# A Prospective Evaluation of Emergency Patients Presenting to 8-hour Primary Care Clinics

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KKMMAR001



Submitted to the UNIVERSITY OF CAPE TOWN in partial fulfilment of the degree

Masters in Medicine (Emergency Medicine)

Faculty of Health Sciences

UNIVERSITY OF CAPE TOWN

Submission date: May 2012

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# DECLARATION

I, Marsha Koekemoer, hereby declare that the work on which this dissertation is my original work (except where acknowledgements indicate otherwise) and that neither the whole work nor any part of it has been, is being, or is to be submitted for another degree in this or any other university. I also declare that this work has not been published prior to registration for the abovementioned degree.

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# ABSTRACT

*Background*: Very little is known about the acuity case mix of patients presenting to eight-hour primary care facilities. Emergency centre triage identifies patients in urgent need of care and speeds up disposition to higher levels of care.

*Objectives:* To describe the acuity of patients presenting to eight-hour facilities, and to determine patient mode of arrival as well as the current triage practice so as to determine the need for SATS to be introduced.

*Methods:* A descriptive study of patients arriving at eight-hour primary care clinics in the Western Cape was conducted at four facilities in the Western Cape for a three-month period. The triage nurses collected routine observations from all monthly unscheduled walk-inpatients seen at these facilities. The Triage Early Warning Score was then calculated and the South African Triage Scale acuity level identified and recorded.

*Results*: A total of 1801 patients were included in the study. The total acuity distribution of the four facilities was as follows: emergency (0.3%), very urgent (15.3%), urgent (26.5%) and non-urgent (57.8%). The 2 smaller clinics (De Doorns and Heideveld) saw a higher percentage of emergency/very urgent/urgent versus non-urgent patients (85% versus 15%).

*Conclusions:* This study shows that eight-hour primary care facilities have a large proportion of urgent patients (42%) and would benefit from a standardised emergency centre triage tool for patients. Therefore it is recommended that the South African Triage Scale be implemented at these facilities as soon as possible.

# PART A: PROTOCOL

**A PROSPECTIVE EVALUATION OF EMERGENCY PATIENTS PRESENTING TO 8-HOUR PRIMARY CARE CLINICS**

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**DATE:** NOVEMBER 2010



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## 1. INTRODUCTION

Triage is a process of sorting patients based on medical urgency as they enter a health care facility. The benefits of using a standardized evidence based triage tool, such as the South African Triage Scale (SATS)[1], are to decrease mortality, reduce waiting times of very urgent patients needing emergency care, and to reduce the overall length of stay [2,3].

The SATS has been validated in the public and private health sector, and is currently in use at primary, secondary and in tertiary level facilities with Emergency Centres (ECs) in the Western Cape[3,4]. At primary care level, 8-hour facilities do not have ECs and are not adequately equipped to see emergencies and very urgent patients. The reality however is that these facilities do have emergency and very urgent patients presenting and due to overcrowded waiting rooms and limited resources there is a concern that these patients may not be picked up and sent to the appropriate level of care fast enough to save lives.

## 2. LITERATURE REVIEW

To date, no similar studies were found on the validation of SATS at 8-hour facilities in the Western Cape region or South Africa. A literature search included the following search engines – Pubmed, Embase, Cochrane and Google Scholar.

In-hospital triage systems that have been validated include the Mancester triage system (MTS) [5], the Canadian triage acuity scale (CTAS) [6] and the Australasian triage scale (ATS) [7]: "each of these triage tools require extensive training to implement, making their widespread adoption in South Africa problematic. Furthermore, the time taken to triage each patient using the above scales are too long for most emergency centres in the South African setting, where the caseload presenting to many emergency centres are so large that a rapid system is required" [8].

"The South African Triage Scale (SATS) is a scientifically derived triage tool developed by the South African Triage Group (SATG), a joint initiative between the Division of Emergency Medicine (UCT and US) and the Western Cape Department of Health" [9].

Studies have been performed in hospitals and 24-hour community health centres testing the impact of the SATS in these facilities. Results demonstrate that waiting times and the disposal of urgent patients to higher levels of care "were significantly reduced in all but the lowest priority category" [2,3].

8-hour clinics are there to provide patients with primary health care (monthly follow-up for chronic illnesses and to deal with minor complaints), but the reality is that they sometimes have to deal with emergencies as well. A study done at 24-hour community health centre (CHC) emergency centres in the Cape Town metropole revealed that "emergencies formed around one-third of the casemix" [10]. There was however a clear peak incidence of presentation outside of normal office hours [10], but nevertheless it can be assumed that if the burden on 24-hour CHCs is so high, there is a definitive need to determine what is happening at the 8-hour clinics.



**Aim of the study**

The aim of the study is to describe the current practice at 8-hour facilities, as well as their patient population and then to assess if there is a need for the SATS to be introduced.

**Objectives**

1) To determine patient mode of arrival

2) To determine patient acuity, using colour code

3) To determine patient disposition

## 3. METHODOLOGY

- **Study design**

This is a prospective descriptive study of patients arriving at 8-hour primary care clinics in the Western Cape. The triage nurse at each of the facilities will receive data capture sheets to collect the information needed and this will be used to describe the walk-in patients seen daily. The sample size will comprise a percentage of the monthly unscheduled walk-in patients seen at each of the facilities included in the study.

- **Characteristics of the study population**

The estimated sample size will comprise roughly 50% of the monthly unscheduled walk-in patients seen at each of the facilities included in the study. A quick estimate of the unscheduled walk-in patients at the 4 clinics revealed that they see roughly 1300 patients a month (550+630+40+80). This gives a total of 3900 for three months. The aim is to include at least 1800 records depending on the sample sizes of the different facilities.

Only adult patients (over 12 years of age and taller than 150cm) will be included in the study irrespective of gender or ethnicity. Patients under 12 years or less than 150 cm will be excluded as they are triaged using a separate triage algorithm not tested in the current study. Children, booked patients, club patients, and patients accessing the chronic dispensing unit (CDU) will be excluded. Patients who are well and only accessing the system for HIV or pregnancy testing will also be excluded.

The following 8-hour facilities were chosen for data collection by convenience sampling:

<u>Rural clinics</u>:

- De Doorns clinic
- Worcester clinic

Urban clinics:

- Heideveld clinic
- Woodstock clinic

- **Recruitment and enrolment**

Patients included in the study will be those presenting to 8-hour facilities as unscheduled walk-in patients. No informed consent will be obtained from these patients. Data will be collected using patient's folder numbers only (for quality purposes) and no names or other identifiable information will be used.

- **Research procedures and data collection methods**

The study will include prospective data obtained from the facilities mentioned above for a 3-month period (January – March 2011). The patients presenting complaint, mobility, vital signs (systolic blood pressure, respiratory rate, temperature and heart rate), a modified version of the Glascow coma scale – the AVPU score (**A**lert, **V**oice, **P**ain, **U**nresponsive) and their mode of transport to the facility will be recorded under their folder number. This information will then be transferred to an Excel spread sheet and all information will be kept confidential. Data captured will be stored on a password-protected computer that only the researchers will have access to.

Written permission will be obtained to use the above-mentioned facilities for data collection (see Appendix 1).

The following outcome markers will be collected:

- Deferred – transfer to higher level of care (DTH)
- Deferred – out patient appointment (DO)
- Discharged (DC)
- Death in facility(D)
- Left without being seen (LWS)

The study aims to commence in January 2011 after ethical approval has been granted. Writing up of findings will commence in April 2011. Completion of the study should be in August 2011. The aim is to submit the findings for publication to a peer-reviewed journal no later than December 2011.

- **Data safety and monitoring**

The triage nurse working at each of the facilities will initially capture the data on recording sheets (see Appendix 2). This information will then be transferred to an Excel spread sheet on a password-protected computer by the primary researcher. Only the triage nurse and the researchers will have access to the data collected.

- **Data analysis**

The information will be entered into an Excel spread sheet using the patients' folder numbers. From the information gathered the Triage Early Warning Score (TEWS) and SATS colour codes will be calculated (see Appendix 3) and recorded. This information will then be processed using simple descriptive statistics.



## 4. FUNDING

This is a self-funded study.

## 5. DESCRIPTION OF RISKS AND BENEFITS

There are no risks involved for the patients.

All patients attending 8-hour clinics will however benefit from better and more efficient health care if a favourable outcome is achieved with this study.

## 6. ETHICAL CONSIDERATIONS

- **Informed consent process**

Informed consent will be obtained from the facilities included in the study (see Appendix 1). No data will be collected before written consent is obtained.

No informed consent however will be obtained from the patients. Data will be collected using patient's folder numbers for quality purposes.

- **Privacy and confidentiality**

All data collected will be treated with the utmost confidentiality. Information will be stored on a password-protected computer that only the researchers will have access to.

## 7. DISSEMINATION OF FINDINGS

On conclusion of the study the findings will be sent to the District Health Services (DHS) as well as the facility managers of all the clinics included in the study and any other 8-hour clinics that are interested in the outcome. The findings will be used to improve care of unscheduled walk-in patients at 8-hour facilities and to hasten disposal of emergency and very urgent patients to higher levels of care.

