000; Richardson, 2009). In many countries such as Australia, Canada and the UK such systems have been in place for decades.

In most cases, the triage systems used in developed countries are based on five levels of urgency (Australasian College for Emergency Medicine, 2005; Beveridge et al., 1998; Manchester Triage Group, 1997). The current study investigated emergency department triage practice in public hospitals in Saudi Arabia in order to develop a clinically and culturally safe system of triage. To achieve this, three separate studies were undertaken. The first and second studies were concerned with exploring current triage practice, including supporting policy and procedures as well as education documents. Study 3 aimed to develop a Saudi national triage system.

The study found that ED triage in public hospitals is supported by MOH triage policy and procedure. However, implementation was flawed. Public hospitals in Saudi Arabia cannot claim ignorance in this situation, as the Ministry of Health has a clear, but out-dated triage policy. The purpose of the MOH policy and procedure document is to provide a basic guide for triage practice in all public EDs operated by the MOH. This policy recommended using a three-level triage scale and assigning ED nurses to the triage role. The existence of this policy may indicate that the MOH has recognised the importance of triage to the ED services. However, it the policy and procedure has not seemed to have obtained the appropriate managerial, clinical and educational support to ensure successful implementation. The study found that educational preparation for the triage role in the public EDs (MOH hospitals) seemed to be nonexistent.

The findings from this and other studies clearly demonstrate that public EDs in Saudi Arabia do not adhere to the MOH triage policy and procedure. In fact, the findings from Study 1 directly contradict the MOH policy and procedure recommendations in terms of the triage scale and the clinician responsible for performing triage. Though the policy names nurses as the appropriate professional to perform triage, more than half of the participants who worked in an ED with a triage system reported that triage is currently undertaken by ED physicians. Critically, it appears that the nature of triage practice is not as the MOH recommended or as it is internationally practiced.

In general, the findings from Study 1 revealed that triage practice in the participating public EDs is not conducted in a consistent way. Triage practice largely varied from no triage system at all to using modified, unvalidated triage systems. The majority of MOH EDs do not have a formal triage system, while other EDs employed different triage systems ranging from two to five levels of urgency. These variations led clinicians to employ different criteria for prioritising patient care in the public EDs. The existing variation suggests that patients' safety is at risk. Patients with similar health problems might get different medical attention based on which ED they visit. Although the primary purpose of ED triage systems is to prioritise patient care based on the actual clinical urgency (Richardson, 2009), the current study showed that this purpose was not satisfied in most of the public EDs. The majority of the participants believed that ED patients are prioritised for care based on the 'obviousness' of the illness and injuries. Studies have shown that reliance on the patients' obviousness of illness and injuries in prioritising ED patients care is problematic (Göransson, Ehrenberg, Marklund, et al., 2005; Ruger et al., 2007). The literature is clear on this issue—the majority of presenting medical conditions are not 'obvious' (McNair, 2005; Ruger et al., 2007). The failure to attend to patients in the appropriate timeframe may affect treatment options and health care outcomes. In fact, reliance on obviousness as an assessment method can prove fatal.

In addition, Study 1 found considerable variability among the study participants in ratings for 1,575 triage occasions. The inter-rater agreement level in triage ratings among the study participants was only fair (unweighted kappa = .25). The study did not find a significant difference between the nurses' and physicians' agreement level. Further, the findings showed that the level of accuracy in selecting

the expected triage category was low. In more than 60 per cent of the triage occasions, the participants failed to identify the correct triage category. In most of these cases, the participants tended to allocate a triage category that was higher than the patients' actual urgency. The low levels of accuracy and inter-rater agreement obtained in this study along with the high level of overtriage demonstrated that the participants seemed to understand urgency in different ways, most likely due to the lack of a standardised triage system in the public EDs.

In Study 3, a triage system that clinically and culturally suits the public EDs in Saudi Arabia was developed; the system was called the Saudi Arabian Triage System (SATS). This was achieved through a panel of expert ED nurses and physicians working in public EDs in Saudi Arabia.

This study was divided into two stages. The first stage focused on the development of the triage scale. The second stage concerned the identification of clinical descriptors for each triage category. In addition, Stage Two identified the possible barriers to the implementation of the triage system as well cultural and religious issues that need to be considered when implementing the new triage system.

The panel members achieved the targeted consensus on a five-level triage scale (Table 8.1). The new scale was developed based on the ATS and CTAS. The scale is similar to the ATS in term of the response time in each triage category.

Table 8.1

Description of the Saudi Arabian Triage System

SATS Category	Description	Timeframe
1	Immediately life-threatening	Immediate
2	Imminently life-threatening or important time-critical treatment or very severe pain	10 min
3	Urgent	30 min
4	Less urgent	60 min
5	Non-urgent	120 min

In addition, this study identified exemplars of clinical descriptors. The panel members agreed on 98 usual presentations to be used as indicators for urgency in the new triage system. These clinical descriptors were developed to support the implementation of the new triage system. Research has shown that the use of clinical descriptors guides triage decision making and provides a consistent approach for the triage education (Beveridge et al., 1998; Considine et al., 2002). This is critical, especially when the ED clinicians are not familiar with ED triage, as is the case in many public EDs in Saudi Arabia.

The study also provided a list of the most important barriers that may affect the implementation of the new triage system and probably any triage system in Saudi Arabia. These barriers were mainly related to the lack of triage legislation and guidelines such as a national triage policy or the lack of support for triage clinicians such as educational preparation for triage nurses. In addition, the study identified a list of cultural issues that need to be considered when implementing the new triage system. These cultural issues are related to examining and observing female patients in EDs as well as the communication (language) barriers between triage nurses and ED patients.

8.4.1 Implications

This study has significant implications for current and future triage practice in public EDs in Saudi Arabia. These implications are related to clinical practice, policy development and triage education. The findings from Studies 1 and 2 indicated that current triage practice in public EDs operated by the Ministry of Health is not standardised. Current practice lacks some important components of a comprehensive triage system: a valid and reliable triage scale; supporting policies, guidelines and protocols; and access to a standardised triage training and education programme.

Interestingly, the MOH has developed a triage policy and procedure. This policy and procedure was circulated to all the public EDs ($n = 231$) for implementation. However, it seems that the policy and procedure has been inconsistently implemented across the public EDs. The findings from Study 1 showed that only 27 per cent of the study participants reported using a three-level triage system, while the majority did not use any formal triage system. Reasons for

the variation between the recommendations of the MOH triage policy and procedure and current triage practice was not studied. Research on this area may have positive impact on future implementation of policy and procedures in public EDs in Saudi Arabia.

8.4.1.1 Implications for clinical practice

Given that more than 16 million people present to EDs in Saudi Arabia annually, emergency department clinicians need to make certain that the patients are categorised and seen based on clinical urgency. However, the findings from this study showed that prioritising ED patients for care is not based on the patients' actual urgency.

The findings from Studies 1 and 2 highlighted the need to change current triage practice in public EDs in Saudi Arabia. The MOH must lead this change and legislate for a national system to put in place. Critical to this change would be the political will to follow through and enforce government policy. Such a change would necessitate the implementation of a reliable and valid five-level triage scale as the first step towards implementing a standardised triage system as outlined in this thesis. Therefore, it is essential for the MOH to ensure that public EDs in Saudi Arabia move from using the three-level triage scale to the five-level triage scale developed in this thesis.

The implementation of the new triage system requires preparation and modification to current triage practice. This includes significant changes to current triage policy and procedure. In line with current MOH policy and supported by international literature, qualified and expert ED nurses should perform the triage role (Australasian College for Emergency Medicine, 2005; Beveridge et al., 1998).

8.4.1.2 Implications for policy development

In Saudi Arabia, the health system is fragmented. Many agencies are responsible for providing health care to the population, including ED services. In many cases, these agencies have the freedom to individually implement what they think best suits the organisations' needs. This fragmentation has resulted in the application of different standards of care within the same health system.

Currently, the implementation of triage in Saudi EDS is not consistent. This study showed that different triage policies and procedures have been developed and implemented. Current MOH triage policy does not address implementation of a national triage system that can be used across the Saudi EDs regardless of the provider's organisation. Policymakers should take the whole health system into account when developing a triage policy. Developing triage policies at the hospital- or organisation-level will, in fact, make achieving a standardised triage system impossible. To ensure implementation of a standardised triage system, triage must be introduced from the top down (i.e. from the MOH), not from the bottom up (hospital or organisation level). By virtue of its role, the MOH in Saudi Arabia can develop a national triage policy that controls triage practice in all Saudi EDs (MOH hospitals, other governmental hospitals and private hospitals).

8.4.1.3 Implications for education

The appropriate triage of patients is not an easy task and requires not only an experienced ED nurse but one trained in the nuances of triage. This situation may include rapid clinical decision making and knowing what initial management treatments are required to prevent further imminent injury or suffering for the patient. Therefore, the triage nurse needs to be educationally prepared before engaging in triage practice. The findings from this study showed that nurses and physicians have an unclear understanding of urgency. This confusion might stem from the fact that most EDs have not paid attention to theoretical preparation for triage. The MOH must address this shortfall through a standardised triage education programme that aims to prepare triage nurses for the triage role. Triage educators also must be groomed and prepared to teach at both the hospital and university levels to ensure that triage education is relevant and consistent.

8.4.2 Recommendations for Implementing the New System

A proposal will be submitted to the Ministry of Health that will include the emergency department triage system developed from this thesis. This plan will include the triage scale, the clinical descriptors, the potential barriers and the cultural and religious issues important to implementation of the triage system.

In summary, the proposal will suggest the following:

- Testing the new triage scale in public EDs. The new triage scale might be implemented in three EDs over a 6-month period to establish its utility, reliability, validity and safety as well as to identify any limitations and fix them before full implementation
- Developing a national ED triage policy that introduces and directs the new triage system
- Revising the current triage policy and procedures based on evidence and adding details about the triage process from entering the ED until discharge
- Developing standardised triage education programmes and competency standards
- Using a computerised system to document and track the triage process

8.4.3 Recommendations for Future Research

In the process of exploring and conducting this research project, the researcher discovered several possible areas for future research in emergency department triage in the Kingdom of Saudi Arabia. These recommendations include the following:

1. Additional research is needed to measure health organisations' level of compliance with health-related policies, including triage policies, and to investigate the factors that contributed to the low level of adherence by the public EDs in the KSA to the current MOH triage policy.
2. Additional research is needed to evaluate the experience of adopting Western triage systems into some non-public EDs in the KSA.
3. Additional research is needed to investigate triage practice in the Saudi private hospital EDs and to establish whether these EDs require a triage system because of the number of patient visits and the demand for ED services in private EDs.
4. Additional research is needed to investigate triage education at the academic and health organisation levels. Research is also needed to identify a triage education curriculum that is appropriate for the Saudi context and that will satisfy the needs of the triage clinicians.

8.4.4 Study Limitations

As with any research, there are limitations to this study as a consequence of the social, economic and cultural conditions present during the study period. In this thesis there are limitations with each of the three component studies.

In Study 1, using only public hospitals may have impacted the ability of the results to be generalised to all hospital situations. In addition, using paper-based simulation scenarios to evaluate the accuracy and concordance in triage decision making has several limitations. By using this method, triage clinicians are not able to gather information that would exist in real situations, such as social interactions and visual cues (Göransson, Ehrenberg & Ehnfors, 2005; Thomas et al., 1989).

In Study 2, the number of documents that were available for analysis was very small. This may have affected the overall results. Although only one document was collected from the MOH, this document is applicable to and represents 60 per cent of the total EDs in the Kingdom (operated by MOH). In addition, the search for triage education materials and programmes in the MOH elicited no documents available at a national level or at a local (hospital) level. Due to the fact this study did not investigate all EDs in the Kingdom, this claim cannot be generalised to other EDs in Saudi Arabia.

In Study 3, the new triage scale could not be tested for utility, validity and reliability in public EDs in Saudi Arabia. Although the triage scale was based on expert consensus, it must be tested before actual implementation. Without a directive from the MOH, no testing of the scale can be instigated or supported by any institution. The Ministry needs to be confident of success and have access to the appropriate consultants, both from within Saudi Arabia and internationally. Time and financial constraints prevented this from occurring at this time.

Overall, triage in Saudi Arabia is fragmented. This may result from the fact that many agencies, both private and governmental, are responsible for providing health care. As a result, healthcare quality is varied. Triage should be standardised in order to achieve the noted benefits, such as optimising patient safety and benchmarking between Saudi EDs. The Ministry of Health should play an important role in implementing a national standardised triage system. This can be achieved by

developing a national triage policy that organises triage practice in all EDs. As a starting point, the MOH needs to promote triage in their hospitals (n = 230) first before attempting to generalise the standardised triage system to other organisations, including private EDs.

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Appendices

Appendix A: Approval from Monash University Standing Committee of Ethics Research in Humans (SCERH)



Standing Committee on Ethics in Research Involving Humans (SCERH)

Research Office

Dr Joy Lyneham
School of Nursing and Midwifery
Faculty of Medicine, Nursing and Health Sciences
Peninsula Campus

28 June 2007

CF07/1706 - 2007/0517LIR: Development of a Saudi emergency department triage system

Dear Researchers,

Thank you for the information provided in relation to the above project. The items requiring attention have been resolved to the satisfaction of the Standing Committee on Ethics in Research Involving Humans (SCERH). Accordingly, this research project is approved to proceed.

Terms of approval

1. This project is approved for five years from the date of this letter and this approval is only valid whilst you hold a position at Monash University.
2. It is the responsibility of the Chief Investigator to ensure that all information that is pending (such as permission letters from organisations) is forwarded to SCERH, if not done already. Research cannot begin at any organisation until SCERH receives a letter of permission from that organisation. You will then receive a letter from SCERH confirming that we have received a letter from each organisation.
3. It is the responsibility of the Chief Investigator to ensure that all investigators are aware of the terms of approval and to ensure the project is conducted as approved by SCERH.
4. You should notify SCERH immediately of any serious or unexpected adverse effects on participants or unforeseen events affecting the ethical acceptability of the project.
5. The Explanatory Statement must be on Monash University letterhead and the Monash University complaints clause must contain your project number.
6. **Amendments to the approved project:** Changes to any aspect of the project require the submission of a Request for Amendment form to SCERH and must not begin without written approval from SCERH. Substantial variations may require a new application.
7. **Future correspondence:** Please quote the project number and project title above in any further correspondence.
8. **Annual reports:** Continued approval of this project is dependent on the submission of an Annual Report. Please provide the Committee with an Annual Report determined by the date of your letter of approval.
9. **Final report:** A Final Report should be provided at the conclusion of the project. SCERH should be notified if the project is discontinued before the expected date of completion.
10. **Monitoring:** Projects may be subject to an audit or any other form of monitoring by SCERH at any time.
11. **Retention and storage of data:** The Chief Investigator is responsible for the storage and retention of original data pertaining to a project for a minimum period of five years.

All forms can be accessed at our website www.monash.edu.au/research/ethics/human/index.html

We wish you well with your research.



Dr Souheir Houssami
Executive Officer, Human Research Ethics (on behalf of SCERH)

Cc: Mr Mohammed Aljohani

Appendix B: Ethical Approval from the Ministry of Health in Saudi Arabia

بِسْمِ اللَّهِ الرَّحْمَنِ الرَّحِيمِ

المملكة العربية السعودية
وزارة الصحة

الرقم: ٤٧/٧٠٧٥٦
التاريخ: ١٤٢٨/٧/٢٤
المقرنات: المستانة

المحترم
سعادة مدير عام الشؤون الصحية بمنطقة مكة المكرمة
السلام عليكم ورحمة الله وبركاته،،،

إشارة إلى الطلب المقدم من الطالب محمد بن عيسى الجهني المبتعث من وزارة الصحة لدراسة الدكتوراه في اسبانيا بخصوص طلبه الموافقة على إجراء دراسة تحت مسمى / إنشاء نظام طبي سعودي لفرز الحالات بأقسام الطوارئ،
نفيد سعادتكم أنه وبعد الإطلاع ودراسة الموضوع بأنه تم عرض هذه الدراسة على لجنة أخلاقيات البحوث الصحية بالإدارة لدينا وتمت موافقة اللجنة على إجرائها، وذلك في اجتماعها الدوري بتاريخ ١٤٢٨/٧/٢١هـ.
وعليه نامل منكم تسهيل مهمة الباحث المذكور في المستشفيات التابعة للوزارة وذلك وفق الاستبانة المرفقة، علماً أنه لا يعتب على هذه الموافقة تحمل الوزارة أية أعباء مالية، ومراعاة عدم تأخر الخدمة في المرافق المعنية، وضرورة الحفاظ على سرية المعلومات واستخدامها لأغراض البحث العلمي فقط. متمنين للباحث كل التوفيق.

شاكرين لسعادتكم حسن تعاونكم.
ولسعادتكم أطيب تحياتي،،،

مدير عام البحوث الطبية
د/ فيصل محمد أبو ظهير

١٤٢٨/٧/٢٤

I certify [redacted] copy
Signed: [redacted]
Belal Kheir Assaad
Minister of Religion - Req. V26372

Translation of a foreign document into English by a registered Translator and Interpreter
with National Accreditation Authority of Translators and Interpreters (NAATI)

Kingdom of Saudi Arabia

Ministry of Health

To: The General Director of the Health Directorate in Makkah / Riyadh Region/ Holy Capital/ Jazan/ Njran/Eastern region/ Jeddah/ Almadinah

RE: the application of Mohammed Saeed Aljohani from ministry of health to conduct the study entitled "Development of triage System in Saudi Arabia"

We would like to advise you that the Health Ethics Committee in the Ministry of Health studied and approved the above application in 21/ 07/ 1428 H.

You are kindly requested to facilitate the researcher's mission in the Ministry of Health hospitals according to the attached questionnaire. Please note that this approval does not involve any financial burdens on the Ministry of health. Also make sure that this study will not influence the healthcare services and will not violate confidentiality; any information from this study should be used for the research purposes only. We wish all the best for the researcher.

Thank you for your co-operation

The General Director of Medical Research

Dr Faisal Mohammed Abu-Duhair

I, Mohammed Hemedah, a registered NAATI accredited Translator and Interpreter state that I have translated this document from Arabic into English to the best of my knowledge and ability.

Signed: [REDACTED] Date: 11/03/08

(Any unsealed alteration renders this document void)



Appendix C: Explanatory Statement for the Participants in Study 1

MONASH University

15 March 2008

Explanatory Statement for Participants

Title: Development of a Saudi Emergency Department Triage System

This information sheet is for you to keep.

My name is Mohammed Aljohani and I am conducting a research project with Dr Joy Lyneham a senior lecturer in the Faculty of Medicine, Nursing and Health sciences towards a PhD at Monash University. This means that I will be writing a thesis which is the equivalent of a 300 page book. You are invited to participate in this study as you are a nurse or physician that working in an emergency department in Saudi Arabia. You have been invited to take part in this study because you have satisfied the study inclusion criteria (see next paragraph).

Inclusion and exclusion criteria

The study includes ED nurses and ED physicians who are currently working in any Saudi public ED with a clinical work experience of not less than one year. Nurses and physicians with non clinical role or/and have ED work experience less than one year will be excluded from the study.

The aim/purpose of the research

My study seeks to explore how the Saudi ED nurses and physicians understand urgency using a standard urgency scale.

The study aims:

To describe the level of agreement and the accuracy in ED triage urgency ratings among Saudi ED clinicians (nurses and physicians) using a standard 5-point urgency scale.

Possible benefits

In many western countries ED triage systems has been developed and implemented, the primary purpose of these systems is to prioritise care according to objective clinical criteria. As you might know, the number of people seeking emergency care in Saudi EDs is on the rise; however most emergency departments do not use formalised triage systems therefore the process of prioritising ED patients' care is not clear. The outcome Information from this study is expected to identify the current ED process of prioritisation. This will help stakeholders in planning for future as well as identifying the educational needs for the Saudi ED clinicians. In addition, it will help the researcher to identify the current understanding of urgency and identify the need for developing a national triage system.

What does the research involve?

Participation in this study involves completion of a questionnaire which has three parts, the first part, seeks personal demographics information. The second part is about hospital demographics. The third part is 15 paper-based simulation scenarios using a standard 5-point urgency scale. In each scenario, participant required to select the ideal time to see physicians, where to send the patient and how long a patient with similar condition usually wait in the participant's ED.

How much time will the research take?

It is anticipated that filling the questionnaire will require an estimated 30-40 minutes of your time.

Inconvenience/discomfort

It is possible that some of the participants may feel that this questionnaire is to examine their clinical background. However, the participants' answer will be treated as a group and no identity is required.

Can I withdraw from the research?

Being in this study is voluntary and you are under no obligation to consent to participation and you can withdraw from the study at any time. The consent to participants will be assumed if your questionnaire is returned completed.

Confidentiality

Participation in this study is voluntary. In order to ensure you remain anonymous, no names or identity codes are required in this study. Also the completed questionnaires will be returned in a sealed envelope (will be provided with the questionnaire) in a secured box in your ED. Any publication from this study will not include identity of the participants. The result from this study that will be published will be presented in summary; there will be no identifying information about any participant in written report or article related to the study.

Storage of data

Storage of the data collected will adhere to the University regulations and kept on University premises in a locked cupboard/filing cabinet for 5 years. A report of the study may be submitted for publication, but individual participants will not be identifiable in such a report.

Use of data for other purposes

The results of this study will be published in a PhD thesis and in journal articles. No identity of the participants will be published.

Results

The aggregate research finding will be provided to each ED, however, if you do not receive the result by the end of January 2009 please contact Mohammed Aljohani on e-mail address: mohammed.aljohani@med.monash.edu.

<p>If you would like to contact the researchers about any aspect of this study, please contact the Chief Investigator: Dr Joy Lyneham</p>	<p>If you have a complaint concerning the manner in which this research <insert your project number here, i.e. 2006/011> is being conducted, please contact:</p>
<p>Building E, Peninsula Campus, McMahons Road, Peninsula, VIC 3199, Po Box 527</p> <p>Phone 1: 3 9904 4651</p> <p>Fax: 3 9904 4655</p> <p>joy.lyneham@med.monash.edu.au</p>	<p>Human Ethics Officer, Standing Committee on Ethics in Research Involving Humans (SCERH)</p> <p>Building 3e Room 111, Research Office</p> <p>Monash University VIC 3800</p> <p>Tel: +61 3 9905 2052 Fax: +61 3 9905 1420</p> <p>Email: scerh@adm.monash.edu.au</p>

Appendix D: Study One's Instructions and Questionnaire

MONASH University



Information and Guidelines

Dear Participant,

Thank you for your participation in this study, in this study the Australian Triage Scale (ATS) will be used as a framework. The Australian Triage Scale allocates ED patients on the base of their clinical condition into five categories:

Category	Description of Category	Response
1	Immediately life-threatening	Immediately
2	Imminently life-threatening	Assessment and treatment within 10 minutes
3	Potentially life-threatening	Assessment and treatment start within 30 minutes
4	Potentially life-serious	Assessment and treatment start within 60 minutes
5	Less urgent	Assessment and treatment start within 120 minutes

Each scenario will require you to:

- Record your first impression of the case.
- Assign the category that you believe it is the ideal to the case scenario
- Answer the following questions.

(Please don't discuss your answer with your colleagues while answering)

Please proceed to the questionnaire

Part 1: Personal Demographics**1- Are you a:**

- Physician
 Nurse

1- Your gender is:

- Male
 Female

2- Your age is

- 18-25Y
 26 -35Y
 36-50Y
 $\geq 50Y$

3- What are your qualifications?

- Health institute
 Intermediate university degree
 Bachelor
 Postgraduate studies

4- How many years of experience do you have in your profession?

- Less than 5 years
 5-9
 10-15
 ≥ 15

5- How many years of experience do you have in Emergency?

- Less than one year
 1- 6
 7-10
 >10

Part 2: Hospital Demographics**1- How many beds do you have in your emergency department?**

- Less than 10 beds
- 10–20 beds
- 21–30 beds
- More than 30 beds

2- Are you currently using a triage system in your emergency department?

- Yes
- No (if no proceed to question 5)

3- What urgency scale are you using in your emergency department?

- 2 levels
- 3 levels
- 4 levels
- 5 levels
- Other (specify)

4- Who is doing triage in your emergency department?

- Physicians
- Nurses
- Ward Clerk
- Other (specify)

5- Do you have a designated area in which all ED patients are seen and prioritised?

Yes

No

6- When your emergency department is overcrowded, on what bases do you decide which patient should get attention first?

Obvious illness or injury

Patient history

Time of arrival

Other (specify)

--

Part 3: Simulation Scenarios**Please select the answer for each scenario****Scenario 1:**

An 18 year old female presented to the emergency department with her friends. According to them, she ingested an unknown quantity of tablets about 40 minutes ago following a fight with a friend. On further questioning you establish the medication she took included 24 x paracetamol tablets. She appears drowsy at triage, is disorientated to time and place, and in the last 10 minutes her friends report that she has been 'twitchy' O/A: RR 26 HR 136.

A- Ideally, how long this patient should wait to be seen by a physician?

- | | | | |
|--------------------------|-----------------------|--------------------------|----------------------|
| <input type="checkbox"/> | Immediately | <input type="checkbox"/> | Within 10 |
| <input type="checkbox"/> | Within 30 min | <input type="checkbox"/> | Within 60 min |
| <input type="checkbox"/> | Within 120 min | | |

B - Where should this patient sent?

- | | | | |
|--------------------------|------------------------|--------------------------|-------------------------|
| <input type="checkbox"/> | Waiting area | <input type="checkbox"/> | Un-Monitored bed |
| <input type="checkbox"/> | Monitored bed | <input type="checkbox"/> | Resuscitation |
| <input type="checkbox"/> | Other (specify) | | |

C - How long does this type of patient usually wait in your Emergency Department?**Answer:**

Scenario 2:

A 45 year old female presents to triage complaining of a 'cold' for 4 days. She presents because over the last 2 days the pain in her right upper quadrant is increasing and she now describes right thoracic back pain. She states that she has had no vomiting, diarrhoea or urinary symptoms but has had difficulty in breathing since yesterday. Her skin is pale, hot and moist and she has a normal respiratory effort. She describes having a fever and her heart rate is 112 and her respiratory rate is 26/min. She rates her pain as 7/10 and her pain increases with movement and deep inspiration.

A- Ideally, how long this patient should wait to be seen by a physician?

- | | |
|--|---|
| <input type="checkbox"/> Immediately | <input type="checkbox"/> Within 10 |
| <input type="checkbox"/> Within 30 min | <input type="checkbox"/> Within 60 min |
| <input type="checkbox"/> Within 120 min | |

B - Where should this patient sent?

- | | |
|---|--|
| <input type="checkbox"/> Waiting area | <input type="checkbox"/> Un-Monitored bed |
| <input type="checkbox"/> Monitored bed | <input type="checkbox"/> Resuscitation |
| <input type="checkbox"/> Other (specify) | |

C - How long does this type of patient usually wait in your Emergency Department?**Answer:**

Scenario 3:

Ambulance officers arrive without prior notice with a female front seat passenger from a single motor vehicle crash that involved multiple rollovers. They state the patient was walking around at the scene, intoxicated, abusive, and complaining of abdominal pain but was reluctant to come to hospital. On examination the patient is centrally cyanosed and not breathing.

A- Ideally, how long this patient should wait to be seen by a physician?

- | | | | |
|--------------------------|-----------------------|--------------------------|----------------------|
| <input type="checkbox"/> | Immediately | <input type="checkbox"/> | Within 10 |
| <input type="checkbox"/> | Within 30 min | <input type="checkbox"/> | Within 60 min |
| <input type="checkbox"/> | Within 120 min | | |

B - Where should this patient sent?

- | | | | |
|--------------------------|------------------------|--------------------------|-------------------------|
| <input type="checkbox"/> | Waiting area | <input type="checkbox"/> | Un-Monitored bed |
| <input type="checkbox"/> | Monitored bed | <input type="checkbox"/> | Resuscitation |
| <input type="checkbox"/> | Other (specify) | | |

C - How long does this type of patient usually wait in your Emergency Department?

Answer:

Scenario 4:

A 53 year old male presents asking for a review of his blood pressure medication. He describes having had a headache during the past week it is 2 years since he saw any doctor about his medication. GCS 15/15, heart rate 70, no nausea or vomiting, currently pain free.

A- Ideally, how long this patient should wait to be seen by a physician?

- | | | | |
|--------------------------|-----------------------|--------------------------|----------------------|
| <input type="checkbox"/> | Immediately | <input type="checkbox"/> | Within 10 |
| <input type="checkbox"/> | Within 30 min | <input type="checkbox"/> | Within 60 min |
| <input type="checkbox"/> | Within 120 min | | |

B - Where should this patient sent?

- | | | | |
|--------------------------|------------------------|--------------------------|-------------------------|
| <input type="checkbox"/> | Waiting area | <input type="checkbox"/> | Un-Monitored bed |
| <input type="checkbox"/> | Monitored bed | <input type="checkbox"/> | Resuscitation |
| <input type="checkbox"/> | Other (specify) | | |

C - How long does this type of patient usually wait in your Emergency Department?

Answer:

Scenario 5:

A 36 year old female presents with a two day history of feeling generally unwell. She has an ache in her lower abdomen and describes having to go to the toilet more frequently than normal. On further questioning she has had urinary frequency for 12/24, rates pain 4/10, HR 98, temperature 37.8. Patient appears pale.

A- Ideally, how long this patient should wait to be seen by a physician?

- | | | | |
|--------------------------|-----------------------|--------------------------|----------------------|
| <input type="checkbox"/> | Immediately | <input type="checkbox"/> | Within 10 |
| <input type="checkbox"/> | Within 30 min | <input type="checkbox"/> | Within 60 min |
| <input type="checkbox"/> | Within 120 min | | |

B - Where should this patient sent?

- | | | | |
|--------------------------|------------------------|--------------------------|-------------------------|
| <input type="checkbox"/> | Waiting area | <input type="checkbox"/> | Un-Monitored bed |
| <input type="checkbox"/> | Monitored bed | <input type="checkbox"/> | Resuscitation |
| <input type="checkbox"/> | Other (specify) | | |

C - How long does this type of patient usually wait in your Emergency Department?

Answer:

Scenario 6:

A woman presents with a 6 month old baby who she states won't wake up. Child breathing, floppy, unrousable with pin-point pupils.

A- Ideally, how long this patient should wait to be seen by a physician?

- | | | | |
|--------------------------|-----------------------|--------------------------|----------------------|
| <input type="checkbox"/> | Immediately | <input type="checkbox"/> | Within 10 |
| <input type="checkbox"/> | Within 30 min | <input type="checkbox"/> | Within 60 min |
| <input type="checkbox"/> | Within 120 min | | |

B - Where should this patient sent?

- | | | | |
|--------------------------|------------------------|--------------------------|-------------------------|
| <input type="checkbox"/> | Waiting area | <input type="checkbox"/> | Un-Monitored bed |
| <input type="checkbox"/> | Monitored bed | <input type="checkbox"/> | Resuscitation |
| <input type="checkbox"/> | Other (specify) | | |

C - How long does this type of patient usually wait in your Emergency Department?

Answer:

Scenario 7:

A 64 year old female is brought in by her husband in a private car, self referred. She states she caught her leg on a garden seat whilst carrying the washing in from the clothesline. She is concerned that there was a fair amount of bleeding as she describes the gash to be 3 cms long. She is not distressed.

A- Ideally, how long this patient should wait to be seen by a physician?

- | | | | |
|--------------------------|-----------------------|--------------------------|----------------------|
| <input type="checkbox"/> | Immediately | <input type="checkbox"/> | Within 10 |
| <input type="checkbox"/> | Within 30 min | <input type="checkbox"/> | Within 60 min |
| <input type="checkbox"/> | Within 120 min | | |

B - Where should this patient sent?

- | | | | |
|--------------------------|------------------------|--------------------------|-------------------------|
| <input type="checkbox"/> | Waiting area | <input type="checkbox"/> | Un-Monitored bed |
| <input type="checkbox"/> | Monitored bed | <input type="checkbox"/> | Resuscitation |
| <input type="checkbox"/> | Other (specify) | | |

C - How long does this type of patient usually wait in your Emergency Department?

Answer:

Scenario 8:

A 27 years old male, presents to triage via private car following a fall from scaffolding at a construction site approximately 20 minutes ago. He apparently fell approximately 10 feet onto a concrete slab. He was observed by work mates to be unresponsive for about 5 minutes, since has woken but is drowsy. He has vomited x 4 since the fall, has a large boggy haematoma to his occiput and is complaining of generalised headache. GCS 13/15 HR 74 RR 14.

A- Ideally, how long this patient should wait to be seen by a physician?

- | | | | |
|--------------------------|-----------------------|--------------------------|----------------------|
| <input type="checkbox"/> | Immediately | <input type="checkbox"/> | Within 10 |
| <input type="checkbox"/> | Within 30 min | <input type="checkbox"/> | Within 60 min |
| <input type="checkbox"/> | Within 120 min | | |

B - Where should this patient sent?

- | | | | |
|--------------------------|------------------------|--------------------------|-------------------------|
| <input type="checkbox"/> | Waiting area | <input type="checkbox"/> | Un-Monitored bed |
| <input type="checkbox"/> | Monitored bed | <input type="checkbox"/> | Resuscitation |
| <input type="checkbox"/> | Other (specify) | | |

C - How long does this type of patient usually wait in your Emergency Department?

Answer:

Scenario 9:

A 19 year old male presents with a 12 month history of an infected great right toe. He has had the same problem twice in the last year and the nail has been removed on each occasion. Pus is seen oozing from under the nail. The toe is red, swollen and tender. No other relevant medical history, Temperature 36.8.

A- Ideally, how long this patient should wait to be seen by a physician?

- | | | | |
|--------------------------|-----------------------|--------------------------|----------------------|
| <input type="checkbox"/> | Immediately | <input type="checkbox"/> | Within 10 |
| <input type="checkbox"/> | Within 30 min | <input type="checkbox"/> | Within 60 min |
| <input type="checkbox"/> | Within 120 min | | |

B - Where should this patient sent?

- | | | | |
|--------------------------|------------------------|--------------------------|-------------------------|
| <input type="checkbox"/> | Waiting area | <input type="checkbox"/> | Un-Monitored bed |
| <input type="checkbox"/> | Monitored bed | <input type="checkbox"/> | Resuscitation |
| <input type="checkbox"/> | Other (specify) | | |

C - How long does this type of patient usually wait in your Emergency Department?

Answer:

Scenario 10:

A 45 year old male presents to triage with a one hour history of sudden onset left flank pain radiating to left lower quadrant, associated with nausea but no vomiting. The patient states pain comes and goes, currently c/o slight ache only. Looks pale, skin cool/dry. When questioned patient states that he has had trouble voiding and is only passing small amounts of dark urine. Pain scale: 6/10

A- Ideally, how long this patient should wait to be seen by a physician?

- | | | | |
|--------------------------|-----------------------|--------------------------|----------------------|
| <input type="checkbox"/> | Immediately | <input type="checkbox"/> | Within 10 |
| <input type="checkbox"/> | Within 30 min | <input type="checkbox"/> | Within 60 min |
| <input type="checkbox"/> | Within 120 min | | |

B - Where should this patient sent?

- | | | | |
|--------------------------|------------------------|--------------------------|-------------------------|
| <input type="checkbox"/> | Waiting area | <input type="checkbox"/> | Un-Monitored bed |
| <input type="checkbox"/> | Monitored bed | <input type="checkbox"/> | Resuscitation |
| <input type="checkbox"/> | Other (specify) | | |

C - How long does this type of patient usually wait in your Emergency Department?

Answer:

Scenario 11:

A 38 year old woman with a past history of asthma for which she has required 2 ICU admissions in the past 2 years. She presents to triage at 2030 hours following an 18 hour history of wheeze and SOB. She has been self-administering ventolin at home but has had minimal response to this despite 3 x nebulizers in the past hour. O/A RR 26, speaking in 3 word sentences, audible wheeze.

A- Ideally, how long this patient should wait to be seen by a physician?

- | | | | |
|--------------------------|-----------------------|--------------------------|----------------------|
| <input type="checkbox"/> | Immediately | <input type="checkbox"/> | Within 10 |
| <input type="checkbox"/> | Within 30 min | <input type="checkbox"/> | Within 60 min |
| <input type="checkbox"/> | Within 120 min | | |

B - Where should this patient sent?

- | | | | |
|--------------------------|------------------------|--------------------------|-------------------------|
| <input type="checkbox"/> | Waiting area | <input type="checkbox"/> | Un-Monitored bed |
| <input type="checkbox"/> | Monitored bed | <input type="checkbox"/> | Resuscitation |
| <input type="checkbox"/> | Other (specify) | | |

C - How long does this type of patient usually wait in your Emergency Department?

Answer:

Scenario 12:

A 74-year old male presents following trauma to his left arm after slipping on a wet floor. He describes tenderness at his wrist, elbow and shoulder. Pain rating is 3. No obvious deformity but decreased range of movement, Heart rate 92.

A- Ideally, how long this patient should wait to be seen by a physician?

- | | | | |
|--------------------------|-----------------------|--------------------------|----------------------|
| <input type="checkbox"/> | Immediately | <input type="checkbox"/> | Within 10 |
| <input type="checkbox"/> | Within 30 min | <input type="checkbox"/> | Within 60 min |
| <input type="checkbox"/> | Within 120 min | | |

B - Where should this patient sent?

- | | | | |
|--------------------------|------------------------|--------------------------|-------------------------|
| <input type="checkbox"/> | Waiting area | <input type="checkbox"/> | Un-Monitored bed |
| <input type="checkbox"/> | Monitored bed | <input type="checkbox"/> | Resuscitation |
| <input type="checkbox"/> | Other (specify) | | |

C - How long does this type of patient usually wait in your Emergency Department?

Answer:

Scenario 13:

An obviously pregnant woman presents stating she is in labour and that she thinks there is something hanging down between her legs. On cursory examination under her dress what appears to be umbilical cord is observed.

A- Ideally, how long this patient should wait to be seen by a physician?

- | | | | |
|--------------------------|-----------------------|--------------------------|----------------------|
| <input type="checkbox"/> | Immediately | <input type="checkbox"/> | Within 10 |
| <input type="checkbox"/> | Within 30 min | <input type="checkbox"/> | Within 60 min |
| <input type="checkbox"/> | Within 120 min | | |

B - Where should this patient sent?

- | | | | |
|--------------------------|------------------------|--------------------------|-------------------------|
| <input type="checkbox"/> | Waiting area | <input type="checkbox"/> | Un-Monitored bed |
| <input type="checkbox"/> | Monitored bed | <input type="checkbox"/> | Resuscitation |
| <input type="checkbox"/> | Other (specify) | | |

C - How long does this type of patient usually wait in your Emergency Department?

Answer:

Scenario 14:

A 32 year old male presents to triage stating that he has vomited blood twice in the lasts 6 hours. He describes dark bowel motions for the last three days and has a past Hx of liver cirrhosis. His skin is pale, warm and dry, his heart rate is 108 and his respiratory rate is 20/min. He states he does not have any pain but complains of nausea.

A- Ideally, how long this patient should wait to be seen by a physician?

- | | | | |
|--------------------------|-----------------------|--------------------------|----------------------|
| <input type="checkbox"/> | Immediately | <input type="checkbox"/> | Within 10 |
| <input type="checkbox"/> | Within 30 min | <input type="checkbox"/> | Within 60 min |
| <input type="checkbox"/> | Within 120 min | | |

B - Where should this patient sent?

- | | | | |
|--------------------------|------------------------|--------------------------|-------------------------|
| <input type="checkbox"/> | Waiting area | <input type="checkbox"/> | Un-Monitored bed |
| <input type="checkbox"/> | Monitored bed | <input type="checkbox"/> | Resuscitation |
| <input type="checkbox"/> | Other (specify) | | |

C - How long does this type of patient usually wait in your Emergency Department?

Answer:

Scenario 15:

A male aged 28 years presents to the emergency department at 9 pm on a Friday night requesting a workers' compensation certificate for a day off work the previous week. He had been seen at the hospital five days previously with a sprained wrist and had been given the certificate for one day off work. He had lost his certificate. He said he was prepared to wait as his boss had told him to get a new certificate by Saturday morning or he would be 'in big trouble' Wrist no longer painful, says he 'feels fine'.

A- Ideally, how long this patient should wait to be seen by a physician?

- | | | | |
|--------------------------|-----------------------|--------------------------|----------------------|
| <input type="checkbox"/> | Immediately | <input type="checkbox"/> | Within 10 |
| <input type="checkbox"/> | Within 30 min | <input type="checkbox"/> | Within 60 min |
| <input type="checkbox"/> | Within 120 min | | |

B - Where should this patient sent?

- | | | | |
|--------------------------|------------------------|--------------------------|-------------------------|
| <input type="checkbox"/> | Waiting area | <input type="checkbox"/> | Un-Monitored bed |
| <input type="checkbox"/> | Monitored bed | <input type="checkbox"/> | Resuscitation |
| <input type="checkbox"/> | Other (specify) | | |

C - How long does this type of patient usually wait in your Emergency Department?

Thank You

Appendix E: Permission Letter from the Commonwealth Copyright Administration



Australian Government
Attorney-General's Department

**Information Law and
 Human Rights Division**

10 September 2007

Mr Mohammed Aljohani
 2A Cornwall Rd
 PASCOE VALE VIC 3044

Email: mohammed.aljohani@med.monash.edu.au

Copyright Request - Reference Number – 14105

Dear Mr Aljohani

I refer to your request of 9 September 2007 in which you seek permission to reproduce/ communicate and/or adapt the following Commonwealth of Australia copyright material:

1 Triage Education Resource Book

for inclusion in your PhD research project.

Copyright Permission

Permission is granted to use the advised material for the specific purpose requested on a revocable, non-exclusive, non-transferable basis without charge subject to the following terms:

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The source of the material must be recognised through the inclusion of an acknowledgment.

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Separate permission is required for commercial use. You may charge a fee for the material, provided that the material is used for educational purposes (eg. provision to students, teachers and other schools) and the fee charged does not exceed the cost of making and supplying the material.

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Separate permission is required for commercial use. You may charge a fee for the material, provided that the material is used for educational purposes (eg. provision to students, teachers and other schools) and the fee charged does not exceed the cost of making and supplying the material.