The findings will also be submitted for publishing in a peer-reviewed journal.

## 8. REFERENCES


(1) Wallis LA. The Cape Triage Score: update. Emerg Med J 2006; 23: 740

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(9) Cape Triage Group. Implementation of the South African Triage Scale in Community Health Centre Emergency Centres. URL: http://emssa.org.za/documents/em014.pdf Pages 1-6

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# APPENDIX 1

# CONSENT FORM

# CONSENT - RESEARCH AT FACILITY

**A PROSPECTIVE EVALUATION OF EMERGENCY PATIENTS PRESENTING TO 8-HOUR PRIMARY CARE CLINICS**

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Triage is a process of sorting patients based on medical urgency as they enter a health care facility. The benefits of using a standardized evidence based triage tool, such as the South African Triage Scale (SATS)[1], are to decrease mortality, reduce waiting times of very urgent patients needing emergency care, and to reduce the overall length of stay [2,3].

The aim of the study is to describe the current practice at 8-hour facilities, as well as their patient population and then to assess if there is a need for the SATS to be introduced.

The objectives are:

1) To determine patient mode of arrival

2) To determine patient acuity, using colour code

3) To determine patient disposition

This is a prospective descriptive study of patients arriving at 8-hour primary care clinics in the Western Cape. The triage nurse at each of the facilities will receive data capture sheets to collect the information needed and this will be used to describe the walk-in patients seen daily. The sample size will comprise a percentage of the monthly unscheduled walk-in patients seen at each of the facilities included in the study.

On conclusion of the study the findings will be sent to the District Health Services (DHS) as well as the facility managers of all the clinics included in the study and any other 8-hour clinics that are interested in the outcome. The findings will be used to improve care of unscheduled walk-in patients at 8-hour facilities and to hasten disposal of emergency and very urgent patients to higher levels of care.

The findings will also be published in a peer-reviewed journal.

I/We _____ hereby give written consent that _____(clinic name) are prepared to participate in the research study mentioned above.

_____ _____

Signature: Facility Manager Date

# APPENDIX 2
# DATA CAPTURE SHEET

**A PROSPECTIVE EVALUATION OF EMERGENCY PATIENTS PRESENTING TO 8-HOUR PRIMARY CARE CLINICS**

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Date: Age: Gender: M F

Folder number:

Main complaint:

Mode of transport: Own Ambulance

Vitals: BP Pulse

Resp rate Temp

AVPU score: Alert Voice Pain Unresponsive

Disposal: Nurse Doctor D/C

# APPENDIX 3

**ADULT TRIAGE SCORE** © South African Triage Group 2008

| | 3 | 2 | 1 | 0 | 1 | 2 | 3 | |
|---|---|---|---|---|---|---|---|---|
| Mobility | | | | Walking | With Help | Stretcher/ Immobile | | Mobility |
| RR | | less than 9 | | 9-14 | 15-20 | 21-29 | more than 29 | RR |
| HR | | less than 41 | 41-50 | 51-100 | 101-110 | 111-129 | more than 129 | HR |
| SBP | less than 71 | 71–80 | 81-100 | 101-199 | | more than 199 | | SBP |
| Temp | | Cold OR Under 35 | | 35-38.4 | | Hot OR Over 38.4 | | Temp |
| AVPU | | Confused | | Alert | Reacts to Voice | Reacts to Pain | Unresponsive | AVPU |
| Trauma | | | | No | Yes | | | Trauma |

over 12 years / taller than 150cm

| Colour | RED | ORANGE | YELLOW | GREEN | BLUE |
|---|---|---|---|---|---|
| TEWS | 7 or more | 5-6 | 3-4 | 0-2 | DEAD |
| Target time to treat | Immediate | less than 10 mins | less than 60 mins | less than 240 mins | DEAD |
| Mechanism of injury | | High energy transfer | | | |
| Presentation | | Shortness of breath - acute | | ALL OTHER PATIENTS | |
| | | Coughing blood | | | |
| | | Chest pain | | | |
| | | Haemorrhage - uncontrolled | Haemorrhage - controlled | | |
| | Seizure - current | Seizure - post ictal | | | |
| | | Focal neurology - acute | | | |
| | | Level of consciousness reduced | | | |
| | | Psychosis / Aggression | | | |
| | | Threatened limb | | | |
| | | Dislocation - other joint | Dislocation - finger or toe | | |
| | | Fracture - compound | Fracture - closed | | |
| | Burn - face / inhalation | Burn over 20% | Burn - other | | |
| | | Burn - electrical | | | |
| | | Burn - circumferential | | | |
| | | Burn - chemical | | | |
| | | Poisoning / Overdose | Abdominal pain | | |
| | Hypoglycaemia - glucose less than 3 | Diabetic - glucose over 11 & ketonuria | Diabetic - glucose over 17 (no ketonuria) | | |
| | | Vomiting - fresh blood | Vomiting - persistent | | |
| | | Pregnancy & abdominal trauma or pain | Pregnancy & trauma | | |

APPENDIX 1: The South African Triage Scale

# PART B: LITERATURE REVIEW

**A) Objectives of the literature review:**

1) To define emergency centre (EC) triage as a process
2) To summarize which triage tools have been published as valid, with an expansion of the South African Triage Scale (SATS)
3) To discuss the burden of disease in South Africa
4) To summarize publications on the process of triage in the primary health care setting



**B) Literature search strategy:**

An initial literature search included the following search engines – Pubmed, Embase, Cochrane and Google Scholar. Key words that were used included: South African Triage Scale (SATS); primary care clinics AND triage; triage tools AND validation; burden of disease AND South Africa; emergency centre/department AND triage; primary health care AND triage.

The literature search was limited to only EC triage tools. Mass casualty triage tools were excluded. Only literature after the year 2000 was included; before 2000 were excluded.

To date, no similar studies were found on the validation of SATS or the patient population presenting to eight-hour facilities in the Western Cape region or South Africa.

**C) Summary of the literature:**

1) To define emergency centre (EC) triage as a process

The word 'triage' was originally used by the French in the 1700's. It means 'to select or sort'[1]. EC triage is a process of sorting patients based on medical urgency as they enter a health care facility. It was designed and initially utilised by the military before it was used in medical facilities. Resources were limited on the battle field and the number and/or severity of the injured soldiers exceeded their capacity [2]. The objective is to do the most good for the most people [2] in order to increase the number of survivors or to prevent death.

In hospitals or clinics where the undifferentiated, unscheduled patient load exceeds the available capacity, the most urgent patients need to be identified and cared for first [3]. The acuity level determines the urgency of their condition with which they are presenting to the health care facility and how quickly medical intervention or treatment is necessary before their condition deteriorates. If a patient is cared for within the prescribed time limit and before deterioration, then triage has been effective in that setting [4].

Ideally, triage should be done by a senior sister or another medical staff member with appropriate experience [2]. In South Africa it has been shown that junior staff members, if trained and tested comprehensively on the SATS, are competent at triage [5]. Health care facilities usually have many patients attending on a daily basis leading to long waiting times. All these patients need to be triaged within minutes from arriving. During triage the triage nurse documents their presenting problem and determines their acuity level by using a standardised tool. Some additional investigations are done at triage such as a finger-prick glucose level in diabetics or urine analysis to check for an infection or electrocardiogram (ECG) for chest pain [2]. These investigations may change the patient's triage priority.

According to a recent paper written by *Jean Augustyn* there are several reasons why a standardized triage tool should be used: patients with life-threatening conditions or injuries receive emergency treatment, their length of stay decreases, better patient-flow thus less overcrowding, better patient and staff satisfaction and the risk of infection decreases [6].



2) To summarize which triage tools have been published as valid, with an expansion of the SATS

A systematic review by *Farrohknia et al.* evaluated different adult triage tools currently in use in ECs. The objectives of the review were to determine: (i) whether assessment of individual vital signs or presenting complaints affects mortality during in-hospital stay or within 30 days of arrival in the EC; (ii) the reliability of triage tools when used by clinicians; (iii) the validity of each triage tool measured against hospitalization and hospital mortality [7].

The Australasian Triage Scale (ATS), Canadian Emergency Department Triage and Acuity Scale (CTAS), Manchester Triage System (MTS), Emergency Severity Index (ESI), Soterion Rapid Triage Scale (SRTS), and a few other smaller tools were included and evaluated [7]. The South African Triage Scale (SATS) was not included in this review. The conclusion revealed shortcomings in the scientific evidence and recommended further reliability and validity studies to provide stronger evidence to determine which vital signs and presenting complaints are more predictive at triage. The safety of triage tools requires further investigation and comparisons of triage tools were suggested to determine if any have advantages over the others [7].