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Yours sincerely

Alison Mora
Commonwealth Copyright Administration
Copyright Law Branch

Telephone—6250 6200

Website—<http://www.ag.gov.au/cca>

Appendix F: Study 1, Instructions and Questionnaire, Arabic Version

MONASH University



معلومات وتعليمات لتعبئة الاستبيان

عزيزي المشارك،

شكراً جزيلاً على مشاركتك في هذه الدراسة. وسيتم في هذه الدراسة استخدام المقياس الأسترالي لفرز الحالات حسب درجة الإلحاح.

هذا المقياس يقسم الحالات إلى خمس فئات زمنية، كل حالة يجب أن توضع في الأولوية التي تحتاجها حسب خطورة الحالة وليس بناء على أول المرضى وصولاً. هذه الفئات الخمس كما يلي :

الفئة	الوصف	التعامل
الأولى	عاجل - فيه خطورة على الحياة	التقييم والعلاج حالاً
الثانية	وضع وشيك أن يصبح خطراً على الحياة	التقييم والعلاج خلال 10 دقائق
الثالثة	وضع قد يكن خطراً على الحياة	التقييم والعلاج خلال 30 دقيقة
الرابعة	وضع قد يكون خطير	التقييم والعلاج خلال 60 دقيقة
الخامسة	وضع أقل استعجالاً	التقييم والعلاج خلال 120 دقيقة

كل حالة من الحالات الخمسة تحتاج منك ما يلي:

- تسجيل انطباعك الأولي عن الحالة
- اختيار الفئة التي تراها مناسبة
- الإجابة على الأسئلة التالية

يرجى عدم مناقشة الخيارات مع زملائك أثناء الإجابة
الرجاء الانتقال إلى الاستبيان

School of Nursing and Midwifery

Faculty of Medicine, Nursing and Health Sciences
PO Box 527. Frankston, VIC, 3199, Australia

الجزء الأول: دراسة إحصائية عن المشاركين

1- هل أنت:

طبيب ممرض

2- الجنس:

ذكر أنثى

3- عمرك؟

فوق 50 50-36 35-26 25-18

4- ماهو مؤهلك العلمي؟

معهد صحي الشهادة الجامعية المتوسطة
 بكالوريوس دراسات فوق الجامعية

5- كم عدد سنوات العمل في مهنتك؟

اقل من خمس سنوات 9-5 15-10 أكثر من 15

6- كم عدد سنوات العمل في قسم الطوارئ؟

اقل من سنة 6-1 10-7 أكثر من عشر سنوات

الجزء الثاني: دراسة إحصائية عن المستشفى

1- كم عدد الأسرة في قسم الطوارئ لديكم؟

- أقل من عشرة أسرة
 10-20 سرير
 21-30 سرير
 أكثر من 30 سرير

2- هل قسم الطوارئ لديكم حالياً يستخدم نظام رسمي لفرز الحالات التي تصل إلى القسم؟

- نعم
 لا (انتقل إلى السؤال رقم 5)

3- ماهو المقياس المستخدم لتقسيم الحالات بحسب الخطورة ؟ هل هو:

- مستويان
 3 مستويات
 4 مستويات
 5 مستويات
 غير ذلك (حدد)

4- من الذي يقوم بفرز الحالات عند وصولها قسم الطوارئ؟

- أطباء القسم
 التمريض
 موظف استقبال القسم (إداري)
 غير ذلك (حدد)

5- هل يوجد في القسم منطقة مخصصة يتم فيها فحص جميع المرضى لدى وصولهم للقسم؟

نعم

لا

6- عند وصول عدد كبير من المرضى في وقت واحد، على أي أساس يتم اتخاذ قرار من يتلقى العناية أولاً؟

المرض الواضح أو الإصابة الواضحة

التاريخ المرضي

وقت الوصول

أمور أخرى (حدد)

الجزء الثالث: حالات إفتراضية

الرجاء قراءة الحالات وأختار الإجابة المناسبة حسب رؤيتك لكل حالة ، ثم اجب على الأسئلة المتعلقة بها

الحالة رقم 1:

حضرت أنثى عمرها 18 سنة إلى قسم الطوارئ برفقة أصدقائها، أفاد مرافقوها أنها ابتلعت كمية غير معروفة من الأقراص منذ حوالي أربعين دقيقة عقب شجار مع أحد الأصدقاء. وبالسؤال تمكنت من معرفة أنها ابتلعت 24 حبة من أقراص الباراسيتامول. تبدو مترنحة وغير مدركة للوقت والمكان، وأفاد المرافقون أنها كانت ترتعش خلال العشر دقائق الأخيرة، بالفحص وجدت أن معدل التنفس 26 و ضربات القلب 136.

أ- ماهو الوقت المثالي الذي يجب ان يتم خلاله معاينة هذا المريض من قبل طبيب الطوارئ؟

□ - حالاً □ خلال 10 دقائق □ خلال 30 دقيقة □ خلال 60 دقيقة □ خلال 120 دقيقة

ب- إلي اين يجب أن يتم إرسال هذا المريض؟

- إلى غرفة الانتظار □ إلى سرير يكون تحت الملاحظة
□ إلى سرير بدون ملاحظة □ إلى غرفة الإنعاش
□ أخرى (حدد)

ج- ماهو الوقت المعتاد الذي تنتظره الحالات المشابهة لهذه الحالة في قسم الطوارئ لديكم؟

الحالة رقم 2:

حضرت امرأة عمرها 45 سنة إلى قسم الطوارئ (الفرز) تشكو من برد لمدة 4 أيام. سبب حضورها للطوارئ بسبب الألم في منطقة الربع العلوي الأيمن من البطن الذي بدأ في الزيادة خلال اليومين الأخيرين، وهي حالياً تشكو من الألم في الصدر من الجهة الخلفية. أفادت انه لا يوجد لديها قيء، إسهال، أو أعراض بولية غير أنها تجد صعوبة في التنفس منذ أمس. الجلد شاحب، حار، ورطب والجهد التنفسي طبيعي. وصفت بأن لديها حمى ، معدل ضربات القلب 112 ومعدل التنفس 26 في الدقيقة. تقييم الألم 7 من 10 ويزداد الألم مع الحركة والتنفس العميق.

أ- ماهو الوقت المثالي الذي يجب ان يتم خلاله معاينة هذا المريض من قبل طبيب الطوارئ؟

حالاً خلال 10 دقائق خلال 30 دقيقة خلال 60 دقيقة خلال 120 دقيقة

ب- إلى أين يجب أن يتم إرسال هذا المريض؟

إلى غرفة الانتظار إلى سرير يكون تحت الملاحظة
 إلى سرير بدون ملاحظة إلى غرفة الإنعاش
 أخرى (حدد)

ج- ماهو الوقت المعتاد الذي تنتظره الحالات المشابهة لهذه الحالة في قسم الطوارئ لديكم؟

حالة رقم 3:

حضر موظفو الإسعاف بدون إخطار سابق ومعهم مصابة في حادث سير وكانت في المقعد الأمامي حين انقلبت السيارة عدة مرات. أفادوا بأن المصابة كانت تمشي حول مكان الحادث وتشكو من ألم في البطن، غير أنها كانت ترفض المجيء للمستشفى. بالفحص وجد لدى المصابة زرقة مركزية ولا تتنفس.

أ- ماهو الوقت المثالي الذي يجب أن يتم خلاله معاينة هذا المريض من قبل طبيب الطوارئ؟

حالاً خلال 10 دقائق خلال 30 دقيقة خلال 60 دقيقة خلال 120 دقيقة

ب- إلى أين يجب أن يتم إرسال هذا المريض؟

إلى غرفة الانتظار إلى سرير يكون تحت الملاحظة
 إلى سرير بدون ملاحظة إلى غرفة الإنعاش
 أخرى (حدد)

ج- ماهو الوقت المعتاد الذي تنتظره الحالات المشابهة لهذه الحالة في قسم الطوارئ لديكم؟

الحالة رقم 4:

حضر إلى قسم الطوارئ رجل عمره 53 سنة يطلب مراجعة أدوية الضغط لديه. يقول المريض انه كان يشكو من صداع خلال الأسبوع الماضي، وأيضاً انه مرت سنتين لم يراجع خلالها أي طبيب بخصوص أدوية الضغط. مقياس جلاسكو للغيوبة (GCS) 15/15، ضربات القلب 70، لا يوجد غثيان أو قيء، ولا يوجد ألم حالياً.

أ- ماهو الوقت المثالي الذي يجب أن يتم خلاله معاينة هذا المريض من قبل طبيب الطوارئ؟

□ - حالاً □ خلال 10 دقائق □ خلال 30 دقيقة □ خلال 60 دقيقة □ خلال 120 دقيقة

ب- إلى أين يجب أن يتم إرسال هذا المريض؟

□ إلى غرفة الانتظار □ إلى سرير يكون تحت الملاحظة
□ إلى سرير بدون ملاحظة □ غرفة الإنعاش
□ أخرى (حدد)

ج- ماهو الوقت المعتاد الذي تنتظره الحالات المشابهة لهذه الحالة في قسم الطوارئ لديكم؟

الحالة رقم 5:

حضرت امرأة تبلغ من العمر 36 سنة إلى قسم الطوارئ تشكو من توعك عام منذ يومين. يوجد لديها ألم أسفل البطن ، وتصف أنها تذهب لدورة المياه أكثر من المعتاد. وبالسؤال علمت انه بلغ مرات التبول 12 خلال أربع وعشرين ساعة، تقييم الألم 10/4، ضربات القلب 98، الحرارة 37.8. المريضة تبدو شاحبة.

أ- ماهو الوقت المثالي الذي يجب أن يتم خلاله معاينة هذا المريض من قبل طبيب الطوارئ؟

□ - حالاً □ خلال 10 دقائق □ خلال 30 دقيقة □ خلال 60 دقيقة □ خلال 120 دقيقة

ب- إلي أين يجب أن يتم إرسال هذا المريض؟

□ إلى غرفة الانتظار □ إلى سرير يكون تحت الملاحظة
□ إلى سرير بدون ملاحظة □ إلى غرفة الإنعاش
□ أخرى (حدد)

ج- ماهو الوقت المعتاد الذي تنتظره الحالات المشابهة لهذه الحالة في قسم الطوارئ لديكم؟

الحالة رقم 6:

حضرت امرأة لقسم الطوارئ معها طفل عمره 6 أشهر وقد أفادت أمه انه لا يستطيع تنفس الطفل متخبطاً، غير قادر على الاستيقاظ، وبؤبؤ العينين بشكل رأس الدبوس.

أ- ماهو الوقت المثالي الذي يجب أن يتم خلاله معاينة هذا المريض من قبل طبيب الطوارئ؟

□ - حالاً □ خلال 10 دقائق □ خلال 30 دقيقة □ خلال 60 دقيقة □ خلال 120 دقيقة

ب- إلي أين يجب أن يتم إرسال هذا المريض؟

□ إلى غرفة الانتظار □ إلى سرير يكون تحت الملاحظة
□ إلى سرير بدون ملاحظة □ إلى غرفة الإنعاش
□ أخرى (حدد)

ج- ماهو الوقت المعتاد الذي تنتظره الحالات المشابهة لهذه الحالة في قسم الطوارئ لديكم؟

الحالة رقم 7:

أحضرت أنثى عمرها 64 سنة إلى قسم الطوارئ بواسطة سيارة زوجها (بدون تحويل) أفادت بأنها قد جرحت رجلها على كرسي الحديقة أثناء حمل الغسيل، وهي قلقة من كمية الدم الذي نزفتها، كما أنها تصف الجرح بالبليغ بطول 3 سم، تنفسها طبيعي.

أ- ماهو الوقت المثالي الذي يجب ان يتم خلاله معاينة هذا المريض من قبل طبيب الطوارئ؟

□ - حالاً □ خلال 10 دقائق □ خلال 30 دقيقة □ خلال 60 دقيقة □ خلال 120 دقيقة

ب- إلى أين يجب أن يتم إرسال هذا المريض؟

- إلى غرفة الانتظار □ إلى سرير يكون تحت الملاحظة
 □ إلى سرير بدون ملاحظة □ إلى غرفة الإنعاش
 □ أخرى (حدد)

ج- ماهو الوقت المعتاد الذي تنتظره الحالات المشابهة لهذه الحالة في قسم الطوارئ لديكم؟

الحالة رقم 8:

حضر رجل عمره 27 سنة إلى قسم الطوارئ (الفرز) بواسطة سيارة خاصة اثر سقوطه من سقالة في موقع بناء قبل 20 دقيقة تقريباً. يبدو انه سقط من ارتفاع 10 أقدام تقريباً على لوح خرساني. لاحظ زملائه في العمل أنه بدأ غير مستجيب لمدة 5 دقائق، عاد لوعيه بعدها غير انه غير متزن. استفرغ 4 مرات منذ سقوطه. يوجد لديه تجمع دموي في مؤخرة الرأس ويشكو من صداع عام. مقياس جلاسكو للغيبوبة (GCS) 15/13 ضربات القلب 74 والتنفس 14.

أ- ماهو الوقت المثالي الذي يجب أن يتم خلاله معاينة هذا المريض من قبل طبيب الطوارئ؟

□ - حالاً □ خلال 10 دقائق □ خلال 30 دقيقة □ خلال 60 دقيقة □ خلال 120 دقيقة

ب- إلي أين يجب أن يتم إرسال هذا المريض؟

□ إلى غرفة الانتظار □ إلى سرير يكون تحت الملاحظة
□ إلى سرير بدون ملاحظة □ إلى غرفة الإنعاش
□ أخرى (حدد)

ج- ماهو الوقت المعتاد الذي تنتظره الحالات المشابهة لهذه الحالة في قسم الطوارئ لديكم؟

الحالة رقم 9:

حضر رجل عمره 19 سنة وهو يشكو من التهاب في إصبع القدم الكبير منذ 12 شهر. وقد سبق أن تعرض لنفس المشكلة مرتين في السنة السابقة وتم إزالة الظفر في كلتا الحالتين. يوجد صديد يخرج من تحت الأظفار، الإصبع احمر، متورم، ومؤلم. لا يوجد اي تاريخ مرضي آخر، الحرارة 36.8.

أ- ماهو الوقت المثالي الذي يجب أن يتم خلاله معاينة هذا المريض من قبل طبيب الطوارئ؟

□ - حالاً □ خلال 10 دقائق □ خلال 30 دقيقة □ خلال 60 دقيقة □ خلال 120 دقيقة

ب- إلي أين يجب أن يتم إرسال هذا المريض؟

- إلى غرفة الانتظار □ إلى سرير يكون تحت الملاحظة
 □ إلى سرير بدون ملاحظة □ إلى غرفة الإنعاش
 □ أخرى (حدد)

ج- ماهو الوقت المعتاد الذي تنتظره الحالات المشابهة لهذه الحالة في قسم الطوارئ لديكم؟

الحالة رقم 10:

حضر مريض ذكر يبلغ من العمر 45 سنة إلى قسم الطوارئ (الفرز) وهو يشكو منذ حوالي ساعة من ألم مفاجئ في الخصرة اليسرى ويشع إلى الربع السفلي الأيسر. مصحوبا بغثيان غير انه لا يوجد قيء. المريض يصف الألم بأنه يأتي ويذهب، حاليا يشكو من ألم خفيف فقط. يبدو شاحبا، الجلد بارد وجاف. بسؤال المريض تبين أن لديه مشكله بالتبول واستطاع فقط أن يتبول كميته قليلة من البول القاتم، تقييم الألم 10/6.

أ- ماهو الوقت المثالي الذي يجب ان يتم خلاله معاينة هذا المريض من قبل طبيب الطوارئ؟

□ - حالاً □ خلال 10 دقائق □ خلال 30 دقيقة □ خلال 60 دقيقة □ خلال 120 دقيقة

ب- إلي أين يجب أن يتم إرسال هذا المريض؟

□ إلى غرفة الانتظار □ إلى سرير يكون تحت الملاحظة
□ إلى سرير بدون ملاحظة □ إلى غرفة الإنعاش
□ أخرى (حدد)

ج- ماهو الوقت المعتاد الذي تنتظره الحالات المشابهة لهذه الحالة في قسم الطوارئ لديكم؟

الحالة رقم 11:

امرأة عمرها 38 سنة لديها تاريخ مرضي سابق مع مرض الربو مما استلزم دخولها قسم العناية المركزة مرتين في السنتين الأخيرتين. حضرت إلى قسم الطوارئ (الفرز) في الساعة 8:30 مساءً، كانت تشكو خلال الـ 18 ساعة الأخيرة من صوت أزيز في الصدر مع قصر في مدة التنفس. وقد استخدمت في المنزل بخاخ الفنتولين غير أن الاستجابة كانت ضعيفة إلى حد أنها استخدمت بخاخ الفنتولين 3 مرات خلال الساعة الأخيرة. بالفحص وجد أن معدل التنفس 26، وتتكلم بجمل من ثلاث كلمات فقط، هنالك صوت أزيز مسموع.

أ- ماهو الوقت المثالي الذي يجب ان يتم خلاله معاينة هذا المريض من قبل طبيب الطوارئ؟

- حالاً خلال 10 دقائق خلال 30 دقيقة خلال 60 دقيقة خلال 120 دقيقة

ب- إلي أين يجب أن يتم إرسال هذا المريض؟

إلى غرفة الانتظار إلى سرير يكون تحت الملاحظة
 إلى سرير بدون ملاحظة إلى غرفة الإنعاش
 أخرى (حدد)

ج- ماهو الوقت المعتاد الذي تنتظره الحالات المشابهة لهذه الحالة في قسم الطوارئ لديكم؟

الحالة رقم 12:

حضر إلى قسم الطوارئ رجل يبلغ من العمر 74 سنة بسبب إصابة في الذراع الأيسر عقب انزلاقه على أرضية مبتلة. يشكو من ألم مع الضغط في الرسغ، المرفق، والكتف. تقييم الألم 3 درجات من 10. لا يوجد اثر لتشووه واضح غير انه هنالك نقص في نطاق الحركة، ضربات القلب 92.

أ- ماهو الوقت المثالي الذي يجب ان يتم خلاله معاينة هذا المريض من قبل طبيب الطوارئ؟

□ - حالاً □ خلال 10 دقائق □ خلال 30 دقيقة □ خلال 60 دقيقة □ خلال 120 دقيقة

ب- إلى أين يجب أن يتم إرسال هذا المريض؟

□ إلى غرفة الانتظار □ إلى سرير يكون تحت الملاحظة
□ إلى سرير بدون ملاحظة □ إلى غرفة الإنعاش
□ أخرى (حدد)

ج- ماهو الوقت المعتاد الذي تنتظره الحالات المشابهة لهذه الحالة في قسم الطوارئ لديكم؟

الحالة رقم 13:

حضرت امرأة تبدو بشكل واضح أنها حامل لقسم الطوارئ، وهي تقول أنها في مخاض وتعتقد أن هناك شيء منحدر منها. بالفحص العابر وجد ما يبدو أنه الحبل السري.

أ- ماهو الوقت المثالي الذي يجب ان يتم خلاله معاينة هذا المريض من قبل طبيب الطوارئ؟

□ - حالاً □ خلال 10 دقائق □ خلال 30 دقيقة □ خلال 60 دقيقة □ خلال 120 دقيقة

ب- إلي أين يجب أن يتم إرسال هذا المريض؟

□ إلى غرفة الانتظار □ إلى سرير يكون تحت الملاحظة
□ إلى سرير بدون ملاحظة □ إلى غرفة الإنعاش
□ أخرى (حدد)

ج- ماهو الوقت المعتاد الذي تنتظره الحالات المشابهة لهذه الحالة في قسم الطوارئ لديكم؟

الحالة رقم 14:

حضر رجل عمره 32 سنة إلى قسم الطوارئ (الفرز) يقول بأنه استفرغ دم مرتين في خلال الست ساعات الأخيرة. ويصف أيضا براز داكن في الثلاثة أيام الأخيرة، كما انه لديه تاريخ مرضي بتليف الكبد. الجلد شاحب، دافئاً و جاف، ضربات القلب 108 ومعدل التنفس 20 في الدقيقة. يقول انه لا يوجد لديه ألم غير انه يشكو من غثيان.

أ- ماهو الوقت المثالي الذي يجب ان يتم خلاله معاينة هذا المريض من قبل طبيب الطوارئ؟

□ - حالاً □ خلال 10 دقائق □ خلال 30 دقيقة □ خلال 60 دقيقة □ خلال 120 دقيقة

ب- إلي أين يجب أن يتم إرسال هذا المريض؟

□ إلى غرفة الانتظار □ إلى سرير يكون تحت الملاحظة
□ إلى سرير بدون ملاحظة □ إلى غرفة الإنعاش
□ أخرى (حدد)

ج- ماهو الوقت المعتاد الذي تنتظره الحالات المشابهة لهذه الحالة في قسم الطوارئ لديكم؟

الحالة رقم 15:

حضر رجل عمره 28 سنة إلى قسم الطوارئ يوم الجمعة الساعة 9 مساءً يطلب شهادة تعويض للعمل عن يوم راحة مرضية في الأسبوع الماضي. وقد سبق له أن حضر لقسم الطوارئ قبل 5 أيام بسبب إلتواء في الرسغ وقد أعطي شهادة بيوم الراحة المرضية لذلك اليوم، وقد ضاعت هذه الشهادة. وهو يقول انه مستعداً للانتظار حيث أن رئيسه في العمل اخبره بان يجلب هذه الشهادة يوم السبت صباحا وإلا سيصبح في مشكله. حالياً لا يوجد ألم في الرسغ ، ويقول انه بخير حالياً.

أ- ماهو الوقت المثالي الذي يجب ان يتم خلاله معاينة هذا المريض من قبل طبيب الطوارئ؟

- حالاً خلال 10 دقائق خلال 30 دقيقة خلال 60 دقيقة خلال 120 دقيقة

ب- إلي أين يجب أن يتم إرسال هذا المريض؟

إلى غرفة الانتظار إلى سرير يكون تحت الملاحظة
 إلى سرير بدون ملاحظة إلى غرفة الإنعاش
 أخرى (حدد)

ج- ماهو الوقت المعتاد الذي تنتظره الحالات المشابهة لهذه الحالة في قسم الطوارئ لديكم؟

شكراً جزئياً على المشاركة

Appendix G: Explanatory Statement for Participants in Study 1, Arabic Version

MONASH University



بيان تفسيري للمشاركين في الدراسة

عنوان الدراسة: إنشاء نظام سعودي لفرز الحالات بأقسام الطوارئ

اسمي محمد الجهني واعمل حالياً على مشروع تحت إشراف الدكتور جوي لاينهم -المحاضر في كلية الطب ، مدرسة التمريض والعلوم الصحية- للحصول على درجة الدكتوراه في جامعة موناش. هذا يعنى بأن أقوم بكتابة أطروحة للدكتوراه بما يوازي كتاب من 300 صفحة.

أنت مدعوا للمشاركة في هذه الدراسة بسبب كونك من هيئة التمريض أو الأطباء العاملين بقسم الطوارئ في المملكة العربية السعودية. أيضا تم اختيارك للمشاركة لانطباق شروط المشاركة في الدراسة عليك (انظر المقطع القادم).

معايير التضمين والاستثناء

الاشتراك في الدراسة يقتصر على هيئة التمريض والأطباء والذين يعملون حالياً في أقسام الطوارئ العامة في المملكة العربية السعودية ممن لديهم خبرة عملية في الطوارئ لا تقل عن سنة واحدة. التمريض والأطباء والذين يقومون بمهام غير إكلينيكية أو لديهم خبرة عملية بحالية بقسم الطوارئ نقل عن السنة الواحدة سوف يتم استبعادهم من المشاركة في هذه الدراسة.

الهدف من هذه الدراسة

من خلال دراستي هذه ارغب في استكشاف كيفية فهم التمريض والأطباء العاملين في أقسام الطوارئ السعودية لمصطلح الإلحاح وذلك عن طريق استخدام مقياس معتمد لقياس الإلحاح. الدراسة تهدف إلى:

❖ وصف مستوى الاتفاق والدقة في اتخاذ القرار بين التمريض والأطباء العاملين في أقسام الطوارئ في المملكة العربية السعودية باستخدام مقياس مدى الإلحاح ذو الخمس درجات.

الفوائد المتوقعة من الدراسة

وفي كثير من الدول المتقدمة – كما في استراليا، كندا وبريطانيا - تم إنشاء وتطبيق أنظمة معتمدة لفرز الحالات في أقسام الطوارئ، والهدف الأول والرئيسي لهذه الأنظمة هو لضمان أن تكون الخدمة المقدمة لمراجعي أقسام الطوارئ مبنية على مدى الخطورة الإكلينيكية للمراجع. ولا يخفى عليكم أن عدد المراجعين لأقسام الطوارئ في ارتفاع مضطرد، وبالرغم من ذلك لا يوجد في كثير من أقسام الطوارئ بالمملكة العربية السعودية نظام منهجي لفرز الحالات التي تصل إليهم، لذلك المنهجية المعتمدة في فرز الحالات غير واضحة من المتوقع أن تفيد المعلومات الناتجة من هذه الدراسة بالتعرف على الطرق الحالية لفرز الحالات في أقسام الطوارئ. هذا بدوره سوف يساعد المسؤولين عن النظام الصحي في عملية التخطيط المستقبلي إضافة إلى التعرف على الاحتياجات التعليمية للعاملين في أقسام الطوارئ من تمريض وأطباء. إضافة إلى ذلك هذه الدراسة سوف تساعد الباحث على التعرف كيفية فهم العاملين بأقسام الطوارئ لمعنى الإلحاح وأيضا معرفة مدى أهمية أن يكون هناك نظام وطني لفرز الحالات.

مالذي يشملله الاشتراك في هذه الدراسة

المشاركة في هذه الدراسة تشتمل على تعبئة إستبانة من ثلاثة أجزاء.

الجزء الأول يحوي معلومات عن المشاركين تشمل المهنة، العمر، الجنس، مستوى التعليم، والخبرة العملية.

الجزء الثاني يهدف لمعرفة معلومات عن المستشفى التي يعمل بها المشارك. الجزء الثالث يتطلب الإجابة على 15 حالة تشبيهيه باستخدام مقياس فرز الحالات والمستخدم في فرز الحالات بجميع أقسام الطوارئ في دولة استراليا. في كل من تلك الحالات سوف يطلب من المشارك أن يختار الوقت المثالي الذي يجب أن يتم التعامل مع المريض خلاله، إلى أين يجب أن يرسل المريض؟ وأخيرا ما هو الوقت الفعلي، الذي تنتظره الحالات المشابهة للمريض في الحالة المذكورة حتى يراه طبيب الطوارئ؟

ماهي المدة المتوقعة لإتمام الإستبانة؟

من المتوقع أن تستغرق قراءة وتعبئة هذه الإستبانة ما بين 30 إلى 40 دقيقة من وقتك.

الإزعاج أو عدم الارتياح المتوقع بسبب الدراسة

من المحتمل أن يشعر بعض المشاركين أن هذه الإستبانة هي لغرض اختبار خلفياتهم العملية. على أي حال، إجابات المشاركين في الدراسة سوف يتم التعامل معها بشكل جماعي ولن يتم طلب هوية المشارك.

هل تستطيع الانسحاب من الدراسة؟

الإشتراك في هذه الدراسة طوعي ولديك الحق في الانسحاب من الدراسة في أي وقت. الإقرار بالموافقة على الإشتراك في هذه الدراسة يكون بإعادة الأستبانة معبأة.

السرية

الإشتراك في هذه الدراسة طوعي. وللمحافظة على سرية المشاركين لا تتطلب الدراسة كتابة أسماء أو ما يدل على شخصية المشارك. وأيضا سوف تعاد الإستبانة في مظروف مغلق إلى الصندوق المخصص لذلك. النتائج التي سوف تنشر من هذه الدراسة سوف تكون بشكل ملخص ولا تحتوي على أي معلومات تقود إلى معرفة هوية المشاركين في الدراسة.

تخزين البيانات

تخزين البيانات من هذه الدراسة سوف يخضع لأنظمة الجامعة وتحفظ في حرم الجامعة في دولاب آمن لمدة خمسة سنوات. قد يقدم تقرير عن الدراسة غير انه لن يشمل أي معلومات تقود إلى معرفة هوية المشاركين.

استخدام البيانات لأي أغراض أخرى

نتائج هذه الدراسة سوف تقدم في أطروحة الدكتوراه وفي مقالات في المجلات العلمية، لن يشمل ذلك نشر أي معلومات تخص هوية المشاركين.

النتائج

النتائج النهائية سوف تقدم بشكل ملخص لكل من الأقسام المشاركة، لذلك إذا لم تصلك النتائج بنهاية شهر يناير 2009 الرجاء الاتصال على الباحث محمد الجهني على البريد الإلكتروني التالي:

mohammed.aljohani@med.monash.edu.au

إذا لديك أي شكوى بخصوص طريقة البحث يمكن الاتصال على	إذا رغبت بالاتصال بالباحث الرئيس بخصوص أي شأن متعلق بالبحث الرجاء الاتصال بالدكتور جوي لاينهام
Building E, Peninsula Campus, McMahons Road, Peninsula, VIC 3199, Po Box 527 Phone 1: 3 9904 4651 Fax: 3 9904 4655 joy.lyneham@med.monash.edu.au	Human Ethics Officer Standing Committee on Ethics in Research Involving Humans (SCERH) Building 3E Room 111, Research Office Monash University VIC 3800 Tel: +61 3 9905 2052 Fax: +61 3 9905 1420 Email: scerh@adm.monash.edu.au

Appendix H: Certification for Accuracy of Translation of the Questionnaire

Date: 23/02/2008

CERTIFICATION

I, **Muataz Eltahir Dafaalla**, Accredited Naati Translator in English>Arabic (*Reg. No. 49037*), hereby certify that I have proofread the attached translation of a **QUESTIONNAIRE** (*for the study: Development of A Saudi Emergency Department Triage System*) to render it as a true and accurate translation from English into Arabic, to the best of my knowledge.

Appendix I: Example of Invitation Letter for the Expert Panel's Members (Study 3)

MONASH University



Invitation and overview of the project

Dear Physician,

My name is Mohammed Aljohani; I am currently studying PhD of Health sciences at Monash University under the supervision of Dr Joy Lyneham. In my PhD research project I am developing a Saudi emergency department (ED) triage system. This task cannot be accomplished without the collaboration of experts in the field of emergency medicine. As you know, the number of people seeking emergency care in Saudi EDs is on the rise; however most emergency departments do not use formalised triage systems. Given the increasing demand for emergency department services in Saudi Arabia, it is important that reliable processes are developed to ensure that decisions about access to emergency care are safe and equitable. To this point, ED triage systems have been developed and implemented in many western countries such as Australia, Canada and United Kingdom. The primary purpose of these systems is to ensure that ED patient care prioritised according to their clinical urgency. Although many of these triage systems have been proven to be valid and reliable in sorting ED patient care, adaptation of these triage systems in Saudi Arabia is questionable due to the differences in health systems as well as the culture.

Why you have been chosen to participate in this study?

The nature of this study is clinically-based; therefore it is important that participants have a good clinical experience in the emergency department. You have been chosen because you already have current ED clinical work experiences for 5 years or more, therefore you are classified as an expert. We would like to invest your experience to be part of a group of experts to develop a national ED triage system for Saudi Arabia.

What will be your role in this study?

In this study, you and another ED physicians and nurses from different Saudi Arabian regions will form the expert panel. The role of this panel is to discuss about specific areas related to developing a new Saudi triage system. The first task will involve shaping the skeleton of the triage system such as the number of triage categories, description and the response for each category and the time interval. The second task is to identify the clinical discriminators for each triage category.

This study will use Delphi technique for data collection. The expert panel members in this study will receive an email that include questions, participants will be asked to answer these questions and send them back by e-mail to the researcher

What is the Delphi technique?

It is a systemic data collection method where individuals (experts) ideas regarding an issue are collected and analysed. These ideas (the first round) are gathered and themed, the results are forwarded (second round) again to the expert panel members and this can be repeated until consensus (agreement in opinion) is achieved.

Who long this process will take?

The exact time needed to complete the data collection process cannot be predicted in the meantime because it depends upon the number of rounds needed to achieve consensus for each task. Generally, you will receive an e-mail from the researcher and you need to answer it and return it back in two- week period. The reading and answering of each e-mail will approximately takes 30 minutes. It is estimated that the total time needed to complete the process is six hours (30 minutes for each e-mail) over a period of 4-6 months.

What do I need to do if I need more information or agreed to take part in this study?

If you need to clarify some thing or make comments regarding to the proposed study or you are interested in this study and you like to be one of the expert members you can use the following contact details:

Dr Joy Lyneham

OR

Mohammed Aljohani

Phone: +61 3 9904 4651

Phone: +61 3 9904 4101

Fax: +61 3 9904 4655

**E-mail joy.lyneham@med.monash.edu.au
mohammed.aljohani@med.monash.edu.au**

E-mail:

Thank you

Mohammed Aljohani

Appendix J: Briefing Paper Given to the Participants in Study 3

Summary

The number of patient seeking care in Emergency Department(ED) is increasing in Saudi Arabia and internationally. Therefore, it is necessary that reliable processes are developed to determine level of urgency and prioritise care requirements for all people seeking ED services. ED triage is the process of prioritising patient care on arrival to ED according to their clinical condition.

Significance of the study

Development of a Saudi triage system is expected to:

- optimise patient safety by treating the most urgent cases first
- It helps to ensure that ED patient care is nationally standardised, i.e. the care is prioritised in a consistent and systemic way in all Saudi EDs.

Reliability of 5-level triage systems Vs 3and 4-level triage systems

Studies demonstrated that triage systems using 5-level urgency scale is more reliable and sensitive than 3 and 4-level urgency scales.

Existing triage systems

Internationally, there are four well recognised triage systems that using 5-level urgency scale, these systems are:

- Australasian Triage Scale (ATS) in Australia and New Zealand
- Canadian Triage and Acuity Scale (CTAS) in Canada
- Manchester Triage Scale (MTS) in UK
- Emergency Severity Index (ESI) in USA

For more details see the attached briefing paper.

الخلاصة

تعتبر زيادة زيارة المرضى لأقسام الطوارئ ظاهرة ملحوظة سواء على مستوى المملكة العربية السعودية أو على المستوى العالمي. ولمقابلة الطلب المتزايد لخدمات الطوارئ كان من المهم أن يتم إيجاد طريقة منهجية معتمدة يتم من خلالها فرز الحالات وترتيب الأولويات في عملية العناية بحسب مدى الخطورة والحاجة الماسة للمرضى للعناية الصحية. ويمكن تعريف الفرز للحالات بأقسام الطوارئ على أنه عملية ترتيب أولويات منظمة تتم لدى وصول المرضى إلى قسم الطوارئ يتم من خلالها تقديم العناية للحالات الأكثر خطورة أولاً.

أهمية الدراسة

إنشاء نظام سعودي لفرز الحالات بأقسام الطوارئ يخدم عدة أهداف منها:

- تعزيز سلامة المرضى وذلك بحصول المريض الأكثر خطورة على العناية أولاً
- توحيد معايير العناية وفرز الحالات على مستوى المملكة العربية السعودية

أنظمة الفرز الموجودة عالمياً

بينت الدراسات في مجال الفرز بأن أنظمة الفرز ذات الخمس مستويات تمتلك حساسية ومصادقية أعلى من الأنظمة التي تعتمد على ثلاث أو أربع مستويات خطورة. وتعتمد أكثر أنظمة الفرز العالمية في الوقت الراهن على خمس مستويات خطورة. ومن أشهر هذه الأنظمة نظام الفرز الاسترالي-الآسيوي ويطبق في استراليا ونيوزيلندا، النظام الكندي، نظام مانثستر ويطبق في بريطانيا وأخيراً مقياس الخطورة الأمريكي.

Dear participant,

Thank you again for your participation in this study. This is a debriefing for the topic of emergency department (ED) triage. This paper will briefly provide background for ED triage and significance of having a formalised triage system. It will also discuss the reliability of 5-level triage scales versus 3 and 4- level triage scales. Finally it will provide an overview of the existing triage scales.

Background

The number of patients presenting for care in emergency departments (ED) internationally is on the rise (Kelly & Richardson, 2001). Given this increasing demand for ED services, it is essential that reliable processes are developed to determine level of urgency and prioritise care requirements for all people seeking treatment (Kelly & Richardson, 2001; Murray, 2003).

In many Western countries including Australia, Canada, the United Kingdom and united state of America ED triage systems have been developed and implemented throughout these countries (Göransson, Ehrenberg & Ehnfors, 2005; Richardson, 2000). The primary purpose of these systems is to optimise the patients' safety by ensuring that ED patients care is prioritised according their clinical conditions rather than other factors such as time of arrival, ability to pay for service or ED work load.

In Saudi Arabia, the demand for emergency department services is also increasing. For example, there was an increase of 9.3 percent of patients attended public Saudi Arabian' EDs between 2002 (11,490,565) and 2006 (13,808,546) (Ministry of Health [MOH], 2006). In addition, Saudi Arabia is one of the world's top countries experiencing population growth at a rate estimated to be at 2.4 percent per year (World Health Organization, 2004). Demand for health care services, in particular, emergency services, is increasing as a result of two factors; the steady population growth, and an 'inappropriate use' of ED services (attending for primary care or non-urgent problems). For example, Al-Shammari (1991) and Siddiqui and Ogbeide (2002) estimate that well over half of the patients attending EDs in Saudi Arabia are patients with primary care or non-urgent problems (70 percent and 59 percent respectively). Although the demands for emergency services increasing in Saudi

Arabia, formalised ED triage is not common practice in hospitals operated by MOH. However, other tertiary hospitals such as the King Faisal Hospital and Research Centre (KFHRC) and the National Guard Hospitals are using the Canadian Triage and Acuity Scale (CTAS) to prioritise patient care (Bond, 2001; King Fahad National Guard Hospital, 2005).

Significance of this study

Due to the absence of a national triage system in Saudi Arabia, the process of prioritising ED patients' care varies from hospital to hospital. Although we can see that there is some sort of triage implemented in the Saudi EDs including establishment of screening rooms for ED patients, there is no systemic process or urgency scales are used in order to prioritise patient care in EDs without delaying patients that need immediate attention. It has been argued that immediate and early patient assessment will result in improved patient safety via a reduction of waiting times and enhanced patient satisfaction (Blythin, 1983; Jones, 1988; Mallet & Woolwich, 1990).

This study sought with the help of the expert panel members to develop a Saudi triage system that can be used throughout the Saudi EDs. Development of a Saudi triage system is expected to optimise patient safety by treating the most urgent cases first. It also helps to ensure that ED patient care is nationally standardised, i.e. the care is prioritised in a consistent and systemic way in all Saudi EDs.

Reliability of 5-level triage systems versus 3 and 4-level triage systems

Different triage acuity systems have been developed and implemented in the last few decades. This includes 2-level, 3-level, 4-level and 5-level acuity systems (Table 1).

2 Levels	3 Levels	4 Levels	5 Levels
Emergent	Emergent	Life-threatening	1-Immediately life-threatening
Non-emergent	Urgent	Emergent	2- imminently life-threatening
	Non-urgent	Urgent	3- potentially life-threatening
		Non-urgent	4- potentially serious
			5- Less-urge

Table 1. Example of triage acuity systems.

Although there is no agreement whether to use three, four or five level acuity triage system internationally, triage studies showed that reliability (inter-rater agreement) of the three and four level acuity triage systems were only poor to moderate. In a study conducted by Wuerz et al.(1998) using a 3-level triage scale in two US EDs and the participants were ED triage nurses and Emergency Medical Technicians. This study found that the reliability of triage assessment using this 3-level scale is poor. Another study was conducted by Travers, Waller, Bowling, Flowers and Tintinalli (2002) to measure the reliability of 3-level triage scale and 5-level triage scale. The study concluded that the 5-level triage system is safer and provides better reliability, greater discrimination, and improved sensitivity and specificity than 3-level triage system. Studies evaluating 4-level triage systems revealed that 4-level triage scales have demonstrated poor to moderate inter-rater reliability (George et al., 1992; Brillman, Doezema, Tandberg, Sklar, Davis, Simms et al, 1996).

In contrast, studies of 5-level triage systems have demonstrated a range of inter-rater agreement that varies from fair to very good (Hollis, 1996; Jelinek & Little, 1996; Doherty, 1996; Beveridge & Ducharme, 1997; Dilley & Standen, 1998; Cooke & Jinks, 1999). In the last few years, there was a growing interest in using 5-level acuity triage system. As can be ascertain, all the internationally recognised triage scale that are currently in use are 5-level scales.

Existing Acuity triage systems

Different triage scales have been developed and implemented worldwide. However, there is no universal agreement about the most reliable ED triage scale (Murray, 2003). Most triage scales use five levels of time-interval in which ED patients should be assigned to the appropriate. These scales include the Australasian Triage Scale (ATS) formerly the NTS (ACEM, 2000), the Canadian Triage and Acuity Scale (CTAS) (Beveridge et al., 1999), the Manchester Triage Scale (MTS) in the United Kingdom (Manchester Triage Group, 1997) and the Emergency Severity Index triage scale (ESI) in the United States of America (Gilboy, Travers & Wuerz, 1999; Wuerz, Milne, Eitel, Travers & Gilboy, 2000). A summary for these scales are provided in table 2.

Australasian Triage Scale

Australia was the first country to successfully implement a national triage scale (Fernandes, Wuerz, Clark & Djurdjev, 1999). The Australasian College for Emergency Medicine in 1993 modified the Ipswich triage scale introduced by Fitzgerald (1989) to create the NTS. In 2000, the ACEM, Emergency Nurses Association and The Australian Commonwealth Department of Ageing refined the NTS to develop the current 5-level ATS (Richardson, 2000). The ATS is currently in use throughout Australia and has also been adopted in a number of other countries including Canada and Sweden (Gerdtz & Bucknall, 2001; Göransson et al., 2005; Murray, 2003). The ATS consists of five categories that are defined by clinical urgency (Gerdtz & Bucknall, 2001).