EC triage tools that have been validated include the ATS [8], MTS [9], CTAS [10] and SATS [11]. The Australasian Triage Scale (ATS) has charts that consist of five different categories: ATS1 – patients to be seen immediately; ATS2 – patients to be seen in 10 minutes; ATS3 – patients to be seen in 30 minutes; ATS4 – patients to be seen in 60 minutes; ATS5 – patients to be seen in 120 minutes. It gives a full description of each category and lists of clinical descriptors in order to triage patients [8]. The MTS consists of fifty two flowcharts [9]. There are flowcharts for each main complaint that patients can present with. These complaints are then further broken down into five categories: illness, lesion, children, abnormal behaviour and major incidents [9]. The flowcharts also have discriminators which help to determine the acuity level of the patients. There are five different acuity levels: **red** where patients need to be attended to immediately, **orange** where patients can wait 10 minutes before being seen, **yellow** where patients can wait 60 minutes, **green** where patients can wait 2 hours and **blue** where patients can wait 4 hours before being seen [9]. The Canadian Triage Acuity Scale (CTAS) has five acuity levels: **Level I** is for patients that need resuscitation; **Level II** is for emergent cases; **Level III** is for urgent cases; **Level IV** is for less urgent cases and **Level V** is for non-urgent cases. This system makes use of modifiers to help the triage staff[10]. Although it is very different to the MTS, it also uses the patients presenting complaint or symptoms to determine their acuity level [12].

All of these triage tools have a five-level triage and acuity scale. Extensive training and experienced staff are required to implement either of them. It also appears that triaging

patients will be very time-consuming as there are so many flowcharts and/or modifiers to go through before the acuity level of one patient can be determined [13].

South Africa is a developing country with very limited resources and staff. According to a report by Solidarity in 2009, there are up to 35 000 vacancies for nurses in South Africa. 30 000 pertain to the public sector [14].

**Table 1: Nurses per 1000 population, various years**

| Country | Year | Number | Density per 1000 population |
|---|---|---|---|
| **United Kingdom** | 1997 | 704332 | 12.12 |
| **Canada** | 2003 | 309576 | 9.95 |
| **Australia** | 2001 | 176188 | 9.10 |
| **South Africa** | 2004 | 184459 | 4.08 |

Source: Table compiled from WHO World health statistics report, 2007



When comparing our number of nurses to that of other countries which have implemented triage tools (refer to table 1), it is very obvious that South Africa has a mismatch of resources and capacity to meet the demand.

There are also other important factors to consider regarding the nursing population in South Africa. The Department of Labour analysed the age distribution and skills level of nurses in their *National Scares Skills List* document. According to this 32.8% of South Africa's nursing staff fall in the age group 40-49 years and only 1.3% of nurses fall into the under 25 year age group [15]. Many nurses also enter or practise as auxiliary nurses especially in the younger age groups. This could lead to a scarcity in the future as there may not be nursing staff available or with the necessary experience to replace the ones that retire [15].

Triage tools used in developed countries are not designed for use in a developing country and therefore the need for a more suitable tool arose. The South African Triage Scale (SATS)

was developed by the South African Triage Group (SATG) [16], a multidisciplinary group consisting of medical doctors, nurses and paramedics with expertise in different aspects related to Emergency Medicine [13].

The SATS has undergone several validation studies and is updated and re-validated every three to five years. The SATS contains three components: (i) a list of key clinical discriminators; (ii) an age-appropriate physiological composite score {i.e. Triage Early Warning Score (TEWS)}; (iii) some key additional investigations. The TEWS originated from the Modified Early Warning Score (MEWS), which was initially used to triage patients. The MEWS was intended for medical patients only, using their physiological parameters (systolic blood pressure, respiratory rate, heart rate, body temperature) and one additional factor (AVPU score, which determines the level of consciousness) to determine how sick they were and their likelihood of demising while in hospital [1,17].

This led to medical bias [1] and an addition had to be made to include trauma patients. Trauma patients usually do not have co-morbidities and their physiological parameters do not always portray the severity of their injuries. Therefore a 'trauma factor' and a 'mobility factor' were added to the MEWS to develop the TEWS [1, 13]. This ensured that injuries did not go unnoticed and prevented patients that were initially triaged as 'low priority' to deteriorate.

A list of discriminators (i.e. clinical signs such as chest pain or inhalation burns) was then added to the TEWS. In patients with co-morbidities, such as Hypertension or Diabetes mellitus, physiological parameters alone do not always recognise the urgency of their presenting problem [11]. They might be triaged in a low acuity level (green or yellow) based on their TEWS, but if they were not attended to immediately, their condition could deteriorate rapidly. A patient's acuity level can be upgraded using the list of discriminators once the TEWS has been calculated, but a patient can never be assigned a lower acuity level than what was calculated initially from the TEWS [6, 11].

There are four acuity levels and each one has a time-limit prescribed to it in which patients should be attended to. **Red** is for emergency patients that should be seen immediately;

**orange** is for very urgent patients that should be seen in less than 10 minutes; **yellow** is for urgent patients that should be seen in less than 60 minutes and **green** is for routine patients that should be seen in less than four hours [18]. The SATS has different charts catering for adults and paediatrics [13]. The idea behind the SATS was that Enrolled Nursing Assistants (ENAs), who only have one year training, were to use it since there is a shortage of doctors and professional nurses in South Africa [5, 18].

When assessing the validity of a triage tool it should be able to determine an acuity level as closely as possible to the patient's true acuity level [19]. For a tool to be reliable the same results should be generated every time with the same health care worker and there should be agreement among health care workers regarding a patient's acuity level irrespective of their true acuity level [18]. The SATS has been validated in the public and private health sector, and is currently been implemented in ECs at all three levels of care in the Western Cape [20, 21]. One of the studies looking at the validity of SATS in the ECs determined the sensitivity and specificity of the SATS to be 75% and 91% respectively [18]. It also looked at under-triage (10%) and over-triage (15%) ratings in comparison to the true acuity levels of patients [18] and this fell within the accepted American College of Surgeons Committee on Trauma (ACSCOT) ranges [22]. It also correlated well with findings from previous studies [20].



3) A discussion of the burden of disease in South Africa

In our current District Health Care (DHC) system, patients that feel unwell need to access the health care system via Primary health care (PHC) facilities or their general practitioner (GP) to be referred to the appropriate level of care. In South Africa pre-hospital ambulance services use a similar triage tool to determine the urgency level of patients. This then determines to which level of care patients will be delivered to. When patients meet the necessary criteria to be transported by ambulance services, they stand a chance to access secondary or tertiary level care without being referred (Prof Lee Wallis and Dr Cleeve Robertson, personal communication).

South Africa's burden of disease is very different to that of developed countries and therefore we need a triage tool that is quick to implement and utilise without needing more

resources or staff. According to the World Health Organisation (WHO) statistics in 2009, South Africa's population is roughly estimated at 50,110,000 with a life expectancy of 54 years [23].They also estimate that our burden from non-communicable diseases is two to three times higher than that of developed countries [24]. Our ECs deal with a significant amount of sick patients every day. Most of these illnesses fall within the so-called 'quadruple burden of disease' [25,26]. This consists of communicable diseases, non-communicable chronic diseases, injuries and HIV/AIDS [25].

The Medical Research Council (MRC) of South Africa released a report in 2008 on the South African National Burden of Disease. This report looked at all the illnesses contributing to our burden of disease as well as the underlying causes for morbidity and mortality in South Africa in 2000 [27]. *Norman et al* published an overview of this report during 2007 which indicated that the top three risk factors as underlying causes of mortality were (i) unsafe sex/sexually transmitted infections (26%); (ii) high blood pressure (9%); (iii) tobacco smoking (8.5%). The three top-ranking diseases/injuries/conditions for South Africa's burden of disease were HIV/AIDS (25.5%), ischaemic heart disease (6.6%) and stroke (6.5%) respectively [28]. An update to the burden of disease was planned to begin in 2011 [26].

Infectious diseases (HIV/AIDS, Tuberculosis, etc) caused a significant amount of deaths in 2000. Non-communicable diseases (Ischaemic heart disease, Hypertension, Diabetes) are also ranked under the top 10. Obesity plays a big role in the development of non-communicable diseases and when this is combined with physical inactivity, tobacco smoking and high alcohol consumption, it seems that South Africa's burden of disease may increase in the future [29].

Injuries form part of our 'quadruple burden of disease'. South Africa's trauma load is one of the highest in the world [30]. In the 7th Annual report of the National Injury Mortality Surveillance System (NIMSS) 2008 of the MRC, 23 541 (39%) non-natural deaths were recorded in 2005. Of those, violence/homicide and accidental deaths such as road traffic accidents were among the biggest causes of death [31].

Another big problem that South Africa faces is mental health disease, especially related to substance abuse. These conditions are not always captured in the mortality reports, but it adds a significant load to the burden of disease [32]. The most common mental health conditions are psychosis, depression and anxiety management of victims from violence [26]. The Western Cape Province specifically has a very high rate of substance abuse, mostly from alcohol and 'tik' [32].

It is therefore paramount that prevention should be on the top of the list when addressing issues regarding burden of disease in a country. There are currently no studies to show the positive impact that SATS has on the burden of disease in South Africa. However annual audits and surveys have shown that the implementation of SATS improves patient flow and timely management in health facilities, especially at district health care level (Dr Pauline Louw, personal communication). This implies that complications as a result of patients waiting too long for medical treatment may be minimised, and prevents recurrent presentations to the same facility.