Canadian Triage and Acuity Scale

The Canadian Triage and Acuity Scale (CTAS) has received widespread acceptance in Canada as a reliable ED triage scale (Murray, 2003). It was endorsed in 1999 by the Canadian Association for Emergency Physicians and The National Emergency Nurses' Affiliation of Canada (Beveridge & Ducharme, 1997; Canadian Association for Emergency Physicians, 2002; Murray, Bullard & Grafstien, 2004). Its use became official policy in Canada in 1997 (Zimmermann, 2006). The CTAS is a 5-level time-interval urgency scale, based on the NTS in which each acuity level is associated with a timeframe where level 1 requires immediate attention by a doctor, level 2

requires attention within 15 minutes, level 3 within 30 minutes, level 4 within 60 minutes and level 5 within 120 minutes. The CTAS is very similar to the ATS in terms of time to treatment except that in category two where patients should be seen in 15 minutes instead of in 10 minutes (Göransson et al., 2005). In 2004, the CTAS was revised by Murray et al (2004) where the main difference in terms of the original scale was the emphasis on time for reassessment instead of time to be seen by a doctor. One of the CTAS's strengths is specifying the time at which ED patients should be seen by nurses and physicians.

Manchester Triage Scale

The Manchester Triage Scale (MTS) is also 5-level triage scale and was developed in 1994 by the Royal College of Nursing Accident and Emergency Association and the British Association for Accident and Emergency Medicine (Zimmermann, 2001). It has been accepted in the United Kingdom (UK) as 'golden standard' for ED triage. In addition, the MTS has been also adopted as the national triage scale in different countries, including Portugal and Holland (Marsden & Windle, 2006). The MTS is a series of presentational flow-charts based on common chief complaints (Manchester Triage Group, 1997). It involves the use of 52 separate flow charts where triage nurses first identify the patient's chief complaint, and then choose one of 52 flow charts to conduct a structured interview and then assign a triage level ranging from 1 (immediate care needed) to 5 (care within 4 hours). These presentation flow charts look at six key discriminators: life-threat, pain, haemorrhage, conscious level, temperature and acuteness (Zimmermann & McNair, 2006).

The Emergency Severity Index

The Emergency Severity Index (ESI) is a 5- level triage scale developed by Drs Richard Wuerz and David Eitel (Wuerz et al., 2000). Acuity and complexity in the ESI is summarised on a 5-point scale without specified time threshold (Richardson, 2000). ESI level one represents the highest acuity and complexity and level five represents the lowest. The ESI is based on an algorithm and anticipated resources consumption, such as the need for radiographs or laboratory tests (Zimmermann, 2006). There is no agreement yet in using a national triage scales in the USA where different hospitals are using different scales. However, the Emergency Nurses Association and the American College of Emergency Physicians have adopted a

policy that recommends using a reliable and valid 5-level triage scale. Their recommendation is that CTAS and ESI both provide good options (Zimmermann, 2006).

Table 2. Summary of the 5-point triage scales

Level	Australian Triage Scale (ATS)	Canadian Triage And Acuity Scale (CTAS)	Manchester Triage Scale (MTS)	Emergency Severity Index (ESI)
1	Immediately Life – Threatening (Immediate)	Resuscitation (Immediate)	Immediate (Red) (0 Minutes)	ESI- 1 Immediately
2	Imminently Life-Threatening (10 Minutes)	Emergent (≤15 Minutes)	Very Urgent (Orange) (10 Minutes)	ESI- 2 Minutes
3	Potentially Life-Threatening (30 Minutes)	Urgent (≤ 30 Minutes)	Urgent (Yellow) (60 Minutes)	ESI- 3 Up To 1 Hour
4	Potentially Serious (60 Minutes)	Less Urgent (≤ 60 Minutes)	Standard (Green) (120 Minutes)	ESI- 4 Could Be Delayed
5	Less Urgent (120 Minutes)	Non Urgent (≤ 120 Minutes)	Non- Urgent (Blue) (240 Minutes)	ESI- 5 Could Be Delayed

Sources: (ACEM, 2000; Canadian Association of Emergency Physicians, 2002; Manchester Triage Group, 1997; Zimmermann, 2006).

If you are interested in reading any of the provided studies, please do not hesitate to contact Mohammed Aljohani:

mohammed.aljohani@med.monash.edu.au

Appendix K: Stage One Round I Instructions and Questionnaire**STAGE ONE****ROUND I****Demographics Information**

1- Please write your name and qualifications (names will be confidential and will not be shared with the expert panel members)

1- Name:
2- Qualifications:

2- You are a:

- Physician
 Nurse

3- Your total work experience is:

- Less than 5 years
 5-10 years
 11- 20 years
 More than 20 years

4- Your work experience in emergency department is:

- Less than 5 years
 5-10 years
 11- 15 years
 More than 15 years

Question 1

Literature (attached briefing paper) have demonstrated that 5-level triage systems possess a higher inter-rater agreement comparing to 3 and 4- level triage systems; Therefore this study will use 5-level triage scale, Do you agree?

Yes NO (why?)

Question 2

Every day, patients come to Emergency Department (ED) seeking emergency care for different reasons. The clinical conditions of these patients considerably varied from one to another. Some patient might come with chest pain (mild, moderate or severe; cardiac or non-cardiac origin) another might come with cardiac or respiratory arrest.

Given that you have 5-urgency levels, what do think it should be the descriptions (name) of the urgency levels that best describe all cases that might come to an ED?

NOTE: Descriptions that used in the Australasian Triage Scale (ATS), the Canadian Triage and Acuity Scale (CTAS) and Manchester Triage Scale (MTS) are included; however, you are encouraged to write your own descriptions.

Level 1

- Immediately Life-Threatening (ATS)
- Resuscitation (CTAS)
- Immediate [Red Colour] (MTS)
- Other (specify)

Level 2

- Imminently life-threatening or Important time-critical treatment or Very severe pain (ATS)
- Emergent (CTAS)
- Very urgent [Orange] (MTS)
- Other (specify)

Level 3

- Potentially Life-Threatening or Situational Urgency or Humane practice mandates the relief of severe discomfort or distress within thirty minutes (ATS)
- Urgent (CTAS)
- Urgent [Yellow] (MTS)
- Other (specify)

Level 4

- Potentially serious or Situational Urgency Significant complexity or Severity Humane practice mandates the relief of discomfort or distress within one hour (ATS)
- Less urgent (CTAS)
- Standard [Green] (MTS)
- Other (specify)

Level 5

- Less Urgent or Clinico-administrative problems (ATS)
- Non-urgent (CTAS)
- Non- urgent [Blue] (MTS)
- Other (specify)

Question 3

You are assigned to prioritised ED patient care on arrival according to their clinical conditions using the 5-level urgency scale in question 2; ideally, how long do you think patients in each urgency level should (safely) wait to see a physician?

Level 1

- Immediate (ATS, CTAS and MTS)
- Other (specify)

Level 2

- Assessment and treatment within 10 minutes (ATS)
- ≤15 min (CTAS)
- 10 min (MTS)
- Other (specify)

Level 3

- Assessment and treatment within 30 minutes (ATS)
- ≤ 30 min (CTAS)
- 60 min (MTS)
- Other (specify)

Level 4

- Assessment and treatment within 60 minutes
- ≤1 hour (CTAS)
- 120 min (MTS)
- Other (specify)

Level 5

- Assessment and treatment within 120 minutes
- ≤ 2 hours (CTAS)
- 240 min (MTS)
- Other (specify)

Thank you

Appendix L: Stage One Round II Letter of Instructions and Questionnaire

MONASH University



Dear Expert Panel Member,

Thank you for the timely response and quality information you gave in round one of the Delphi study on developing a Saudi triage system. Your selection and added comments from round one were collected and analysed. The task in the second round is to evaluate the total answers that were obtained from 1st round in the light of the expert panel members opinions. Also to rate the answers using a 5-point likert scale where 1= strongly disagree and 5= strongly agree. In this task I have provided you with the frequency of each statement and reminded you with your own selection from 1st round. You can keep your idea or change if you think it needs to be changed. Remember that the aim in this task is to obtain consensus among the expert panel members, therefore your rating should help to select only one description or time interval in each triage level.

Thank you again for your time,

Mohammed Aljohani

Mobile: [REDACTED]

E-mail: [REDACTED]

عزيزي المشارك

أشكرك على سرعة الاستجابة وعلى المعلومات القيمة التي شاركت بها من خلال الجولة الأولى في دراسة ديلفي والتي تهدف إلى إنشاء نظام سعودي لفرز الحالات بأقسام الطوارئ. الإجابات التي تم اختيارها وأيضاً ما تم إضافته من مقترحات جديدة خضعت للتحليل الإحصائي. المطلوب في هذه المرحلة هو مراجعة شاملة لكامل المقترحات من الجولة الأولى في ضوء اقتراحات بقية الأعضاء المشاركين. وأيضاً تقييم جميع الاقتراحات باستخدام مقياس لايرت ذو الخمس درجات بحيث يكون 1= غير موافق بشده على اختيار الاقتراح و 5= موافق بشده.

لقد قمت من خلال هذه الإستبانة بتزويدك بالنسبة المئوية التي تمثل نسبة اختيار الأعضاء لكل اقتراح من الجولة الأولى بالإضافة لتذكيرك بما قمت باختياره لكل مستوى من مستويات الفرز. تستطيع خلال هذه المهمة أن تبقى على اختيارك السابق أو تقوم بتغييره إذا وجدت أنه من الأفضل أن يتم ذلك.

تذكر أن الهدف من هذه الجولة هو الوصول لدرجة التوافق بين الأعضاء بما لا يقل عن 75% لذلك يجب أن تضع في عين الاعتبار حين تقييم الاقتراحات أن تكون المحصلة النهائية هو ترجيحك لمسمى أو زمن واحد فقط لكل مستوى من مستويات الفرز.

وأشكر لك مرة أخرى التكرم بوقت المشاركة

محمد الجهني

هاتف: [REDACTED]

بريد الكتروني [REDACTED]

Stage One

Round II

Question 1

Do you agree to use 5-level urgency scale?

5-level triage scale	Selection frequency (percent)	Your selection
Yes	100 percent	<input checked="" type="checkbox"/>
No	0.0	<input type="checkbox"/>

In case you like to add comments, please do so in the following textbox.

Question 2

Triage Levels' Description

The responses of participants from the 1st round were collected and analysed. In order to get consensus, please rate each of the following statements in each level according to 5-point scale where 1= strongly disagree and 5= strongly agree.

Please be aware when selecting comments not to chose same agreement level in one triage level, for example, do not select strongly agree for both Resuscitation and Immediately Life-Threatening.

LEVEL 1	Selection frequency (percent)	Your selection
Immediately Life-Threatening	58.1 percent	
<input type="checkbox"/> 1= Strongly Disagree <input type="checkbox"/> 2= Disagree <input type="checkbox"/> 3= Neutral <input type="checkbox"/> 4= Agree <input type="checkbox"/> 5= Strongly Agree		
Resuscitation	32.3 percent	✓
<input type="checkbox"/> 1= Strongly Disagree <input type="checkbox"/> 2= Disagree <input type="checkbox"/> 3= Neutral <input type="checkbox"/> 4= Agree <input type="checkbox"/> 5= Strongly Agree		
Immediate [Red Colour] (with colour code)	9.7 percent	
<input type="checkbox"/> 1= Strongly Disagree <input type="checkbox"/> 2= Disagree <input type="checkbox"/> 3= Neutral <input type="checkbox"/> 4= Agree <input type="checkbox"/> 5= Strongly Agree		
Other No added statement	0.0 percent	

In case you like to add comments or new statement, please do so in the following textbox

Level 2	Selection frequency (percent)	Your selection
Imminently life-threatening or important time-critical treatment or Very severe pain (highest)	41.9 percent	
<input type="checkbox"/> 1= Strongly Disagree <input type="checkbox"/> 2= Disagree <input type="checkbox"/> 3= Neutral <input type="checkbox"/> 4= Agree <input type="checkbox"/> 5= Strongly Agree		
Emergent	25.8 percent	
<input type="checkbox"/> 1= Strongly Disagree <input type="checkbox"/> 2= Disagree <input type="checkbox"/> 3= Neutral <input type="checkbox"/> 4= Agree <input type="checkbox"/> 5= Strongly Agree		
Very urgent [Orange] (with colour code)	22.6 percent	
<input type="checkbox"/> 1= Strongly Disagree <input type="checkbox"/> 2= Disagree <input type="checkbox"/> 3= Neutral <input type="checkbox"/> 4= Agree <input type="checkbox"/> 5= Strongly Agree		
Top Urgent (newly added)	6.5 percent	✓
<input type="checkbox"/> 1= Strongly Disagree <input type="checkbox"/> 2= Disagree <input type="checkbox"/> 3= Neutral <input type="checkbox"/> 4= Agree <input type="checkbox"/> 5= Strongly Agree		
Very urgent–without colour code (newly added)	3.2 percent	
<input type="checkbox"/> 1= Strongly Disagree <input type="checkbox"/> 2= Disagree <input type="checkbox"/> 3= Neutral <input type="checkbox"/> 4= Agree <input type="checkbox"/> 5= Strongly Agree		

In case you like to add comments or new statement, please do so in the following textbox

LEVEL 3	Selection frequency (percent)	Your selection
Potentially Life-Threatening or Situational Urgency or Humane practice mandates the relief of severe discomfort or distress within thirty minutes	45.8 percent	
<input type="checkbox"/> 1= Strongly Disagree <input type="checkbox"/> 2= Disagree <input type="checkbox"/> 3= Neutral <input type="checkbox"/> 4= Agree <input type="checkbox"/> 5= Strongly Agree		
Urgent	32.3 percent	✓
<input type="checkbox"/> 1= Strongly Disagree <input type="checkbox"/> 2= Disagree <input type="checkbox"/> 3= Neutral <input type="checkbox"/> 4= Agree <input type="checkbox"/> 5= Strongly Agree		
Urgent [Yellow] (with colour code)	22.6 percent	
<input type="checkbox"/> 1= Strongly Disagree <input type="checkbox"/> 2= Disagree <input type="checkbox"/> 3= Neutral <input type="checkbox"/> 4= Agree <input type="checkbox"/> 5= Strongly Agree		
Other No added statement	0.0 percent	

In case you like to add comments or new statement, please do so in the following textbox

=====

LEVEL 4	Selection frequency (percent)	Your selection
Potentially serious or Situational Urgency Significant complexity or Severity Humane practice mandates the relief of discomfort or distress within one hour	25.8 percent	
<input type="checkbox"/> 1= Strongly Disagree <input type="checkbox"/> 2= Disagree <input type="checkbox"/> 3= Neutral <input type="checkbox"/> 4= Agree <input type="checkbox"/> 5= Strongly Agree		
Less urgent	54.8 percent	✓
<input type="checkbox"/> 1= Strongly Disagree <input type="checkbox"/> 2= Disagree <input type="checkbox"/> 3= Neutral <input type="checkbox"/> 4= Agree <input type="checkbox"/> 5= Strongly Agree		
Standard [Green] (with colour code)	16.1 percent	
<input type="checkbox"/> 1= Strongly Disagree <input type="checkbox"/> 2= Disagree <input type="checkbox"/> 3= Neutral <input type="checkbox"/> 4= Agree <input type="checkbox"/> 5= Strongly Agree		
Other No added statement	0.0 percent	

In case you like to add comments or new statement, please do so in the following textbox

LEVEL 5	Selection frequency (percent)	Your selection
Less Urgent or Clinico-administrative problems	29.0 percent	
<input type="checkbox"/> 1= Strongly Disagree <input type="checkbox"/> 2= Disagree <input type="checkbox"/> 3= Neutral <input type="checkbox"/> 4= Agree <input type="checkbox"/> 5= Strongly Agree		
Non-urgent	54.8 percent	✓
<input type="checkbox"/> 1= Strongly Disagree <input type="checkbox"/> 2= Disagree <input type="checkbox"/> 3= Neutral <input type="checkbox"/> 4= Agree <input type="checkbox"/> 5= Strongly Agree		
Non- urgent [Blue] with colour code	16.1 percent	
<input type="checkbox"/> 1= Strongly Disagree <input type="checkbox"/> 2= Disagree <input type="checkbox"/> 3= Neutral <input type="checkbox"/> 4= Agree <input type="checkbox"/> 5= Strongly Agree		
Other No added statement	0.0 percent	

In case you like to add comments or new statement, please do so in the following textbox

=====

Please proceed to the next part ↓↓↓

Question 3

Response for each triage level (time to see a physician)

The responses of participants from the 1st round were collected and analysed, the target consensus (≥ 60) was achieved in 1st round, please rate each of the following statements in each level according to 5-point scale where 1= strongly disagree and 5= strongly agree.

LEVEL 1	Selection frequency (percent)	Your selection
Immediate	100 percent	✓
Other No added statement	0.0 percent	

In case you like to add comments or you like to reject the result, please write your reasons in the Following textbox

LEVEL 2	Selection frequency (percent)	Your selection
10 min	67.7 percent	✓
<input type="checkbox"/> 1= Strongly Disagree <input type="checkbox"/> 2= Disagree <input type="checkbox"/> 3= Neutral <input type="checkbox"/> 4= Agree <input type="checkbox"/> 5= Strongly Agree		
≤15 min	32.3 percent	
<input type="checkbox"/> 1= Strongly Disagree <input type="checkbox"/> 2= D agree <input type="checkbox"/> 3= Neutral <input type="checkbox"/> 4= Agree <input type="checkbox"/> 5= Strongly Agree		
Other: No added statement	0.0 percent	

In case you like to add comments or you like to reject the result, please write your reasons in the Following textbox

LEVEL 3	Selection frequency (percent)	Your selection
30 min	90.3 percent	✓
<input type="checkbox"/> 1= Strongly Disagree <input type="checkbox"/> 2= Disagree <input type="checkbox"/> 3= Neutral <input type="checkbox"/> 4= Agree <input type="checkbox"/> 5= Strongly Agree		
60 min	6.5 percent	
<input type="checkbox"/> 1= Strongly Disagree <input type="checkbox"/> 2= Disagree <input type="checkbox"/> 3= Neutral <input type="checkbox"/> 4= Agree <input type="checkbox"/> 5= Strongly Agree		
Other: 15 min(newly added)	3.2 percent	

In case you like to add comments or you like to reject the result, please write your reasons in the Following textbox

LEVEL 4	Selection frequency (percent)	Your selection
60 min	80.6 percent	✓
<input type="checkbox"/> 1= Strongly Disagree <input type="checkbox"/> 2= Disagree <input type="checkbox"/> 3= Neutral <input type="checkbox"/> 4= Agree <input type="checkbox"/> 5= Strongly Agree		
120 min	16.1 percent	
<input type="checkbox"/> 1= Strongly Disagree <input type="checkbox"/> 2= Disagree <input type="checkbox"/> 3= Neutral <input type="checkbox"/> 4= Agree <input type="checkbox"/> 5= Strongly Agree		
Other: 20 min(newly added)	3.2 percent	

In case you like to add comments or you like to reject the result, please write your reasons in the following textbox

LEVEL 5	Selection frequency (percent)	Your selection
120 min	83.9 percent	✓
<input type="checkbox"/> 1= Strongly Disagree <input type="checkbox"/> 2= Disagree <input type="checkbox"/> 3= Neutral <input type="checkbox"/> 4= Agree <input type="checkbox"/> 5= Strongly Agree		
240 min	12.9 percent	
<input type="checkbox"/> 1= Strongly Disagree <input type="checkbox"/> 2= Disagree <input type="checkbox"/> 3= Neutral <input type="checkbox"/> 4= Agree <input type="checkbox"/> 5= Strongly Agree		
Other: 30 min (newly added)	3.2 percent	

In case you like to add comments or you like to reject the result, please write your reasons in the Following textbox

Thank you

Appendix M: Stage Two Round I Letter of Instructions and Questionnaire

MONASH University



Dear expert panel member,

عزيزي المشارك

Thank you for your contribution during the first stage (identifying the triage scale). From the 1st stage we got expert panel members' consensus ($\geq 75\%$) that the triage scale should be as follow:

شكرا لك على إسهامك في المرحلة الأولى من الدراسة (التعرف على مقياس الفرز). خلال تلك المرحلة تم الحصول على بين الأعضاء على أن يكون مقياس 75% درجة اتفاق أكثر من الفرز المقترح لأقسام الطوارئ السعودية على النحو الآتي:

Level	Description	Response (patient should be seen by a physician within)
1 (SATS 1*)	Immediately life-threatening	immediate
2 (SATS 2)	Imminently life-threatening or Important time-critical treatment or Very severe	10 minutes
3 (SATS 3)	Urgent	30 minutes
4 (SATS 4)	Less-Urgent	60 minutes
5 (SATS 5)	Non-Urgent	120 minutes

*= Saudi Arabia Triage Scale

In this task, it is required that you identify clinical descriptors for each one of the five urgency level. In other word, how the patients in level 1, 2, 3, 4 and 5 look like? For example, you can say that patients assigned to level 1 are patient who present with cardiac or respiratory arrest.

You will find in each urgency level some clinical descriptors that were suggested by the Canadian Association of Emergency Physicians and the National Emergency Nurses Affiliation of Canada and the Australasian College for Emergency Medicine to be used as indicative for the implementation of the ATS and the CTAS. Select from the provided list in each level (optional) or write down your own clinical descriptors. Also you can shift any clinical descriptors from its place in the list to another urgency level. At the end of this questionnaire please answer the questions regarding the barriers and the impact of the culture and religious in implementing a formal triage system in Saudi emergency departments.

تتطلب المرحلة الحالية التعرف على المحددات الإكلينيكية التي تميز كل مستوى من المستويات الخمس. أي كيف يبدو المريض في المستوى الأول والثاني والثالث والرابع والخامس؟ فمثلاً نستطيع القول أن المريض الذي يصل لقسم الطوارئ متوقف القلب أو التنفس يجب أن يوضع في المستوى الأول للفرز.