4) To summarize publications on the process of triage in the primary health care setting

Very few studies have been published on triage in the primary health care setting. One descriptive article discussed the implementation of nurse triage in Bahrain's primary health care system. The preliminary findings demonstrated that the implementation was feasible at one facility. No statistical measures were reported to support further claims on the positive impact of the implementation. The authors suggested further wide-spread implementation in Bahrain to strengthen their claims [33].

Currently, there is no uniform triage tool in use at eight-hour primary care facilities in the Western Cape. The benefits of using a standardized evidence based triage tool, such as SATS, are to reduce waiting times of emergency and very urgent patients needing immediate care, to reduce the overall length of stay and to reduce morbidity and mortality [20, 34, 35].

Validation studies have been done in our central and district health care services including hospitals and 24-hour community health centres (CHCs). Results have shown that waiting times (and the disposal of urgent patients to higher levels of care) were substantially reduced in all urgency categories except in the non-urgent category [20, 35]. Nurse triage, using the SATS, reduced the waiting time of patients from 237 minutes to 146 minutes (p-value of <0.001). The biggest reduction in waiting time were demonstrated in the red acuity level from 216 minutes to 38 minutes (p<0.001) [35].

**D) Identification of gaps or needs for further research:**

To date, no similar studies were found on the validation of SATS or the patient population presenting to eight-hour facilities in the Western Cape region or South Africa. Even the studies done in other countries have very limited information.

Eight-hour CHCs are part of the DHC system and the first point of entry into the health care service. They provide patients with primary health care (monthly follow-up for chronic illnesses and to deal with minor complaints – green acuity level). These facilities do not have ECs and are not adequately equipped to see emergencies and very urgent patients. The reality however is that patients do present with emergency and very urgent complaints and due to overcrowded waiting rooms and limited resources there is a concern that these patients may not be picked up and sent to the appropriate level of care fast enough to save lives.

Very few studies have looked at the patient population or the acuity mix of patients presenting to our ECs. This information is vital if planning is to be done to improve service delivery in South African health care facilities [36]. A study done at one of the 24-hour CHC ECs in the Cape Town metropole revealed that emergencies comprised about 33% of the case mix. There was a clear peak incidence of presentation outside of normal office hours [36]. It can be assumed that if the burden on 24-hour CHCs is so high, there is a need to describe what is happening at the eight-hour clinics.

This study is the first to describe the acuity level of patients seen at eight-hour facilities in order to determine if the use of SATS is justified.

***Word count:*** *3153*

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# PART C: MANUSCRIPT FOR PUBLICATION

## A prospective evaluation of emergency patients presenting to 8-hour primary care clinics

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**MeSH words:** South African Triage Scale (SATS); primary care clinics AND triage; emergency centre/department AND triage; primary health care AND triage

**Word count**: 2987 (excluding abstract)

***ABSTRACT***

*Background*: Very little is known about the acuity case mix of patients presenting to eight-hour primary care facilities. Emergency centre triage identifies patients in urgent need of care and speeds up disposition to higher levels of care.

*Objectives*: To describe the acuity of patients presenting to eight-hour facilities, and to determine patient mode of arrival as well as the current triage practice so as to determine the need for SATS to be introduced.

*Methods:* A descriptive study of patients arriving at eight-hour primary care clinics in the Western Cape was conducted at four facilities in the Western Cape for a three-month period. The triage nurses collected routine observations from all monthly unscheduled walk-inpatients seen at these facilities. The Triage Early Warning Score was then calculated and the South African Triage Scale acuity level identified and recorded.

*Results*: A total of 1801 patients were included in the study. The total acuity distribution of the four facilities was as follows: emergency (0.3%), very urgent (15.3%), urgent (26.5%) and non-urgent (57.8%). The 2 smaller clinics saw a higher percentage of emergency/very urgent/urgent versus non-urgent patients (85% versus 15%).

*Conclusions:* This study shows that eight-hour primary care facilities have a large proportion of urgent patients (42%) and would benefit from a standardised emergency centre triage tool for patients. Therefore it is recommended that the South African Triage Scale be implemented at these facilities as soon as possible.



## INTRODUCTION

In the South African District Health Care (DHC) system, patients that feel unwell access the health care system via Primary health care (PHC) facilities or private general practitioners to be referred to the appropriate level of care. The PHC system includes eight-hour clinics and 24-hour community health centres (CHCs). 24-hour CHCs have Emergency Centres (ECs), providing emergency care to the uninsured population. They are staffed by nurses and medical officers, with clinical governance being provided by a family physician.

Eight-hour CHCs are part of the PHC system and the first point of entry into the health care service. They provide patients with primary health care (monthly follow-up for chronic illnesses and deal with minor complaints). These facilities do not have ECs and are not adequately equipped to see emergency and very urgent patients. The reality however is that patients do present with emergency and very urgent complaints. Due to overcrowded waiting rooms, limited resources and a lack of standardized triage there is a concern that these patients may not be rapidly identified and sent to the appropriate level of care to deal with time-critical illnesses and save lives.

The patient journey through an eight-hour clinic starts with entry into the facility where the patient is directed to the administration desk to open a folder irrespective of their complaint. They wait to be seen by a junior nurse with limited experience to do the observations and then wait again to be seen by a qualified sister or sometimes a doctor based on first come first served. If the junior nurse however feels that a patient is in need of urgent care, she will

inform a senior staff member and the patient may be seen and attended to sooner. This decision to prioritise a patient is currently very subjective, based on clinical experience and not standardised[1].

EC triage is a process of sorting patients based on medical urgency as they enter a health care facility. In hospitals or clinics where the undifferentiated, unscheduled patient load exceeds the available capacity, the most urgent patients need to be identified and cared for first [2]. Patients are sorted according to their acuity level upon arrival. The acuity level determines the urgency of their condition with which they are presenting to the health care facility and how quickly medical intervention or treatment is necessary before their condition deteriorates. If a patient is cared for within the prescribed time limit and before deterioration, then triage has been effective in that setting [3].

EC triage tools that have been validated elsewhere include the Australasian Triage Scale (ATS)[4], Manchester Triage System (MTS)[5] and Canadian Triage and Acuity Scale (CTAS)[6]. All of these triage tools have a five-level triage and acuity scale. Extensive training and experienced staff are required to implement either of them. Triaging patients is very time-consuming as there are so many flowcharts or modifiers to go through before the acuity level of one patient can be determined [7].

Triage tools used in developed countries are not designed for use in a developing country. South Africa's burden of disease is very different to that of developed countries and therefore the South African Triage Scale (SATS) was developed. According to the World Health Organisation (WHO) statistics in 2009, South Africa's population is roughly estimated at 50,110,000 with a life expectancy of 54 years. They also estimate that our burden of non-communicable diseases is two to three times higher than that of developed countries [8]. Our ECs deal with a significant amount of sick patients every day. Most of these illnesses fall within the so-called 'quadruple burden of disease' consisting of communicable diseases, non-communicable chronic diseases, injuries and HIV/AIDS[9].

The SATS contains three components: (i) a list of clinical discriminators; (ii) an age-appropriate physiological composite score {i.e. Triage Early Warning Score (TEWS)}; (iii) some key additional investigations. The SATS has different charts catering for adults and paediatrics[10]. The idea behind the SATS was that Enrolled Nursing Assistants (ENAs), who only have one year training, were to use it since there is a shortage of doctors and professional nurses in South Africa[11].

In the Western Cape the implementation of the South African Triage Scale (SATS) in all ECs has been provincial policy since 2005. The SATS is a quick user-friendly standardized triage tool that was developed for the South African context. Validation and reliability studies have been done in central and district health care services in the Western Cape [1,11,12,13].

Currently, there is no uniform triage tool in use at eight-hour primary care facilities in the Western Cape. The benefits of using a standardized evidence based triage tool, such as SATS [10], are to reduce waiting times of emergency and very urgent patients needing immediate

care, to reduce the overall length of stay and to reduce morbidity and mortality [12,14]. Ideally, triage should be done by a senior sister or another medical staff member with appropriate experience. In South Africa it has been shown that junior staff members, if trained and tested comprehensively on the SATS, are competent at triage. Health care facilities have many patients attending on a daily bases leading to long waiting times. All these patients need to be triaged within minutes from arriving. The triage nurse documents their presenting problem and determines their acuity level by using a standardised tool. Some additional investigations are done at triage such as a finger-prick glucose level in diabetics or urine analysis to check for an infection or electrocardiogram (ECG) for chest pain. These investigations may change the patient's triage priority.

In South Africa pre-hospital ambulance services use the same triage tool to determine the urgency level of patients. This determines the level of care patients will be transferred to. When patients are triaged into a higher acuity level they access a secondary or tertiary level of care via ambulance (Prof Lee Wallis and Dr Cleeve Robertson, personal communication).

Very few studies have looked at the patient population or the acuity mix of patients presenting to our ECs. This information is vital if planning is to be done to improve service delivery in South African health care facilities. A study done at one of the 24-hour CHC ECs in the Cape Town metropole revealed that emergencies comprised about 33% of the case mix. There was a clear peak incidence of presentation outside of normal office hours [15]. It is assumed that if the burden on 24-hour CHCs is so high, there is a need to describe what is happening at the eight-hour clinics.

This study aims to describe the acuity level of patients seen at eight-hour facilities in order to determine if there is a need for SATS to be introduced. The authors undertook to describe patient mode of arrival, acuity level and the facility readiness for SATS implementation.



## METHODS

### Study design

This was a descriptive study of patients arriving at eight-hour primary care clinics in the Western Cape.

### Sampling

The population size for the selected facilities drainage areas, as reported by each facility manager range from 21 000 to 170 000. The sample size comprised all of the monthly unscheduled walk-in patients seen at each of the facilities included in the study. Adult patients, defined as over 12 years of age and taller than 150cm, were included in the study irrespective of gender or ethnicity. Children defined as under 12 years or less than 150cm are

triaged using a separate algorithm not tested in the current study and were thus excluded. Booked patients, club patients, and patients accessing the chronic dispensing unit (CDU) were also excluded, as well as patients who were well and only accessing the system for HIV or pregnancy testing.

**Research procedures**

The study included prospective data collected from four facilities in the Western Cape (facilities 1 & 2 – rural, facilities 3 & 4 – urban) for a three-month period (March - May 2011) during office hours (Mondays – Fridays from 08h00 - 16h00). Data was collected anonymously using patient's folder numbers only (for tracking purposes). Confidentiality was maintained at all times.

The triage nurses and facility managers working at each of the facilities attended a briefing session where the study was explained in detail. The triage nurse at each of the facilities received data capture forms to collect the information needed and this was used to describe the unscheduled, undifferentiated walk-in patients seen daily. A folder with the research proposal and full instructions was given to each facility in the event of any queries. The triage nurses initially captured the data on recording forms. Each patient's presenting complaint, mobility, vital signs (systolic blood pressure, respiratory rate, temperature and heart rate), a modified version of the Glascow coma scale – the AVPU score (**A**lert, **V**oice, **P**ain, **U**nresponsive) and their mode of transport to the facility were recorded under their folder number.

The minimum requirements for collected information to be included in the results were: (i) all vital signs documented and (ii) the main complaint or presenting problem documented. Only information from those forms fulfilling the minimum requirements were transferred to a password-protected database by the primary researcher. This was done using the patients' folder numbers for quality control purposes. All information was stored on a password-protected computer and only the researchers had access to the data collected. From the initial information gathered, the Triage Early Warning Score (TEWS) and SATS priority categories were obtained retrospectively and recorded.

Although no formal training in triage was done, each of the facilities were handed a questionnaire to complete in order to determine their current set-up for triage.

**Data analysis**

This information was collated in a password-protected Excel database and summarized using simple descriptive statistics only.

## Ethics

Ethics approval was granted by the University of Cape Town, Faculty of Health Sciences Research Ethics Committee (HREC Ref: 075/2011) as well as the Department of Health.

# RESULTS

## Demographic data

A total of 1801 patients from the four facilities were included in the study. Of those, 693 (38.4%) were male and 1061 (59%) were female. 47 (2.6%) of the forms did not indicate the gender. Their ages ranged between 13 and 87 years old (mean age of 41.1 years, median age of 50 years).

1259 (69.9%) of the patients arrived at the hospital with their own transport, while 9 (0.5%) arrived by ambulance. In 533 (29.6%) cases the mode of arrival was unknown.



## Outcomes

Data from 1801 patients were collected from the four different CHCs over the three-month period. From those, only 745 (41.4%) of the data capture sheets were completed in full. Some of the incomplete forms could however be included in the results due to the presenting complaint which matched a discriminator on the SATS chart, therefore making the total 906 (50.3%). The other 895 forms were not included because the forms were either incomplete or changed to suit the specific facility's need (weight and urine analysis were captured instead of respiratory rate and pulse rate).

When evaluating each facilities contribution to the total (1801), the breakdown was as follows: facility one collected 2% (41) of the total data, facility two 26% (462), facility three 22% (402) and facility four 50% (896) (see figure 1). Of the 745 completed data capture sheets, facility one contributed 2% (17), facility two 11% (80), facility three 3% (19) and facility four 84% (629) (see figure 2).

## Acuity level

The total acuity distribution of the four facilities is illustrated in figure 3. Red 0.3% (95% CI: 0.1-1.0%), orange 15.3% (95% CI: 13.1-17.9%), yellow 26.5% (95% CI: 23.6-20.5%) and green 57.8% (95% CI: 54.5-61.1%).

The two smaller CHCs (facility one – rural and facility three – urban) saw a significantly higher percentage of emergency/very urgent/urgent versus non-urgent patients (85% versus 15%) (figure 4).

**Qualitative section on triage readiness**

A summary of the triage readiness checklist is shown in table 1. Two of the facilities only had one staff member dedicated to triage, while another facility had two and the fourth facility had four staff members allocated to the area. Their qualifications ranged from assistant staff nurses to Chief professional nurses. In the event that those staff members allocated to triage happened to be off sick or attending courses, three of the facilities had replacements. One of the facilities however, did not have a replacement for these staff members, and in the event that they may have been absent, the facility would not see any walk-in patients for that day. Patients would be requested to come back the next day or to attend another facility.

All the facilities have a separate resuscitation area in close proximity to the triage area and a doctor is available on most of the days in the event of an emergency.

Staff members from two of the facilities have attended some form of SATS information workshop, but have not attended comprehensive SATS training. In spite of this, all facilities that were included in this study use a modified version of a triage system that has not been validated or tested.



**DISCUSSION**

To our knowledge this was the first study to describe the patient population and acuity mix of patients presenting to eight-hour primary care facilities in the Western Cape. From figures 1 and 2 it is clear that there is a big discrepancy in the amount of patients seen at each facility. It is important to note that facility four contributed 84% to the total completed data capture sheets and therefore the results mostly reflect one facility rather than an equal distribution of four.

With reference to figure 4, it is clear that a large proportion (42.2%) of the patients seen at eight-hour facilities should be seen by secondary or tertiary level facilities. According to the level of care, primary care facilities should only be providing care for the lowest priority category (i.e. non-urgent or green). If these proportions are representative of the work load, then these facilities are not appropriately equipped, skilled and staffed to deal with more urgent patients. The SATS is a quick and easy triage tool to be implemented, however it is only part of the solution and should be considered in conjunction with appropriate staffing ratios and resource requirements to prevent setting facilities up for failure.

When looking at the acuity mix of each facility in figure 4, it is evident that the two smaller facilities when compared to the other two larger facilities see greater proportions of emergency/very urgent/urgent patients versus non-urgent patients. The possible reason for this is that secondary and tertiary facilities are in close proximity to the two bigger facilities.

From the triage readiness questionnaire, it is clear that the need for a uniform triage process has been identified. Various efforts have already been made to plan and prepare towards the requirements for SATS implementation at three of the four facilities. It is however clear that a great deal is still required before the SATS can be implemented.

## LIMITATIONS

The biggest limitation of the study was the poor completion of data capture forms despite training beforehand. The two most common issues were (i) missing information and (ii) parameters that were changed. This suggests a lack of understanding as to why and how the study was meant to be conducted. No attempt was made to analyse the incomplete data capture forms. In order to determine the TEWS, all the vital sign parameters needed to be completed. No assumption was made that the vital signs were within normal range if it was not filled in on the forms, especially since most of the main complaints or presenting problems were also omitted. Even though almost 50% of the forms were not completed, a significant amount of emergency cases that should not be managed at primary care level presented to these facilities. If one were to assume that the rest of the incomplete forms were triaged green, the fact remains that these facilities need urgent help with triage and appropriate referral processes.

The researchers found it challenging to determine the exact number of patients that presented to these facilities over the study period. After data collection was complete, it became clear that not all the walk-in patients had been captured in the given time. Routine statistics are not comprehensively kept at these facilities and it was thus not possible to give an accurate account of the total patient numbers during the study period. Some facilities would not see walk-in patients if no staff were available to triage. For the purpose of this study, it was assumed that the total number of forms collected in the study period reflected the total number of patients that were seen in the three months.

Even though only four facilities were included, this has been the first attempt to describe the current acuity distribution at eight-hour facilities. The researchers chose to include two urban and two rural facilities to make it more representative of the whole Western Cape, but to get a deeper understanding the authors suggest a more comprehensive study in the future.

Another limitation to the study is that 84% of the completed data capture sheets were obtained from facility 4. Therefore one could argue that the study results mostly reflect only what was happening at this one facility.

## CONCLUSION

This study shows that eight-hour primary care facilities see a significant proportion of urgent patients and need a standardised tool for triaging patients. It has always been assumed that they only deal with non-urgent patients, but in reality they do attend to emergencies as well. The SATS has been validated in private and public health care sectors and is currently in use in many different institutions [15].

This study was done in four of the eight-hour facilities in the Western Cape and does not necessarily portray what is happening in the rest of the country. But if it is to be assumed that

this is true for most of South Africa, it is our recommendation that the SATS be implemented in these facilities as soon as possible.

**Funding:** none

**Competing interests:** none declared

**Acknowledgements:** The authors would like to thank Professor Kidd from the Department of Statistics at Stellenbosch University for his help in the statistical analysis of this study. They would also like to thank all the nursing staff of the four facilities that collected the data for this study.