سوف تجد في كل مستوى من مستويات الفرز بعض من المحددات الإكلينيكية المطبقة في نظامي الفرز الأسترالي-آسيوي والكندي والتي تم اقتراحها كمؤشرات تساعد على تطبيق نظامي الفرز، وقد قام كلا من الجمعية الكندية لأطباء الطوارئ و المؤسسة الوطنية لتدريب الطوارئ بإنشاء هذه المحددات لنظام الفرز الكندي بينما قامت الكلية الأسترالي-آسيوية لطب الطوارئ بعمل المحددات لنظام الفرز الأسترالي.

المطلوب في هذه المهمة أن تقوم باختيار المحددات لكل مستوى على حده من القائمة المرفقة أو إضافة ما تراه مناسباً. أيضاً يمكنك أن قوم بتعديل أو نقل أي من المحددات من أي مستوى إلى آخر. وفي نهاية الاستبانة الرجاء التكرم بإجابة السؤالين المرفقين بغرض معرفة العوائق التي قد تعترض تطبيق نظام الفرز وأيضاً ماهي الاعتبارات التي يجب الاهتمام بها قبل تطبيق نظام الفرز.

Thank you again for your time and proceed to the questionnaire. Mohammed Aljohani

Mobile: [REDACTED]

E-mail: [REDACTED]

STAGE TWO

ROUND ONE

Dear expert panel member,

According to patient clinical condition, what are the features (clinical descriptors) for patients in each triage category? You need to comment to each statement below, comments include accepting the statement as descriptor for the triage level, reject, modify (re-phrase) or shift the statement to another triage level.

Triage level	Description	Response
1	immediately life-threatening	Immediately

To assign a patient to the level 1, the patient might have one or more of the following conditions:

Code arrest (Cardiac and/ or respiratory) Accept Reject Modify Shift to level:

Modification:-----

Major shock Accept Reject Modify Shift to level:

Modification:-----

Severe respiratory distress Accept Reject Modify Shift to level:

Modification:-----

Immediate risk to airway - impending arrest Respiratory rate <10/min

Accept Reject Modify Shift to level:

Modification:-----

Ongoing/prolonged seizure Accept Reject Modify Shift to level:

Modification:-----

BP< 80 (adult) or severely shocked child/infant Accept Reject Modify Shift to level:

Modification:-----

Near fatal asthma Accept Reject Modify Shift to level:

Modification:-----

Altered mental state (unconscious or delirious) Accept Reject Modify Shift to level:

Modification:-----

Unresponsive or responds to pain only (GCS < 9) Accept Reject Modify Shift to level:

Modification:-----

IV overdose and unresponsive or hypoventilation Accept Reject Modify Shift to level:

Modification:-----

Severe behavioural disorder with immediate threat of dangerous violence

Accept Reject Modify Shift to level:

Modification:-----

Add other conditions

1-

2-

Triage level	Description	Response
2	Imminently life-threatening or Important time-critical treatment or Very severe	10 minutes

To assign a patient to the level 2, the patient might have one or more of the following conditions:

Airway risk - severe stridor or drooling with distress Accept Reject Modify Shift to level:

Modification:-----

Head injury (risk features with or without altered mental state)

Accept Reject Modify Shift to level:

Modification:-----

Chest pain of likely cardiac nature Accept Reject Modify Shift to level:

Modification:-----

Moderate or severe dyspnea Accept Reject Modify Shift to level:

Modification:-----

Altered mental state (lethargic, drowsy, agitated GCS< 13)

Accept Reject Modify Shift to level:

Modification:-----

Very severe pain - any cause Accept Reject Modify Shift to level:

Modification:-----

Hypotension with hemodynamic effects Accept Reject Modify Shift to level:

Modification:-----

Major multi trauma Accept Reject Modify Shift to level:

Modification:-----

Severe asthma (peak expiratory flow rate <40 percent) Accept Reject Modify Shift to level:

Modification:-----

Chemical exposure to the eye - requiring irrigation Accept Reject Modify Shift to level:

Modification:-----

Significant sedative or other toxic ingestion Accept Reject Modify Shift to level:

Modification:-----

Severe localised trauma - major fracture, amputation Accept Reject Modify Shift to level:

Modification:-----

Signs of serious infection (purpuric rash, toxic) Accept Reject Modify Shift to level:

Modification:-----

Abdominal pain (age > 50 yr) with visceral symptoms Accept Reject Modify Shift to level:

Modification:-----

Severe allergic reaction Accept Reject Modify Shift to level:

Modification:-----

Temperatures ³38.0 in children under 3 months Accept Reject Modify Shift to level:

Modification:-----

Acute vaginal bleeding (pain scale > 5 with or without abnormal vital signs)

Accept Reject Modify Shift to level:

Modification:-----

GI bleeding with abnormal vital signs Accept Reject Modify Shift to level:

Modification:-----

Severe blood loss Accept Reject Modify Shift to level:

Modification:-----

CVA with major deficit Accept Reject Modify Shift to level:

Modification:-----

Diabetic hypoglycaemia or hyperglycaemia Accept Reject Modify Shift to level:

Modification:-----

Headache, with pain scale 8–10/10 Accept Reject Modify Shift to level:

Modification:-----

Vomiting or diarrhoea, suspicion of dehydration Accept Reject Modify Shift to level:

Modification:-----

Acute psychotic episode or extreme agitation (immediate threat to self or others)

Accept Reject Modify Shift to level:

Modification:-----

Add other conditions (below)

1-

2-

3-

4-

Triage level	Description	Response
3	Urgent	30 minutes

To assign a patient to the level 3, the patient might have one or more of the following conditions:

Head injury: alert with vomiting Accept Reject Modify Shift to level:

Modification:-----

Severe hypertension Accept Reject Modify Shift to level:

Modification:-----

Moderately severe blood loss - any cause Accept Reject Modify Shift to level:

Modification:-----

Moderate shortness of breath Accept Reject Modify Shift to level:

Modification:-----

Moderate trauma Accept Reject Modify Shift to level:

Modification:-----

Acute psychosis with or without suicidal ideation Accept Reject Modify Shift to level:

Modification:-----

Mild or moderate dyspnea Accept Reject Modify Shift to level:

Modification:-----

Seizure (now alert) Accept Reject Modify Shift to level:

Modification:-----

Any fever if immunosuppressed eg oncology patient, steroid Rx

Accept Reject Modify Shift to level:

Modification:-----

Persistent vomiting

Accept Reject Modify Shift to level:

Modification:-----

Dehydration

Accept Reject Modify Shift to level:

Modification:-----

Mild or moderate asthma (peak expiratory flow rate ≥ 40 percent)

Accept Reject Modify Shift to level:

Modification:-----

GI bleeding with normal vital signs

Accept Reject Modify Shift to level:

Modification:-----

Acute vaginal bleeding with normal vital signs

Accept Reject Modify Shift to level:

Modification:-----

Moderately severe pain - any cause - requiring analgesia

Accept Reject Modify Shift to level:

Modification:-----

Chest pain likely non-cardiac and mod severity

Accept Reject Modify Shift to level:

Modification:-----

Abdominal pain without high risk features - mod severe or patient age >65 years

Accept Reject Modify Shift to level:

Modification:-----

Moderate limb injury - deformity, severe laceration

Accept Reject Modify Shift to level:

Modification:-----

Trauma - high-risk history with no other high-risk feature

Accept Reject Modify Shift to level:

Modification:-----

Crush Limb - altered sensation, acutely absent pulse

Accept Reject Modify Shift to level:

Modification:-----

Dialysis problem

Accept Reject Modify Shift to level:

Modification:-----

Vomiting and diarrhea (age ≤ 12 yr) without dehydration

Accept Reject Modify Shift to level:

Modification:-----

Child at risk

Accept Reject Modify Shift to level:

Modification:-----

Add other conditions (below)

1-	
2-	
3-	

Urgency level	Description	Response
4	Less Urgent	60 minutes

To assign a patient to the level 4, the patient might have one or more of the following conditions:

Mild haemorrhage Accept Reject Modify Shift to level:

Modification:-----

Chest injury without rib pain or Foreign body aspiration, no respiratory distress

Accept Reject Modify Shift to level:

Modification:-----

Normal vital signs, low/moderate pain Accept Reject Modify Shift to level:

Modification:-----

Difficulty swallowing, no respiratory distress Accept Reject Modify Shift to level:

Modification:-----

Minor head injury, no loss of consciousness Accept Reject Modify Shift to level:

Modification:-----

Eye inflammation or foreign body - normal vision Accept Reject Modify Shift to level:

Modification:-----

Vomiting or diarrhoea without dehydration Accept Reject Modify Shift to level:

Modification:-----

Suicidal ideation or depression Accept Reject Modify Shift to level:

Modification:-----

Minor allergic reaction Accept Reject Modify Shift to level:

Modification:-----

Vomiting and diarrhea (age > 2 yr) without dehydration

Accept Reject Modify Shift to level:

Modification:-----

Minor limb trauma - sprained ankle, possible fracture, uncomplicated laceration

Accept Reject Modify Shift to level:

Modification:-----

Tight cast, no neurovascular impairment Accept Reject Modify Shift to level:

Modification:-----

Swollen "hot" joint Accept Reject Modify Shift to level:

Modification:-----

Acute abdominal pain Accept Reject Modify Shift to level:

Modification:-----

Behavioural/Psychiatric: Under observation and/or no immediate risk to self or others

Accept Reject Modify Shift to level:

Modification:-----

Semi-urgent mental health problem Accept Reject Modify Shift to level:

Modification:-----

Chronic back pain Accept Reject Modify Shift to level:

Modification:-----

Corneal foreign body Accept Reject Modify Shift to level:

Modification:-----

Pain scale 4–7/10 Accept Reject Modify Shift to level:

Modification:-----

Add other conditions (below)

1-

2-

3-

Urgency level	Description	Response
5	Non-Urgent	120 minutes

To assign a patient to the level 5, the patient might have one or more of the following conditions:

Minor trauma: not necessarily acute Accept Reject Modify Shift to level:

Modification:-----

Diarrhoea alone, without dehydration Accept Reject Modify Shift to level:

Modification:-----

Minimal pain with no high risk features Accept Reject Modify Shift to level:

Modification:-----

Sore throat without respiratory symptoms Accept Reject Modify Shift to level:

Modification:-----

Vomiting alone, with normal mental status and no dehydration

Accept Reject Modify Shift to level:

Modification:-----

Pain scale < 4/10 Accept Reject Modify Shift to level:

Modification:-----

Minor symptoms of existing stable illness Accept Reject Modify Shift to level:

Modification:-----

Minor symptoms of low-risk conditions Accept Reject Modify Shift to level:

Modification:-----

Minor wounds - small abrasions, minor lacerations (not requiring sutures)

Accept Reject Modify Shift to level:

Modification:-----

Chronic abdominal pain Accept Reject Modify Shift to level:

Modification:-----

Known patient with chronic Psychiatric symptoms Accept Reject Modify Shift to level:

Modification:-----

Add other conditions (next page)

1-

2-

3-

In your opinion, what could be the barriers to implement a formal triage system in public emergency departments in Saudi Arabia? Please write down as much as you like

ماهي العوائق المتوقعة التي تواجه تطبيق نظام رسمي لفرز الحالات بأقسام الطوارئ في المستشفيات العامة في المملكة العربية السعودية؟ بإمكانك الكتابة باللغة العربية

1-

2-

3-

4-

5-

2- What are the cultural and/or religious aspects that need to be considered in the implementation of the triage system in Saudi Arabia?

ماهي الاعتبارات الدينية أو الثقافية في المجتمع السعودي التي يجب أخذها في عين الاعتبار لتطبيق نظام منهجي لفرز الحالات في أقسام الطوارئ في المملكة العربية السعودية؟

1-

2-

3-

4-

Thank you

Appendix N: Stage Two Round II Letter of Instructions and Questionnaire

MONASH University



Dear expert panel member,

Thank you for your contribution during the first round. I received the answers from the first round and analysed them. *Through the first round most of the clinical descriptors were accepted by more than 75 % of the expert panel members. However, the expert panel member did not get the required consensus in few clinical descriptors.*

In this task, it is required to re-evaluate your answers of the three clinical descriptors that did get the required consensus in the first round; you will find the total percentage of each selection. In addition, you are required to select one answer of the modified clinical descriptors from the first round. This includes accepting modification or rejecting modification. Please note that rejecting modification means to keep the original clinical descriptor unchanged.

Also you need to comment to each of the newly added clinical descriptors by the expert panel members through the first round. Comment includes accept the clinical descriptor as it is, reject, modify or shift to another triage category. You can also add new clinical descriptors in the provided space in each triage category if you needed to.

Thank you for your contribution and your patient during the whole study.

عزيزي المشارك

شكراك على إسهامك في الجولة الأولى من المرحلة الثانية للدراسة . لقد تم استلام الاستبيانات وتم إجراء التحليل الإحصائي لما فيها من معلومات. من خلال تلك الجولة تم الحصول على نسبة الاتفاق المقررة مسبقاً (75%) في الكثير من المحددات الإكلينيكية التي عرضت خلال الجولة الأولى غير أنه وجد بعض من المحددات لم تصل لنسبة الاتفاق المقررة.

لمطلوب في هذه المهمة أن تقوم بإعادة النظر في إجابتك على لمحددات الإكلينيكية الثلاث التي لم تحصل على نسبة الاتفاق المطلوبة وذلك على ضوء جميع إجابات المجموعة المشاركة في الدراسة وذلك في سبيل الحصول على الاتفاق المطلوب بين المشاركين وسوف تجد مدرجاً في الاستبيانات لنسبة المنوية لكل اختيار لهذه المحددات من الجولة الأولى. بالإضافة إلى ذلك مطلوب منك أن تعلق على بعض المحددات الإكلينيكية التي تم اقتراح تعديلها جزئياً بواسطة المشاركين من خلال الجولة الأولى. لتعلق يشمل الموافقة على التعديل المقترح أو رفض التعديل، علماً أن اختيار رفض التعديل المقترح يعنى الإبقاء على المحدد الأصلي كما هو من دون تعديل.

تتطلب هذه المرحلة أيضاً التعليق على كل المحددات الإكلينيكية التي تم إضافتها خلال الجولة الأولى بواسطة بعض أعضاء الفريق المشاركين. هذا لتعليق يشمل الآتي:

قول للمحدد الجديد - رفضه - إجراء تعديل - نقله إلى مستوى آخر من مستويات الفرز. كما أنه يمكنك خلال هذه الجولة أن تضيف أي محدّدات جديدة تراها مناسبة.

شكراك مرة أخرى على إسهاماتك وعلى سعة صدرك خلال هذه الدراسة

Thank you again for your time and proceed to the questionnaire. Mohammed Aljohani

Mobile: [REDACTED]

E-mail: [REDACTED]

STAGE TWO

ROUND TWO

Triage category	Description	Response
1	immediately life-threatening	Immediately

All the suggested clinical descriptors in triage category 1 were accepted by more than 60 percent of the expert panel members, modification was only suggested in two clinical descriptors. Modification is as follow:

1:

Original clinical descriptor	Modified clinical descriptor
S. BP< 80 (adult) or severely shocked child/infant	S. BP< 80 (adult) or severely shocked child/infant - children BP ≤ 70
<input type="checkbox"/> Accept modification	<input type="checkbox"/> Reject modification

2:

Original clinical descriptor	Modified clinical descriptor
Altered mental state (unconscious or delirious)	Altered mental state (unconscious or delirious) with unstable vital signs (GCS 3-6)
<input type="checkbox"/> Accept modification	<input type="checkbox"/> Reject modification

Newly suggested clinical descriptors for triage category 1

Sever chest pain –cardiac related Accept Reject Modify Shift to level:
Modification:-----

Palpitation with dizziness Accept Reject Modify Shift to level:
Modification:-----

Near drowning with respiratory distress Accept Reject Modify Shift to level:
Modification:-----

Hypoglycaemia with loss of consciousness and / or seizures
 Accept Reject Modify Shift to level:
Modification:-----

Chocking with foreign body aspiration Accept Reject Modify Shift to level:
Modification:-----

infant with Bulging fontanel Accept Reject Modify Shift to level:
Modification:-----

Sudden loss of vision Accept Reject Modify Shift to level:
Modification:-----

You can add new clinical descriptors here.....

Triage category	Description	Response
2	Imminently life-threatening or Important time-critical treatment or Very severe pain	10 minutes

In this triage category, two of the clinical descriptors did not reach the required consensus. In this task, you are kindly requested to re-answer these clinical descriptors again in the light of the group's feedback. These clinical descriptors are:

1:

Clinical descriptor	Accepted	Rejected	Modified	Shift to:	
Headache, with pain scale 8–10/10	59.3 percent	3.7 percent	0.0 percent	Level 3 18.5 percent	Level 4 18.5 percent
<input type="checkbox"/> Accept <input type="checkbox"/> Reject <input type="checkbox"/> Modify <input type="checkbox"/> Shift to level:					

Modification was also suggested in six clinical descriptors. Modification is as follow:

1:

Original clinical descriptor	Modified clinical descriptor
Altered mental state (lethargic, drowsy, agitated GCS< 13)	Altered mental state (lethargic, drowsy, agitated GCS< 13) with unstable vital signs
<input type="checkbox"/> Accept modification <input type="checkbox"/> Reject modification	

2:

Original clinical descriptor	Modified clinical descriptor
Significant sedative or other toxic ingestion	Significant sedative or other toxic ingestion-hemodynamically Unstable
<input type="checkbox"/> Accept modification <input type="checkbox"/> Reject modification	

3:

Original clinical descriptor	Modified clinical descriptor
Abdominal pain (age > 50 yr) with visceral symptoms	Abdominal pain (age > 50 yr) with visceral symptoms - hemodynamically unstable
<input type="checkbox"/> Accept modification <input type="checkbox"/> Reject modification	

4:

Original clinical descriptor	Modified clinical descriptor
Temperatures ≥ 38.0 in children under 3 months	Temperatures ≥ 38.0 in children under 3 months - with history of febrile convulsion
<input type="checkbox"/> Accept modification <input type="checkbox"/> Reject modification	

5:

Original clinical descriptor	Modified clinical descriptor
Diabetic hypoglycaemia or hyperglycaemia	Diabetic hypoglycaemia or hyperglycaemia or diabetic ketoacidosis

<input type="checkbox"/> Accept modification <input type="checkbox"/> Reject modification

6:

Original clinical descriptor	Modified clinical descriptor
Vomiting or diarrhoea, suspicion of dehydration	Infant and old age with Vomiting or diarrhoea, suspicion of dehydration
<input type="checkbox"/> Accept modification <input type="checkbox"/> Reject modification	

Newly suggested clinical descriptors for the triage category 2

Oral drug overdose Accept Reject Modify Shift to level:

Modification:-----

Animal/ Snake bite Accept Reject Modify Shift to level:

Modification:-----

Stings (Scorpion / spiders) Accept Reject Modify Shift to level:

Modification:-----

Corrosive ingestion Accept Reject Modify Shift to level:

Modification:-----

Croup Accept Reject Modify Shift to level:

Modification:-----

You can add new clinical descriptors here

.....

.....

.....

Triage category	Description	Response
3	Urgent	30 minutes

In this triage category, Modification was also suggested in five clinical descriptors. Modification is as follow:

1:

Original clinical descriptor	Modified clinical descriptor
Acute vaginal bleeding with normal vital signs	Acute vaginal bleeding related to pregnancy - with normal vital signs
<input type="checkbox"/> Accept modification <input type="checkbox"/> Reject modification	

2:

Original clinical descriptor	Modified clinical descriptor
Seizure (now alert)	Seizure (now alert) - with history of frequent attack at the same day
<input type="checkbox"/> Accept modification <input type="checkbox"/> Reject modification	

3:

Original clinical descriptor	Modified clinical descriptor
Persistent vomiting	Persistent vomiting -hemodynamically unstable
<input type="checkbox"/> Accept modification	<input type="checkbox"/> Reject modification

4:

Original clinical descriptor	Modified clinical descriptor
Dehydration	Dehydration - hemodynamically unstable
<input type="checkbox"/> Accept modification	<input type="checkbox"/> Reject modification

5:

Original clinical descriptor	Modified clinical descriptor
Acute vaginal bleeding with normal vital signs	Acute vaginal bleeding related to pregnancy - with normal vital signs
<input type="checkbox"/> Accept modification	<input type="checkbox"/> Reject modification

Newly suggested clinical descriptors for the triage category 3

Gun Shots Accept Reject Modify Shift to level:

Modification:-----

Sexual assault Accept Reject Modify Shift to level:

Modification:-----

You can add new clinical descriptors here

.....

Triage category	Description	Response
4	Less Urgent	60 minutes

All the suggested clinical descriptors in triage category 4 were accepted by more than 60 percent of the expert panel members, modification only was suggested in one clinical descriptor. Modification is as follow:

Original clinical descriptor	Modified clinical descriptor
Vomiting or diarrhoea without dehydration	Vomiting or diarrhoea without dehydration- mild (non persistent)
<input type="checkbox"/> Accept modification	<input type="checkbox"/> Reject modification

You can add new clinical descriptors here

.....