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## FIGURES AND TABLES

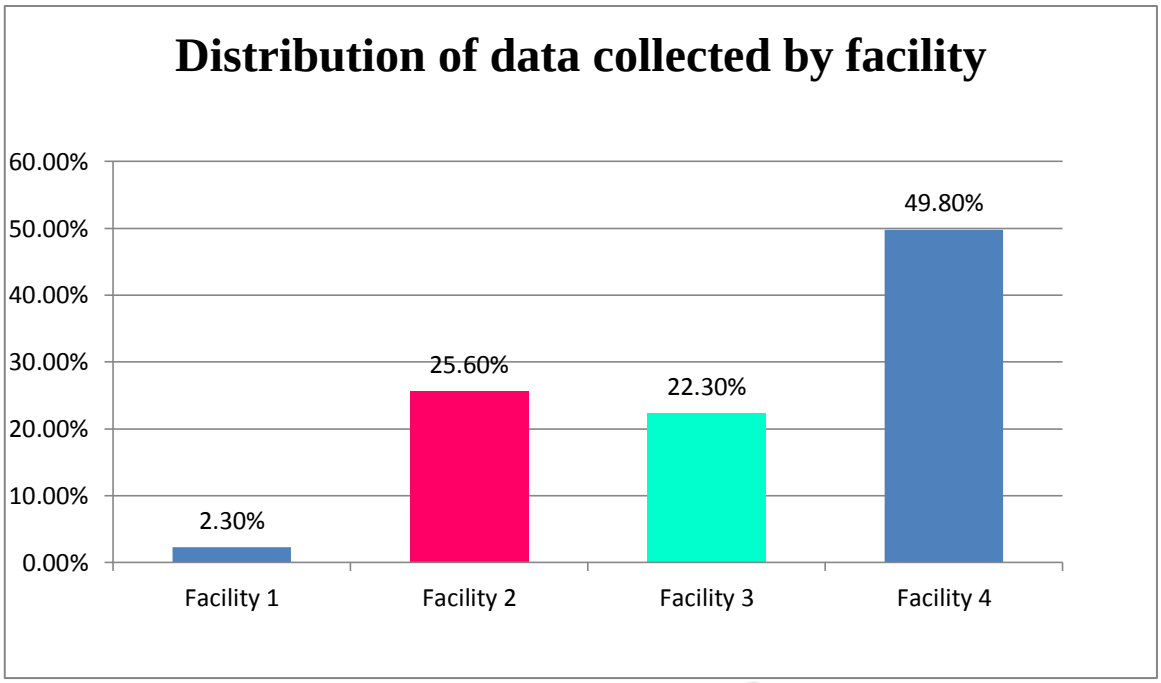



**Figure 1:** Distribution of data collected by facility

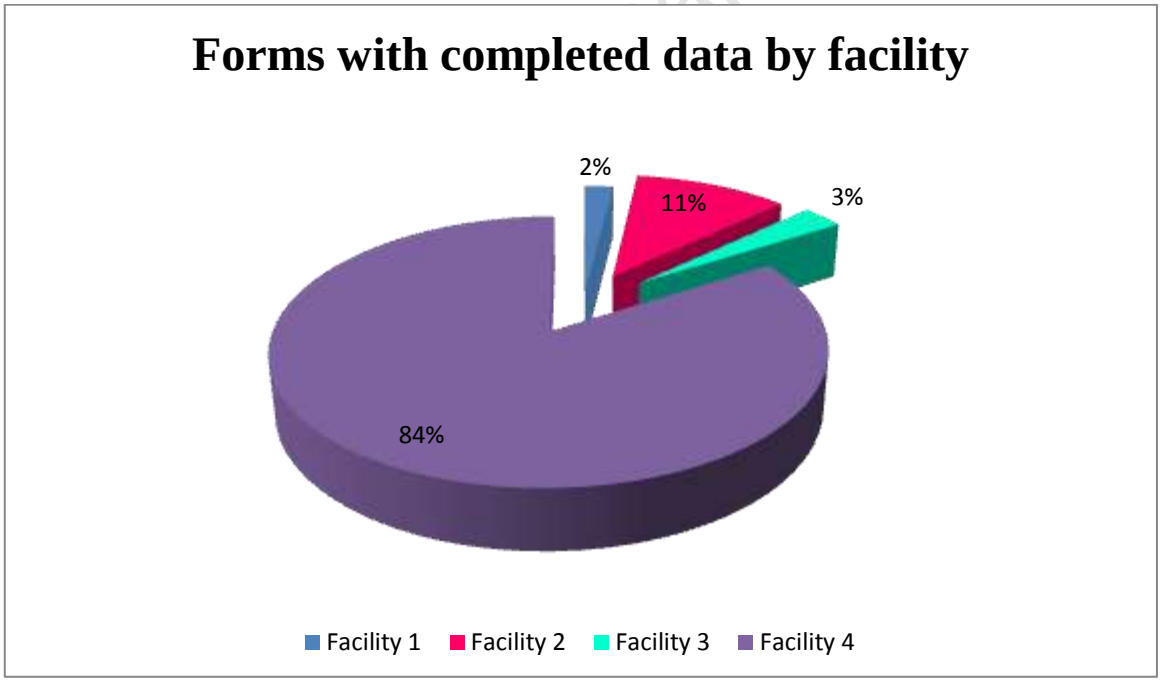



**Figure 2:** Forms with completed data by facility

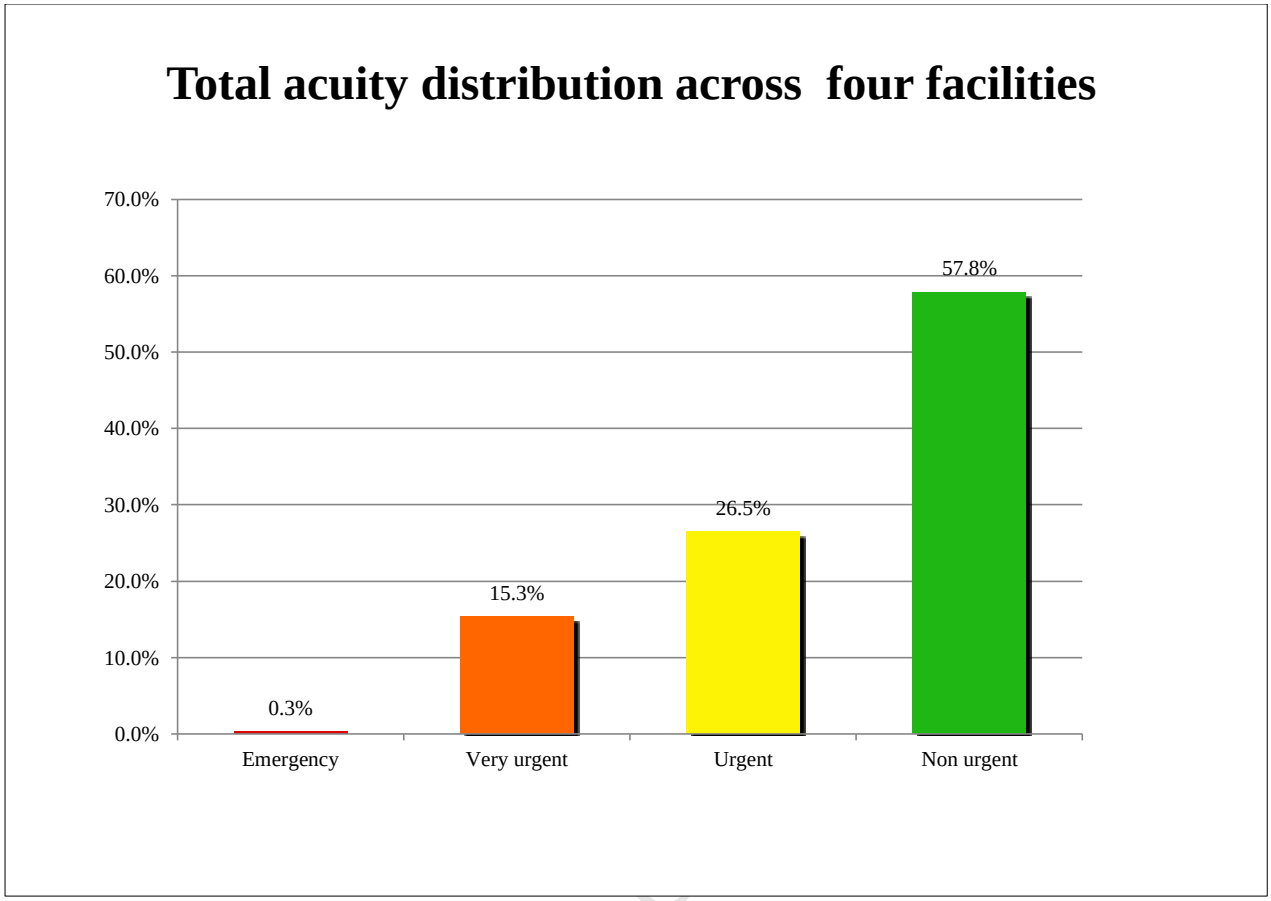



**Figure 3:** Total acuity distribution across the four facilities

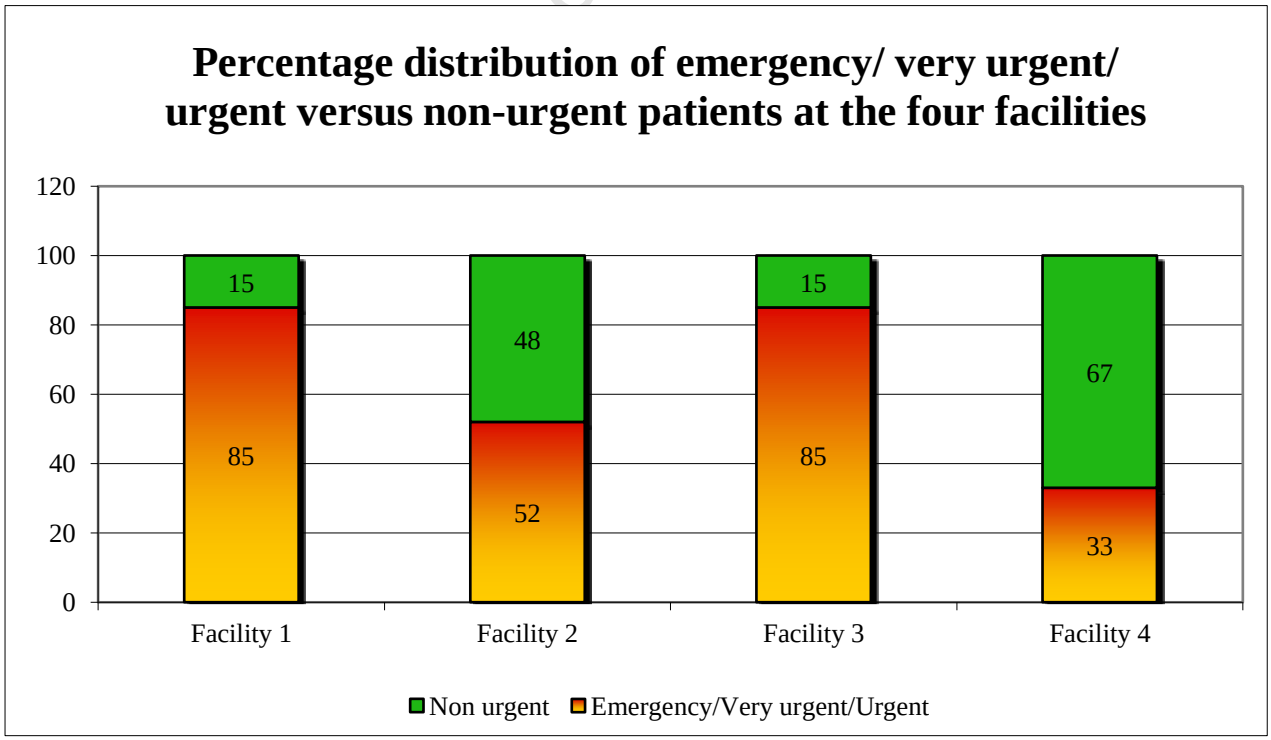



**Figure 4:** Percentage distribution of emergency/very urgent/urgent versus non-urgent patients at the four facilities

**Table 1:** Checklist for triage requirements

| **Table 1: Checklist of triage requirements** | | **Facility 1** | **Facility 2** | **Facility3** | **Facility4** |
|---|---|---|---|---|---|
| The triage area meets the following criteria: | | | | | |
| 1 | There is a dedicated space for triage | NO | YES | YES | YES |
| 2 | The triage area is well signed | N/A | NO | YES | NO |
| 3 | The triage area is secure (i.e. behind a security gate, or in view | | | | |
| | of security staff) | N/A | YES | NO | NO |
| 4 | The triage area is at least 10 square meters in size | N/A | YES | YES | YES |
| | | | | | |
| The traige area contains the following: | | | | | |
| 1 | A desk and chair | N/A | YES | YES | YES |
| 2 | Triage paperwork for adults, children and infants | N/A | YES | NO | YES |
| 3 | A wall clock with a second hand | N/A | YES | NO | NO |
| 4 | A stethoscope | N/A | YES | YES | YES |
| 5 | A low reading thermometer | N/A | NO | NO | NO |
| 6 | Dry dressings and bandages | N/A | YES | YES | YES |
| 7 | Gloves | N/A | YES | YES | YES |
| 8 | Sphygnomanometer (manual, digital or electronic) | N/A | YES | YES | YES |
| 9 | Blood glucose monitor | N/A | YES | YES | YES |
| 10 | A measuring tape or marks displayed on a wall in the triage area to measure children | N/A | YES | N/A | YES |
| 11 | 5x different SATS posters prominently displayed in triage area | N/A | YES | NO | YES |
| 12 | SATS manual readily available for triage officer as a source of info | N/A | NO | NO | YES |
| 13 | SATS patient info leaflet prominently displayed in waiting area | N/A | NO | NO | NO |

# PART D: SUPPORTING DOCUMENTS

## A: Addendum to manuscript (with relation to research protocol)

From the manuscript it is clear that not all the objectives of the research protocol were met. Objective nr 3 – to determine patient disposition with the following outcome markers:

- Deferred – transfer to higher level of care (DTH)
- Deferred – out patient appointment (DO)
- Discharged (DC)
- Death in facility(D)
- Left without being seen (LWS),

was deliberately left out due to time constraints.

When the actual research project started, after approval from the DRC and HREC, it became clear that very little data is available regarding demographics and acuity levels of patients that present to eight-hour facilities. The priority was to first establish these parameters and then expand from there.

Due to time constraints of the primary researcher (who needs to complete the dissertation before final exams can be entered into), it was decided to rather exclude the third objective and so provide an opportunity for future researchers to continue from there.

The decision was made to rather evaluate each facility's triage readiness. This information is regarded as more valuable if triage should be implemented in these facilities.



One of the aims was also to submit the manuscript for publication to the SAMJ in December 2011. This has not yet been done, but we plan to submit before December 2012.

## B: Acknowledgements

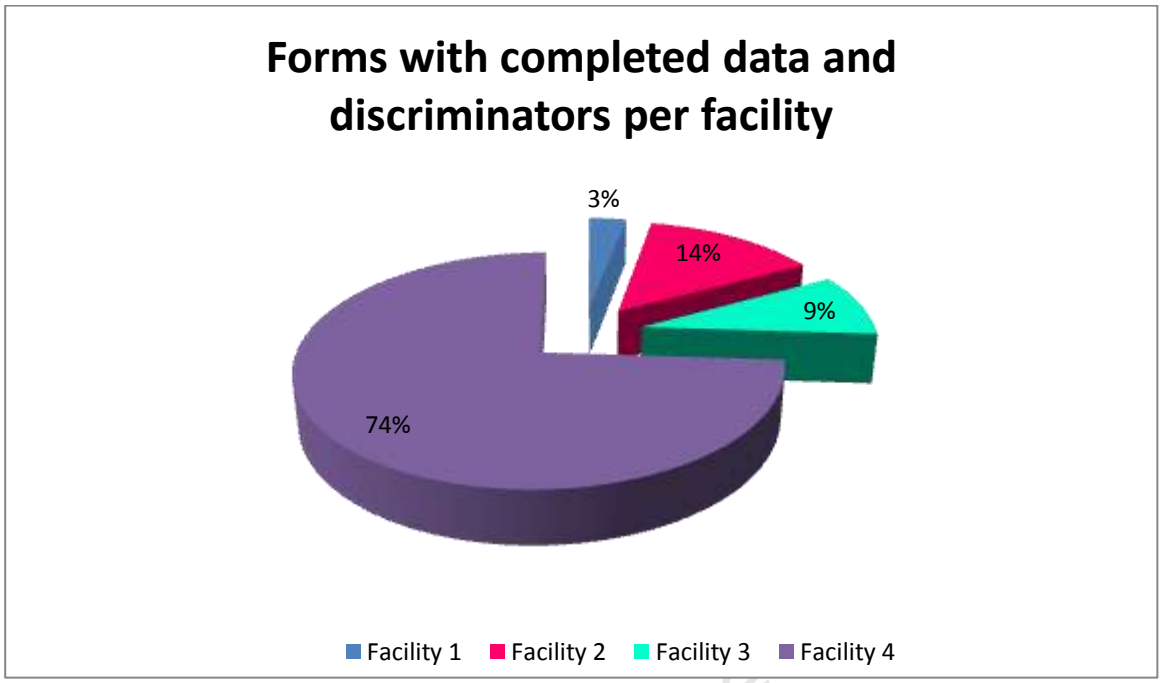
The author would like to thank the following individuals:

- The supervisors, M Twomey and KL Cohen for their help and support during this study
- Professor Kidd from the Department of Statistics at Stellenbosch University for his help in the statistical analysis of this study
- All the nursing staff of the four facilities that collected the data for this study

Contribution towards this study:

- M Twomey – extensive research; formatting of study; critical revision
- KL Cohen – idea development

## C: Additional graphs (not included in manuscript)




**Graph 1:** Forms with completed data and discriminators per facility

Some of the incomplete forms could however be included in the results due to the presenting complaint which matched a discriminator on the SATS chart, therefore making the total 906 (50.3%). This has increased the first three facilities contribution to the total (facility one 26 (3%) completed plus discriminator forms, facility two 124 forms (14%) and facility three 83 forms (9%)).