Triage category	Description	Response
5	Non-Urgent	120 minutes

All the suggested clinical descriptors in triage category 5 were accepted by more than 60 percent of the expert panel members, modification only was suggested in one clinical descriptor. Modification is as follow:

1:

Original clinical descriptor	Modified clinical descriptor
Chronic abdominal pain	Chronic abdominal pain –with stable vital signs
<input type="checkbox"/> Accept modification	<input type="checkbox"/> Reject modification

2:

Original clinical descriptor	Modified clinical descriptor
Known patient with chronic Psychiatric symptoms	Known patient with chronic Psychiatric symptoms - not agitated or showing signs of violence towards self or others
<input type="checkbox"/> Accept modification	<input type="checkbox"/> Reject modification

You can add new conditions here

.....

Thank you

Appendix O: Stage Three Round III Letter of Instructions and Questionnaire

MONASH University



Dear Expert Panel Member,

Thank you for the timely response and quality information you gave in round 1 and 2. I received several new clinical conditions as well as the modified and accepted clinical descriptors (75%) from the first and second rounds.

This final round is to sort through the information in round one and two to draw the final consensus. This round will allow you to rate each clinical descriptor given in round one and two and to rank the importance of some barriers and cultural issues that were identified in round one. The likert scale to be used for rating is as follow: 1= strongly disagree 2= disagree 3= natural 4= agree 5= strongly agree. Ranking is based on five levels where 1 being not at all important and 5 very important.

Thank you again for your time,

Mohammed Aljohani
Mobile 0555366344
E-mail:erwi2000@yahoo.com

عزيزي المشارك

أشكرك على سرعة الاستجابة وعلى المعلومات القيمة التي شاركت بها من خلال جميع الجولات السابق في دراسة ديلفي والتي تهدف إلى إنشاء نظام سعودي لفرز الحالات بأقسام الطوارئ. الإجابات التي تم اختيارها وأيضا ما تم إضافته من مقترحات جديدة خضعت للتحليل.

المطلوب في هذه الجولة الأخيرة من الدراسة هو مراجعة شاملة لكامل المقترحات من الجولة الأولى والثانية بهدف الحصول على درجة الاتفاق النهائية كما يطلب في هذه الجولة تقييم مدى الأهمية لبعض المعوقات التي تم تحديده في الجولة الأولى. سوف يكون التقييم بواسطة مقياس لا يكرت ذو الخمس درجات بحيث يكون 1= غير موافق بشده على اختيار الاقتراح و 5= موافق بشده.

واشكر لك مرة أخرى التكرم بوقت المشاركة

محمد الجهني

هاتف: 0555366344

بريد الكتروني:erwi2000@yahoo.com

STAGE TWO

ROUND THREE

Dear expert panel member,

In this round, all the accepted, modified and shifted clinical descriptors which got a consensus of 75 percent and more are included here; You need to rate each statement below using the Likert Scale where 1 is strongly disagree to include the specified clinical descriptor in the specified triage category and 5 strongly agree to include it.

Triage level	Description	Response
1	immediately life-threatening	Immediately

To assign a patient to triage category 1, he/ she could have one or more of the following conditions:

Code arrest (Cardiac and/ or respiratory)

1= Strongly Disagree 2= Disagree 3= Neutral 4= Agree 5= Strongly Agree

Major shock

1= Strongly Disagree 2= Disagree 3= Neutral 4= Agree 5= Strongly Agree

Severe respiratory distress

1= Strongly Disagree 2= Disagree 3= Neutral 4= Agree 5= Strongly Agree

Immediate risk to airway - impending arrest Respiratory rate <10/min

1= Strongly Disagree 2= Disagree 3= Neutral 4= Agree 5= Strongly Agree

Ongoing/prolonged seizure

1= Strongly Disagree 2= Disagree 3= Neutral 4= Agree 5= Strongly Agree

S. BP < 80 (adult) or severely shocked child/infant - children BP ≤ 70

1= Strongly Disagree 2= Disagree 3= Neutral 4= Agree 5= Strongly Agree

Near fatal asthma

1= Strongly Disagree 2= Disagree 3= Neutral 4= Agree 5= Strongly Agree

Altered mental state (unconscious or delirious) - (GCS 3-6) and / or unstable vital signs

1= Strongly Disagree 2= Disagree 3= Neutral 4= Agree 5= Strongly Agree

IV overdose and unresponsive or hypoventilation

1= Strongly Disagree 2= Disagree 3= Neutral 4= Agree 5= Strongly Agree

Severe behavioural disorder with immediate threat of dangerous violence

1= Strongly Disagree 2= Disagree 3= Neutral 4= Agree 5= Strongly Agree

Sever chest pain –cardiac related

1= Strongly Disagree 2= Disagree 3= Neutral 4= Agree 5= Strongly Agree

Palpitation with dizziness

1= Strongly Disagree 2= Disagree 3= Neutral 4= Agree 5= Strongly Agree

Near drowning with respiratory distress

1= Strongly Disagree 2= Disagree 3= Neutral 4= Agree 5= Strongly Agree

Hypoglycaemia with loss of consciousness and / or seizures

1= Strongly Disagree 2= Disagree 3= Neutral 4= Agree 5= Strongly Agree

Chocking with foreign body aspiration

1= Strongly Disagree 2= Disagree 3= Neutral 4= Agree 5= Strongly Agree

Sudden loss of vision

1= Strongly Disagree 2= Disagree 3= Neutral 4= Agree 5= Strongly Agree

=====

Triage level	Description	Response
2	Imminently life-threatening or Important time-critical treatment or Very severe	10 minutes

To assign a patient to the level 2, the patient might have one or more of the following conditions:

Airway risk - severe stridor or drooling with distress

1= Strongly Disagree 2= Disagree 3= Neutral 4= Agree 5= Strongly Agree

Head injury (risk features with or without altered mental state)

1= Strongly Disagree 2= Disagree 3= Neutral 4= Agree 5= Strongly Agree

Chest pain of likely cardiac nature

1= Strongly Disagree 2= Disagree 3= Neutral 4= Agree 5= Strongly Agree

Moderate or severe dyspnea

1= Strongly Disagree 2= Disagree 3= Neutral 4= Agree 5= Strongly Agree

Altered mental state (lethargic, drowsy, agitated GCS< 13) with or without unstable vital signs

1= Strongly Disagree 2= Disagree 3= Neutral 4= Agree 5= Strongly Agree

Very severe pain - any cause

1= Strongly Disagree 2= Disagree 3= Neutral 4= Agree 5= Strongly Agree

Hypotension with hemodynamic effects

1= Strongly Disagree 2= Disagree 3= Neutral 4= Agree 5= Strongly Agree

Major multi trauma

1= Strongly Disagree 2= Disagree 3= Neutral 4= Agree 5= Strongly Agree

Severe asthma (peak expiratory flow rate <40 percent)

1= Strongly Disagree 2= Disagree 3= Neutral 4= Agree 5= Strongly Agree

Chemical exposure to the eye - requiring irrigation

1= Strongly Disagree 2= Disagree 3= Neutral 4= Agree 5= Strongly Agree

Significant sedative or other toxic ingestion

1= Strongly Disagree 2= Disagree 3= Neutral 4= Agree 5= Strongly Agree

Severe localised trauma - major fracture, amputation

1= Strongly Disagree 2= Disagree 3= Neutral 4= Agree 5= Strongly Agree

Signs of serious infection (purpuric rash, toxic)

1= Strongly Disagree 2= Disagree 3= Neutral 4= Agree 5= Strongly Agree

Abdominal pain (age > 50 yr) with visceral symptoms

1= Strongly Disagree 2= Disagree 3= Neutral 4= Agree 5= Strongly Agree

Severe allergic reaction

1= Strongly Disagree 2= Disagree 3= Neutral 4= Agree 5= Strongly Agree

Temperatures ≥ 38.0 in children under 3 months - with history of febrile convulsion

1= Strongly Disagree 2= Disagree 3= Neutral 4= Agree 5= Strongly Agree

Acute vaginal bleeding (pain scale > 5 with or without abnormal vital signs)

1= Strongly Disagree 2= Disagree 3= Neutral 4= Agree 5= Strongly Agree

GI bleeding with abnormal vital signs

1= Strongly Disagree 2= Disagree 3= Neutral 4= Agree 5= Strongly Agree

Severe blood loss

1= Strongly Disagree 2= Disagree 3= Neutral 4= Agree 5= Strongly Agree

CVA with major deficit

1= Strongly Disagree 2= Disagree 3= Neutral 4= Agree 5= Strongly Agree

Diabetic hypoglycaemia or hyperglycaemia or diabetic ketoacidosis

1= Strongly Disagree 2= Disagree 3= Neutral 4= Agree 5= Strongly Agree

Headache, with pain scale 8–10/10

1= Strongly Disagree 2= Disagree 3= Neutral 4= Agree 5= Strongly Agree

Infant and old age with Vomiting or diarrhoea, suspicion of dehydration

1= Strongly Disagree 2= Disagree 3= Neutral 4= Agree 5= Strongly Agree

Infant with Bulging fontanel

1= Strongly Disagree 2= Disagree 3= Neutral 4= Agree 5= Strongly Agree

Croup

1= Strongly Disagree 2= Disagree 3= Neutral 4= Agree 5= Strongly Agree

Acute psychotic episode or extreme agitation (immediate threat to self or others)

1= Strongly Disagree 2= Disagree 3= Neutral 4= Agree 5= Strongly Agree

Animal/ Snake bite

1= Strongly Disagree 2= Disagree 3= Neutral 4= Agree 5= Strongly Agree

Corrosive ingestion

1= Strongly Disagree 2= Disagree 3= Neutral 4= Agree 5= Strongly Agree

=====

Triage level	Description	Response
3	Urgent	30 minutes

To assign a patient to triage level 3, the patient might have one or more of the following conditions:

Head injury: alert with vomiting

1= Strongly Disagree 2= Disagree 3= Neutral 4= Agree 5= Strongly Agree

Severe hypertension

1= Strongly Disagree 2= Disagree 3= Neutral 4= Agree 5= Strongly Agree

Moderately severe blood loss - any cause

1= Strongly Disagree 2= Disagree 3= Neutral 4= Agree 5= Strongly Agree

Moderate shortness of breath

1= Strongly Disagree 2= Disagree 3= Neutral 4= Agree 5= Strongly Agree

Moderate trauma

1= Strongly Disagree 2= Disagree 3= Neutral 4= Agree 5= Strongly Agree

Acute psychosis with or without suicidal ideation

1= Strongly Disagree 2= Disagree 3= Neutral 4= Agree 5= Strongly Agree

Mild or moderate dyspnea

1= Strongly Disagree 2= Disagree 3= Neutral 4= Agree 5= Strongly Agree

Seizure (now alert) - with history of frequent attack at the same day

1= Strongly Disagree 2= Disagree 3= Neutral 4= Agree 5= Strongly Agree

Any fever if immunosuppressed eg oncology patient, steroid Rx

1= Strongly Disagree 2= Disagree 3= Neutral 4= Agree 5= Strongly Agree

Oral drug overdose

1= Strongly Disagree 2= Disagree 3= Neutral 4= Agree 5= Strongly Agree

Stings (Scorpion / spiders)

1= Strongly Disagree 2= Disagree 3= Neutral 4= Agree 5= Strongly Agree

Persistent vomiting -hemodynamically unstable

1= Strongly Disagree 2= Disagree 3= Neutral 4= Agree 5= Strongly Agree

Dehydration - hemodynamically unstable

1= Strongly Disagree 2= Disagree 3= Neutral 4= Agree 5= Strongly Agree

Mild or moderate asthma (peak expiratory flow rate \geq 40 percent)

1= Strongly Disagree 2= Disagree 3= Neutral 4= Agree 5= Strongly Agree

GI bleeding with normal vital signs

1= Strongly Disagree 2= Disagree 3= Neutral 4= Agree 5= Strongly Agree

Acute vaginal bleeding related to pregnancy - with normal vital signs

1= Strongly Disagree 2= Disagree 3= Neutral 4= Agree 5= Strongly Agree

Moderately severe pain - any cause - requiring analgesia

1= Strongly Disagree 2= Disagree 3= Neutral 4= Agree 5= Strongly Agree

Chest pain likely non-cardiac and mod severity

1= Strongly Disagree 2= Disagree 3= Neutral 4= Agree 5= Strongly Agree

Abdominal pain without high risk features - mod severe or patient age $>$ 65 years

1= Strongly Disagree 2= Disagree 3= Neutral 4= Agree 5= Strongly Agree

Moderate limb injury - deformity, severe laceration

1= Strongly Disagree 2= Disagree 3= Neutral 4= Agree 5= Strongly Agree

Trauma - high-risk history with no other high-risk feature

1= Strongly Disagree 2= Disagree 3= Neutral 4= Agree 5= Strongly Agree

Crush Limb - altered sensation, acutely absent pulse

1= Strongly Disagree 2= Disagree 3= Neutral 4= Agree 5= Strongly Agree

Dialysis problem

1= Strongly Disagree 2= Disagree 3= Neutral 4= Agree 5= Strongly Agree

Vomiting and diarrhea (age ≤ 12 yr) without dehydration

1= Strongly Disagree 2= Disagree 3= Neutral 4= Agree 5= Strongly Agree

Child at risk

1= Strongly Disagree 2= Disagree 3= Neutral 4= Agree 5= Strongly Agree

Gun Shots

1= Strongly Disagree 2= Disagree 3= Neutral 4= Agree 5= Strongly Agree

Sexual assault

1= Strongly Disagree 2= Disagree 3= Neutral 4= Agree 5= Strongly Agree

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Urgency level	Description	Response
4	Less Urgent	60 minutes

To assign a patient to triage level 4, the patient might have one or more of the following conditions:

Mild haemorrhage

1= Strongly Disagree 2= Disagree 3= Neutral 4= Agree 5= Strongly Agree

Chest injury without rib pain or Foreign body aspiration, no respiratory distress

1= Strongly Disagree 2= Disagree 3= Neutral 4= Agree 5= Strongly Agree

Normal vital signs, low/moderate pain (Pain scale 4–7/10)

1= Strongly Disagree 2= Disagree 3= Neutral 4= Agree 5= Strongly Agree

Difficulty swallowing, no respiratory distress

1= Strongly Disagree 2= Disagree 3= Neutral 4= Agree 5= Strongly Agree

Minor head injury, no loss of consciousness

1= Strongly Disagree 2= Disagree 3= Neutral 4= Agree 5= Strongly Agree

Eye inflammation or foreign body - normal vision

1= Strongly Disagree 2= Disagree 3= Neutral 4= Agree 5= Strongly Agree

Vomiting or diarrhoea without dehydration—mild (non persistent)

1= Strongly Disagree 2= Disagree 3= Neutral 4= Agree 5= Strongly Agree

Suicidal ideation or depression

1= Strongly Disagree 2= Disagree 3= Neutral 4= Agree 5= Strongly Agree

Minor allergic reaction

1= Strongly Disagree 2= Disagree 3= Neutral 4= Agree 5= Strongly Agree

Vomiting and diarrhea (age > 2 yr) without dehydration

1= Strongly Disagree 2= Disagree 3= Neutral 4= Agree 5= Strongly Agree

Minor limb trauma - sprained ankle, possible fracture, uncomplicated laceration

1= Strongly Disagree 2= Disagree 3= Neutral 4= Agree 5= Strongly Agree

Tight cast, no neurovascular impairment

1= Strongly Disagree 2= Disagree 3= Neutral 4= Agree 5= Strongly Agree

Swollen "hot" joint

1= Strongly Disagree 2= Disagree 3= Neutral 4= Agree 5= Strongly Agree

Acute abdominal pain

1= Strongly Disagree 2= Disagree 3= Neutral 4= Agree 5= Strongly Agree

Behavioural/Psychiatric: Under observation and/or no immediate risk to self or others

1= Strongly Disagree 2= Disagree 3= Neutral 4= Agree 5= Strongly Agree

Semi-urgent mental health problem

1= Strongly Disagree 2= Disagree 3= Neutral 4= Agree 5= Strongly Agree

Corneal foreign body

1= Strongly Disagree 2= Disagree 3= Neutral 4= Agree 5= Strongly Agree

Urgency level	Description	Response
5	Non-Urgent	120 minutes

To assign a patient to triage level 5, the patient might have one or more of the following conditions:

Minor trauma: not necessarily acute

1= Strongly Disagree 2= Disagree 3= Neutral 4= Agree 5= Strongly Agree

Diarrhoea alone, without dehydration

1= Strongly Disagree 2= Disagree 3= Neutral 4= Agree 5= Strongly Agree

Minimal pain (pain scale < 4/10) with no high risk features

1= Strongly Disagree 2= Disagree 3= Neutral 4= Agree 5= Strongly Agree

Sore throat without respiratory symptoms

1= Strongly Disagree 2= Disagree 3= Neutral 4= Agree 5= Strongly Agree

Vomiting alone, with normal mental status and no dehydration

1= Strongly Disagree 2= Disagree 3= Neutral 4= Agree 5= Strongly Agree

Minor symptoms of existing stable illness

1= Strongly Disagree 2= Disagree 3= Neutral 4= Agree 5= Strongly Agree

Minor symptoms of low-risk conditions

1= Strongly Disagree 2= Disagree 3= Neutral 4= Agree 5= Strongly Agree

Minor wounds - small abrasions, minor lacerations (not requiring sutures)

1= Strongly Disagree 2= Disagree 3= Neutral 4= Agree 5= Strongly Agree

Chronic abdominal pain—with stable vital signs

1= Strongly Disagree 2= Disagree 3= Neutral 4= Agree 5= Strongly Agree

Known patient with chronic Psychiatric symptoms - not agitated or showing signs of violence towards self or others

1= Strongly Disagree 2= Disagree 3= Neutral 4= Agree 5= Strongly Agree

Possible barriers to implement a formal triage system in public emergency departments in Saudi Arabia:

بعض العوائق المتوقعة التي قد تواجه تطبيق نظام رسمي لفرز الحالات بأقسام الطوارئ في المستشفيات العامة في المملكة العربية السعودية

Please comment to the following statements using 5- point likert scale where 1 not at all important and 5 is very important

1- Lack of qualified emergency staff (especially nurses) to perform triage due to the lack of proper education and training for the role of triage in university level and in-service training programs.

1- نقص الممارسين المؤهلين—وخصوصا التمريض- للقيام بأعباء فرز الحالات بسبب نقص برامج التعليم و التدريب على مهام الفرز على مستوى الدراسة الأكاديمية أو على مستوى الدورات على رأس العمل

1= Not at all important 2=Not important 3= Neutral 4= Important 5=Very important

غير مهم بتاتا غير مهم محايد مهم مهم جدا

2- Emergency department building structure in some MOH hospitals does not allow modifying the ED to have triage area in the main ED entrance as well as waiting area.

2- البنية الأساسية لأقسام الطوارئ في كثير من المستشفيات العامة لا تمكن من تعديل شكل القسم بحيث تكون منطقة الفرز في المدخل الرئيسي لقسم الطوارئ ويكون بقربها منطقة الانتظار

1= Not at all important 2=Not important 3= Neutral 4= Important 5=Very important

غير مهم بتاتا غير مهم محايد مهم مهم جدا

3- Unavailability of written national policy from the MOH to guide and control the implementation of the triage system.

3- عدم وجود سياسة مكتوبة من قبل وزارة الصحة تقود وتساعد على ضبط عملية تطبيق نظام الفرز

1= Not at all important 2=Not important 3= Neutral 4= Important 5=Very important

غير مهم بتاتا غير مهم محايد مهم مهم جدا

4 public and high authority confidences in nurses to carry out the triage role

4- ضعف الثقة من قبل العامة والجهات العليا بالتمريض للقيام بعملية فرز المرضى لدى وصولهم لأقسام الطوارئ

- | | | | | |
|--|--|-------------------------------------|---------------------------------------|---|
| <input type="checkbox"/> 1= Not at all important | <input type="checkbox"/> 2=Not important | <input type="checkbox"/> 3= Neutral | <input type="checkbox"/> 4= Important | <input type="checkbox"/> 5=Very important |
| <input type="checkbox"/> غير مهم بتاتا | <input type="checkbox"/> غير مهم | <input type="checkbox"/> محايد | <input type="checkbox"/> مهم | <input type="checkbox"/> مهم جدا |

5- difficulties in observing or re-assessing female patients in the triage waiting area while waiting due to cultural and religious considerations (for example covering face and separation between male and female)

5- صعوبة ملاحظة وإعادة تقييم حالة المرضى الإناث خلال فترة الانتظار وذلك لاعتبارات دينية وثقافية (مثل تغطية الوجه والفصل بين الرجال والنساء)

- | | | | | |
|--|--|-------------------------------------|---------------------------------------|---|
| <input type="checkbox"/> 1= Not at all important | <input type="checkbox"/> 2=Not important | <input type="checkbox"/> 3= Neutral | <input type="checkbox"/> 4= Important | <input type="checkbox"/> 5=Very important |
| <input type="checkbox"/> غير مهم بتاتا | <input type="checkbox"/> غير مهم | <input type="checkbox"/> محايد | <input type="checkbox"/> مهم | <input type="checkbox"/> مهم جدا |

6- Public acceptance of the waiting time (up to 2 hours)

2- صعوبات تتعلق بتقبل المراجعين لفترة الانتظار والتي قد تصل إلى ساعتين

- | | | | | |
|--|--|-------------------------------------|---------------------------------------|---|
| <input type="checkbox"/> 1= Not at all important | <input type="checkbox"/> 2=Not important | <input type="checkbox"/> 3= Neutral | <input type="checkbox"/> 4= Important | <input type="checkbox"/> 5=Very important |
| <input type="checkbox"/> غير مهم بتاتا | <input type="checkbox"/> غير مهم | <input type="checkbox"/> محايد | <input type="checkbox"/> مهم | <input type="checkbox"/> مهم جدا |

7- Insufficient staff to perform triage

7- القصور في عدد العاملين في قسم الطوارئ من أطباء وتمريض

- | | | | | |
|--|--|-------------------------------------|---------------------------------------|---|
| <input type="checkbox"/> 1= Not at all important | <input type="checkbox"/> 2=Not important | <input type="checkbox"/> 3= Neutral | <input type="checkbox"/> 4= Important | <input type="checkbox"/> 5=Very important |
| <input type="checkbox"/> غير مهم بتاتا | <input type="checkbox"/> غير مهم | <input type="checkbox"/> محايد | <input type="checkbox"/> مهم | <input type="checkbox"/> مهم جدا |

2- Cultural and religious aspects that need to be considered in the implementation of the triage system in Saudi Arabia

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بعض الاعتبارات الدينية أو الثقافية في المجتمع السعودي التي يجب أخذها في عين الاعتبار لتطبيق نظام منهجي لفرز الحالات في أقسام الطوارئ في المملكة العربية السعودية

Please comment to the following statements using 5- point likert scale where 1 not at all important and 5 is very important

1- Female patient cannot be examined in exposed triage area especially if the examination includes face

1- مراعاة عدم فحص المرضى الإناث في منطقة الفرز (المكشوفة) وخصوصا إذا كان الكشف يستدعي كشف الوجه

1= Not at all important
 2=Not important
 3= Neutral
 4= Important
 5=Very important

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 غير مهم
 محايد
 مهم
 مهم جدا

2-seperation between male and female patient should be maintained throughout the patient care including waiting area

2- مراعاة الفصل بين الرجال والنساء خلال عملية تقديم الخدمة الصحية ويشمل ذلك فصل غرف الانتظار

1= Not at all important
 2=Not important
 3= Neutral
 4= Important
 5=Very important

غير مهم بتاتا
 غير مهم
 محايد
 مهم
 مهم جدا

3- It is preferable to assign female triage physician or nurse to assess female patient

3- يفضل أن يكون من ضمن من يقومون بفرز الحالات للنساء طبيبة او ممرضة

1= Not at all important
 2=Not important
 3= Neutral
 4= Important
 5=Very important

غير مهم بتاتا
 غير مهم
 محايد
 مهم
 مهم جدا

4- overcome any language barriers by assigning a triage physician or nurse who can speak Arabic language

4- يمكن تقليل الصعوبات الناشئة بسبب اللغة بتعيين أشخاص في منطقة الفرز ممن يتحدثون العربية

- | | | | | |
|--|--|-------------------------------------|---------------------------------------|---|
| <input type="checkbox"/> 1= Not at all important | <input type="checkbox"/> 2=Not important | <input type="checkbox"/> 3= Neutral | <input type="checkbox"/> 4= Important | <input type="checkbox"/> 5=Very important |
| <input type="checkbox"/> غير مهم بتاتا | <input type="checkbox"/> غير مهم | <input type="checkbox"/> محايد | <input type="checkbox"/> مهم | <input type="checkbox"/> مهم جدا |

Please indicate if you agree to include your name in the expert panel members list that might be published at any time:

- Yes, I agree to include my name in the expert panel list
- NO, I do not like to include my name at this point of time

Thank you

Appendix P: The Participants' Responses to Suggested Clinical Descriptors in Round I

Suggested Clinical Descriptors	Triage category 1			
	Accept percent	Reject percent	Modify percent	Shift to other category percent
Code arrest (Cardiac and/ or respiratory)	100	0	0	0
Major shock	92.6	0	3.7	3.7
Severe respiratory distress	96.3	0	0	3.7
Immediate risk to airway - impending arrest Respiratory rate <10	100	0	0	0
Ongoing/prolonged seizure	81.5	0	0	18.5
BP< 80 (adult) or severely shocked child/infant	85.2	0	3.7	11.1
Near fatal asthma	88.9	0	3.7	7.4
Altered mental state (unconscious or delirious)	63.0	0	7.4	29.6
Unresponsive or responds to pain only (GCS < 9)	92.6	3.7	0	3.7
IV overdose and unresponsive or hypoventilation	74.1	0	3.7	22.2
Severe behavioural disorder with immediate threat of dangerous violence	66.7	0	0	33.3

Suggested Clinical Descriptors	Triage Category 2			
	Accept percent	Reject percent	Modify percent	Shift to other category percent
Airway risk - severe stridor or drooling with distress	96.3	0	0	3.7
Head injury (risk features with or without altered mental state)	96.3	0	0	3.7
Chest pain of likely cardiac nature	96.3	0	0	3.7
Moderate or severe dyspnea	96.3	0	0	3.7
Altered mental state (lethargic, drowsy, agitated GCS< 13)	66.7	0	7.4	25.9
Very severe pain - any cause	96.3	0	0	3.7
Hypotension with hemodynamic effects	85.2	3.7	3.7	7.4
Major multi trauma	85.2	0	0	14.8
Severe asthma (peak expiratory flow rate <40 percent)	81.5	0	3.7	14.8
Chemical exposure to the eye - requiring irrigation	85.2	0	0	14.8
Significant sedative or other toxic ingestion	81.5	0	3.7	14.8
Severe localised trauma - major fracture, amputation	74.1	0	0	25.9
Signs of serious infection (purpuric rash, toxic)	74.1	0	0	25.9
Abdominal pain (age > 50 yr) with visceral symptoms	85.2	0	3.7	11.1

Triage Category 2 (Continued)				
Suggested Clinical Descriptors	Accept percent	Reject percent	Modify percent	Shift to other category percent
Severe allergic reaction	77.8	0	3.7	18.5
Temperatures 38.0 in children under 3 months	63.0	0	11.1	25.9
Acute vaginal bleeding (pain scale > 5 with or without abnormal vital signs)	74.1	0	0	25.9
GI bleeding with abnormal vital signs	81.5	0	0	18.5
Severe blood loss	88.9	0	0	11.1
CVA with major deficit	85.2	0	0	14.8
Diabetic hypoglycaemia or hyperglycaemia	74.1	0	7.4	18.5
Headache, with pain scale 8–10/10	59.3	3.7	0	37.0
Vomiting or diarrhoea, suspicion of dehydration	44.4	0	7.4	48.1
Acute psychotic episode or extreme agitation (immediate threat to self or others)	77.8	0	3.7	18.5

Suggested Clinical Descriptors	Triage Category 3			
	Accept percent	Reject percent	Modify percent	Shift to other Category percent
Head injury: alert with vomiting	96.3	0	0	3.7
Severe hypertension	96.3	0	0	3.7
Moderately severe blood loss - any cause	96.3	0	0	3.7
Moderate shortness of breath	100	0	0	00
Moderate trauma	81.5	0	0	18.5
Acute psychosis with or without suicidal ideation	63.0	0	0	37.0
Mild or moderate dyspnea	77.8	3.7	3.7	14.8
Seizure (now alert)	81.5	0	7.4.	11.1
Any fever if immunosuppressed e.g. oncology patient, steroid Rx	63.0	0	3.7	33.3
Persistent vomiting	70.4	0	7.4	22.2
Dehydration	63.0	0	3.7	33.3
Mild or moderate asthma (peak expiratory flow rate \geq 40 percent)	92.6	0	3.7	3.7
GI bleeding with normal vital signs	66.7	0	0	33.3
Acute vaginal bleeding with normal vital signs	59.3	0	11.1	29.6
Moderately severe pain - any cause - requiring analgesia	70.4	0	0	29.6

Triage Category 3 (continued)				
Suggested Clinical Descriptors	Accept percent	Reject percent	Modify percent	Shift to other Category percent
Chest pain likely non-cardiac and mod severity	77.8	0	0	22.2
Abdominal pain without high risk features - mod severe or patient age >65 years	77.8	0	0	22.2
Moderate limb injury - deformity, severe laceration	85.2	0	0	14.8
Trauma - high-risk history with no other high-risk feature	88.9	0	0	11.1
Crush Limb - altered sensation, acutely absent pulse	81.5	0	0	18.5
Dialysis problem	74.1	0	3.7	22.2
Vomiting and diarrhea (age ≤ 12 yr) without dehydration	63.0	3.7	0	33.3
Child at risk	81.5	7.4	0	11.1

Suggested Clinical Descriptors	Triage Category 4			
	Accept percent	Reject percent	Modify percent	Shift to other Category percent
Mild haemorrhage	96.3	0	0	3.7
Chest injury without rib pain or Foreign body aspiration, no respiratory distress	81.5	0	0	18.5
Normal vital signs, low/moderate pain	81.5	0	0	18.5
Difficulty swallowing, no respiratory distress	74.1	0	0	25.9
Minor head injury, no loss of consciousness	88.9	0	0	11.1
Eye inflammation or foreign body - normal vision	81.5	0	0	18.5
Vomiting or diarrhoea without dehydration	77.8	0	3.7	18.5
Suicidal ideation or depression	85.2	0	0	18.8
Minor allergic reaction	88.9	0	0	11.1
Vomiting and diarrhoea (age > 2 yr) without dehydration	85.2	3.7	0	11.1
Minor limb trauma - sprained ankle, possible fracture, uncomplicated laceration	88.1	0	0	11.1
Tight cast, no neurovascular impairment	92.6	0	0	7.4
Swollen "hot" joint	85.2	0	0	14.8
Acute abdominal pain	96.3	3.7	0	
Under observation and/or no immediate risk to self or others	85.2	7.4	0	7.4
Semi-urgent mental health	81.5	0	3.7	14.8
Chronic back pain	81.5	0	3.7	14.8
Corneal foreign body	81.5	0	3.7	14.8
Pain scale 4–7/10	85.2	0	0	14.8

Triage Category 5				
Suggested Clinical Descriptors	Accept percent	Reject percent	Modify percent	Shift to other category (percent)
Minor trauma: not necessarily acute	92.6	0	0	7.4
Diarrhoea alone, without dehydration	92.6	3.7	0	3.7
Minimal pain with no high risk features	100	0	0	00
Sore throat without respiratory symptoms	100	0	0	00
Vomiting alone, with normal mental status and no dehydration	88.9	3.7	0	7.4
Pain scale < 4/10	100	0	0	00
Minor symptoms of existing stable illness	100	0	0	00
Minor symptoms of low-risk conditions	100	0	0	00
Minor wounds - small abrasions, minor lacerations (not requiring sutures)	96.3	0	0	3.7
Chronic abdominal pain	92.6	0	3.7	3.7
Known patient with chronic Psychiatric symptoms	92.6	0	7.4	0

Appendix Q: : The Participants Responses to the Modifications Made in Round I

Original clinical descriptor	Modified clinical descriptor	Accept Modification		Reject Modification	
		N	percent	N	percent
Systolic BP< 80 (adult) or severely shocked child/infant	Systolic. BP< 80 (adult) or severely shocked child/infant - children BP \leq 70	23	88.5	3	11.5
Altered mental state (unconscious or delirious)	Altered mental state (unconscious or 1 delirious) with unstable vital signs (GCS 3-6)	22	84.6	4	15.4
Altered mental state (lethargic, drowsy, agitated GCS< 13)	Altered mental state (lethargic, drowsy, agitated GCS< 13) with unstable vital signs	20	76.9	6	23.1
Significant sedative or other toxic ingestion	Significant sedative or other toxic ingestion- hemodynamically Unstable	18	69.2	8	30.8
Abdominal pain (age > 50 yr) with visceral symptoms	Abdominal pain (age > 50 yr) with visceral symptoms - hemodynamically unstable	10	38.5	16	61.5
Temperatures 38.0 in children under 3 months	Temperatures 38.0 in children under 3 months - with history of febrile convulsion	23	88.5	3	11.5
Diabetic hypoglycaemia or hyperglycaemia	Diabetic hypoglycaemia or hyperglycaemia or diabetic ketoacidosis	22	84.6	4	15.4

Original clinical descriptor	Modified clinical descriptor	Accept Modification		Reject Modification	
		N	percent	N	percent
Vomiting or diarrhoea, suspicion of dehydration	Infant and old age with vomiting or diarrhoea, suspicion of dehydration	21	80.8	5	19.2
Seizure (now alert)	Seizure (now alert) - with history of frequent attack at the same day	20	76.9	6	23.1
Persistent vomiting	Persistent vomiting - hemodynamically unstable	21	80.8	5	19.2
Dehydration	Dehydration - hemodynamically unstable	22	84.6	4	15.4
Acute vaginal bleeding with normal vital signs	Acute vaginal bleeding related to pregnancy - with normal vital signs	21	80.8	5	19.2
Vomiting or diarrhoea without dehydration	Vomiting or diarrhoea without dehydration—mild (non persistent)	20	76.9	6	23.1
Chronic abdominal pain	Chronic abdominal pain—with stable vital signs	22	84.6	4	15.4
Known patient with chronic Psychiatric symptoms	Known patient with chronic Psychiatric symptoms - not agitated or showing signs of violence towards self or others	22	84.6	4	15.4

Appendix R: Final Clinical Descriptors for Each Triage Category

Triage Category 1	Immediately life-threatening (Immediate)		
Clinical Descriptors	Percent of Consensus	Median	Mean
Code arrest (Cardiac and/ or respiratory)	100	5.00	5
Major shock	100	5.00	4.96
Severe respiratory distress	100	5.00	4.85
Immediate risk to airway - impending arrest	100	5.00	4.96
Respiratory rate <10/min			
Ongoing/prolonged seizure	96.2	5.00	4.81
Systolic BP< 80 (adult) or severely shocked child/infant - children BP ≤ 70	96.2	5.00	4.77
Near fatal asthma	100	5.00	4.96
Altered mental state (unconscious or delirious) - (GCS 3-6) and / or unstable vital signs	96.2	5.00	4.77
IV overdose and unresponsive or hypoventilation	92.3	5.00	4.85
Severe behavioural disorder with immediate threat of dangerous violence	88.5	5.00	4.35
Sever chest pain –cardiac related	100	5.00	4.88
Palpitation with dizziness	84.6	5.00	4.35
Near drowning with respiratory distress	96.2	5.00	4.73
Hypoglycaemia with loss of consciousness and / or seizures	96.2	5.00	4.81
Chocking with foreign body aspiration	96.2	5.00	4.92
Sudden loss of vision	76.9	4.50	4.15

Triage Category 2 Imminently life-threatening or Important time-critical treatment or very severe pain (10 minutes)			
Clinical Descriptors	Percent of Consensus	Median	Mean
Airway risk - severe stridor or drooling with distress	100	5.00	4.96
Head injury (risk features with or without altered mental state)	96.2	5.00	4.65
Chest pain of likely cardiac nature	96.2	5.00	4.69
Moderate or severe dyspnea	96.2	5.00	4.58
Altered mental state (lethargic, drowsy, agitated GCS< 13) with or without unstable vital signs	88.5	5.00	4.46
Very severe pain - any cause	88.5	5.00	4.38
Hypotension with hemodynamic effects	100	5.00	4.65
Major multi trauma	100	5.00	5.00
Severe asthma (peak expiratory flow rate <40 percent)	96.2	5.00	4.73
Chemical exposure to the eye - requiring irrigation	76.9	5.00	4.27
Significant sedative or other toxic ingestion	100	5.00	4.62
Severe localised trauma - major fracture, amputation	100	5.00	4.92
Signs of serious infection (purpuric rash, toxic)	80.8	5.00	4.15
Abdominal pain (age > 50 yr) with visceral symptoms	80.8	4.00	4.23
Severe allergic reaction	96.2	4.00	4.50
Temperatures 38.0 in children under 3 months - with history of febrile convulsion	92.3	5.00	4.58

Triage Category 2 Imminently life-threatening or Important time-critical treatment or very severe pain (10 minutes)			
Clinical Descriptors	Percent of Consensus	Median	Mean
Acute vaginal bleeding (pain scale > 5 with or without abnormal vital signs)	80.8	5.00	4.31
GI bleeding with abnormal vital signs	96.2	5.00	4.73
Severe blood loss	96.2	5.00	4.81
CVA with major deficit	80.8	5.00	4.32
Diabetic hypoglycaemia or hyperglycaemia or diabetic ketoacidosis	92.3	5.00	4.69
Headache, with pain scale 8–10/10	84.6	5.00	4.23
Infant and old age with Vomiting or diarrhoea, suspicion of dehydration	76.9	4.00	4.15
Infant with Bulging fontanel	88.5	5.00	4.42
Croup	84.6	5.00	4.12
Acute psychotic episode or extreme agitation (immediate threat to self or others)	84.6	4.00	4.31
Animal/ Snake bite	84.6	5.00	4.31
Corrosive ingestion	88.5	5.00	4.42

Triage Category 3		Urgent (30 minutes)		
Clinical Descriptors	Percent of Consensus	Median	Mean	
Head injury: alert with vomiting	100	5.00	4.88	
Severe hypertension	92.2	5.00	4.50	
Moderately severe blood loss - any cause	100	5.00	4.65	
Moderate shortness of breath	100	5.00	4.64	
Moderate trauma	88.5	5.00	4.38	
Acute psychosis with or without suicidal ideation	76.9	5.00	4.27	
Mild or moderate dyspnea	84.6	4.00	4.27	
Seizure (now alert) - with history of frequent attack at the same day	92.3	5.00	4.46	
Any fever if immunosuppressed e.g. oncology patient, steroid Rx	88.5	5.00	4.35	
Oral drug overdose	80.8	5.00	4.31	
Stings (Scorpion / spiders)	88.5	5.00	4.50	
Persistent vomiting -hemodynamically unstable	92.3	5.00	4.77	
Dehydration - hemodynamically unstable	96.2	5.00	4.65	
Mild or moderate asthma (peak expiratory flow rate \geq 40 percent)	92.3	5.00	4.58	
GI bleeding with normal vital signs	92.3	5.00	4.50	

Triage Category 3	Urgent	30 Minutes		
Clinical Descriptors	Percent of Consensus	Median	Mean	
Acute vaginal bleeding related to pregnancy - with normal vital signs	84.6	5.00	4.31	
Moderately severe pain - any cause - requiring analgesia	76.9	5.00	4.35	
Chest pain likely non-cardiac and mod severity	76.9	5.00	4.35	
Abdominal pain without high risk features - mod severe or patient age >65 years	80.8	5.00	4.46	
Moderate limb injury - deformity, severe laceration	92.3	5.00	4.62	
Trauma - high-risk history with no other high-risk feature	76.9	5.00	4.23	
Crush Limb - altered sensation, acutely absent pulse	88.5	5.00	4.50	
Dialysis problem	88.5	5.00	4.58	
Vomiting and diarrhea (age \leq 12 yr) without dehydration	84.6	4.50	4.19	
Child at risk	73.1	5.00	4.35	
Gun Shots	92.3	5.00	4.73	
Sexual assault	76.9	4.00	4.08	

Triage Category 4		Less Urgent (60 minutes)		
Clinical Descriptors	Percent of Consensus	Median	Mean	
Mild haemorrhage	96.2	5.00	4.65	
Chest injury without rib pain or Foreign body aspiration, no respiratory distress	84.6	5.00	4.42	
Normal vital signs, low/moderate pain (Pain scale 4–7/10)	88.5	5.00	4.54	
Difficulty swallowing, no respiratory distress	76.9	5.00	4.23	
Minor head injury, no loss of consciousness	84.6	5.00	4.54	
Eye inflammation or foreign body - normal vision	92.3		4.38	
Vomiting or diarrhoea without dehydration–mild (non persistent)	80.8		4.35	
Suicidal ideation or depression	92.3		4.54	
Minor allergic reaction	88.5		4.38	
Vomiting and diarrhea (age > 2 yr) without dehydration	96.2		4.58	
Minor limb trauma - sprained ankle, possible fracture, uncomplicated laceration	88.5	5.00	4.38	
Tight cast, no neurovascular impairment	88.5	5.00	4.42	
Swollen "hot" joint	84.6	5.00	4.46	
Acute abdominal pain	96.2	5.00	4.58	
Behavioural/Psychiatric: Under observation and/or no immediate risk to self or others	84.6	5.00	4.32	
Semi-urgent mental health problem	76.9	5.00	4.19	
Corneal foreign body	88.5	5.00	4.38	

Triage Category 5	Non-Urgent (120 minutes)		
Clinical Descriptors	Percent of Consensus	Median	Mean
Minor trauma: not necessarily acute	92.3	5.00	4.69
Diarrhoea alone, without dehydration	96.2	5.00	4.73
Minimal pain (pain scale < 4/10) with no high risk features	92.3	5.00	4.65
Sore throat without respiratory symptoms	96.2	5.00	4.77
Vomiting alone, with normal mental status and no dehydration	88.5	5.00	4.58
Minor symptoms of existing stable illness	88.5	5.00	4.69
Minor symptoms of low-risk conditions	92.3	5.00	4.73
Minor wounds - small abrasions, minor lacerations (not requiring sutures)	92.3	5.00	4.65
Chronic abdominal pain—with stable vital signs	88.5	5.00	4.85
Known patient with chronic Psychiatric symptoms - not agitated or showing signs of violence towards self or others	96.2	5.00	4.81