***Facility names**

*Facility 1 – De Doorns*

*Facility 2 – Worcester*

*Facility 3 - Heideveld*

*Facility 4 - Woodstock*

# D: South African Medical Journal

## Author Guidelines

Accepted manuscripts that are not in the correct format specified in these guidelines will be returned to the author(s) for correction, and will delay publication.

**AUTHORSHIP**

Named authors must consent to publication. Authorship should be based on substantial contribution to: (i) conception, design, analysis and interpretation of data; (ii) drafting or critical revision for important intellectual content; and (iii) approval of the version to be published. These conditions must all be met (uniform requirements for manuscripts submitted to biomedical journals; refer to **www.icmje.org**).

**CONFLICT OF INTEREST**

Authors must declare all sources of support for the research and any association with a product or subject that may constitute conflict of interest.

**RESEARCH ETHICS COMMITTEE APPROVAL**

Provide evidence of Research Ethics Committee approval of the research where relevant.

**PROTECTION OF PATIENT'S RIGHTS TO PRIVACY**

Identifying information should not be published in written descriptions, photographs, and pedigrees unless the information is essential for scientific purposes and the patient (or parent or guardian) gives informed written consent for publication. The patient should be shown the manuscript to be published. Refer to **www.icmje.org**.

**ETHNIC CLASSIFICATION**

References to ethnic classification must indicate the rationale for this.

**MANUSCRIPTS**

Shorter items are more likely to be accepted for publication, owing to space constraints and reader preferences.

***Original articles*** not exceeding 3 000 words, with up to 6 tables or illustrations, are usually observations or research of relevance to clinical medicine and related fields. References should preferably be limited to no more than 15. Please provide a structured abstract not exceeding 250 words, with the following recommended headings: *Background, Objectives, Methods, Results,* and *Conclusion.*

***Scientific letters***/short reports, which include case reports (the SAMJ is rarely able to publish case reports), side effects of drugs and brief or negative research findings should preferably

be 1500 words or less, with 1 table or illustration and no more than 6 references. Please provide an accompanying abstract not exceeding 150 words.

***Editorials***, Opinions, etc. should be about 1000 words and are welcome, but unless invited, will be subjected to the SAMJ peer review process.

***Review articles*** are rarely accepted unless invited.

***Letters to the editor***, for publication, should be about 400 words with only one illustration or table, and must include a correspondence address.

***Forum articles*** must be accompanied by a short description (50 words) of the affiliation details/interests of the author(s). Refer to recent forum articles for guidance. Please provide an accompanying abstract not exceeding 150 words.

***Book reviews*** should be about 400 words and must be accompanied by the publication details of the book.

***Obituaries*** should be about 400 words and may be accompanied by a photograph.

**MANUSCRIPT PREPARATION**

Refer to articles in recent issues for the presentation of headings and subheadings. If in doubt, refer to 'uniform requirements' - **www.icmje.org**.

Manuscripts must be provided in **UK English**.

**Qualification, affiliation and contact details** of ALL authors must be provided in the manuscript and in the online submission process.

**Abbreviations** should be spelt out when first used and thereafter used consistently, e.g. 'intravenous (IV)' or 'Department of Health (DoH)'.

**Scientific measurements** must be expressed in SI units except: blood pressure (mmHg) and haemoglobin (g/dl). Litres is denoted with a lowercase 'l' e.g. 'ml' for millilitres). Units should be preceded by a space (except for %), e.g. '40 kg' and '20 cm' but '50%'. Greater/smaller than signs (> and <) should be placed immediately preceding the relevant number, i.e. 'women >40 years of age'. The same applies to ± and º, i.e. '35±6' and '19ºC'.

**Numbers** should be written as grouped per thousand-units, i.e. 4 000, 22 160...

**Quotes** should be placed in single quotation marks: i.e. The respondent stated: '...'

Round **brackets** (parentheses) should be used, as opposed to square brackets, which are reserved for denoting concentrations or insertions in direct quotes.

**General formatting**

The manuscript must be in Microsoft Word or RTF document format. Text must be single-spaced, in 12-point Times New Roman font, and contain no unnecessary formatting (such as text in boxes, with the exception of Tables).

**ILLUSTRATIONS AND TABLES**

If tables or illustrations submitted have been published elsewhere, the author(s) should provide consent to republication obtained from the copyright holder.

**Tables** may be embedded in the manuscript or provided as **'supplementary files'**. Tables must be numbered in Arabic numerals (1,2,3...) and referred to in the text (e.g. 'Table 1'). Table footnotes must be indicated with the use of the following symbols (in order): * † ‡ § ¶ || then ** †† ‡‡ etc.

**Figures** must be numbered in Arabic numerals and referred to in the text e.g. '(Fig. 1)'. Figure legends: Fig. 1. 'Title...'

All illustrations/figures/graphs must be of **high resolution/quality**: 300 dpi or more is preferable but images must not be resized to increase resolution. Unformatted and uncompressed images must be attached as '**supplementary files**' upon submission (not embedded in the accompanying manuscript). TIFF and PNG formats are preferable; JPEG and PDF formats are accepted, but authors must be wary of image compression. Illustrations and graphs prepared in Microsoft Powerpoint or Excel must be accompanied by the original workbook.



**REFERENCES**

Authors must verify references from the original sources. *Only complete, correctly formatted reference lists will be accepted.* Reference lists must be generated manually and **not** with the use of reference manager software.

References should be inserted in the text as superscript numbers, e.g. These regulations are endorsed by the World Health Organization,[2] and others.[3,4,6]

All references should be listed at the end of the article in numerical order of appearance in the **Vancouver style** (not alphabetical order). Approved abbreviations of journal titles must be used; see the List of Journals in Index Medicus.

Names and initials of all authors should be given; if there are more than six authors, the first three names should be given followed by et al. First and last page, volume and issue numbers should be given.

**Wherever possible, references must be accompanied by a digital object identifier (DOI) link and PubMed ID (PMID)/PubMed Central ID (PMCID).** Authors are encouraged to use the DOI lookup service offered by **CrossRef**.

**Journal references:**
Price NC, Jacobs NN, Roberts DA, et al. Importance of asking about glaucoma. Stat Med 1998;289:350-355. [http://dx.doi.org/10.1000/hgjr.182] [PMID: 2764753]

**Book references:**
Jeffcoate N. Principles of Gynaecology. 4th ed. London: Butterworth, 1975:96-101.

*Chapter/section in a book:*
Weinstein L, Swartz MN. Pathogenic properties of invading microorganisms. In: Sodeman WA jun, Sodeman WA, eds. Pathologic Physiology: Mechanisms of Disease. Philadelphia: WB Saunders, 1974:457-472.

**Internet references:**
World Health Organization. The World Health Report 2002 - Reducing Risks, Promoting Healthy Life. Geneva: World Health Organization, 2002. http://www.who.int/whr/2002 (accessed 16 January 2010).

**Other references (e.g. reports)** should follow the same format:
Author(s). Title. Publisher place: publisher name, year; pages.

Cited manuscripts that have been accepted but not yet published can be included as references followed by '(in press)'.

Unpublished observations and personal communications in the text must not appear in the reference list. The full name of the source person must be provided for personal communications e.g. '...(Prof. Michael Jones, personal communication)'.

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PDFs may be sent to the author before publication to resolve any remaining query.

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Please notify the Editorial Department of any contact detail changes, including email, to facilitate communication.

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Authors can earn up to 15 CPD CEUs for published articles. Certificates may be requested after publication of the article.

# E: Ethics approval letter

UNIVERSITY OF CAPE TOWN

Faculty of Health Sciences
Human Research Ethics Committee
Room E52-24 Groote Schuur Hospital Old Main Building
Observatory 7925
Telephone [021] 406 6626 • Facsimile [021] 406 6411
e-mail: lameez.emjedi@uct.ac.za

**14 February 2011**

**HREC REF: 075/2011**

**Dr M Koekemoer**
Emergency Medicine
J Floor
OMB

Dear Dr Koekemoer

**PROJECT TITLE: A PROSPECTIVE EVALUATION OF EMERGENCY PATIENTS PRESENTING TO 8-HOUR PRIMARY CARE CLINICS**

Thank you for submitting your study to the Faculty of Health Sciences Human Research Ethics Committee.

It is a pleasure to inform you that the FHS HREC has **formally approved** the above-mentioned study.

**Approval is granted for one year until 15 February 2012.**

Please note that the legal age of majority is 18 and anyone under 18 years is defined as a child or minor. The cut-off age of 12 used by health services is entirely arbitrary.

Please send us an annual progress report (website form FHS 016) if your research continues beyond the approval period. Alternatively, please send us a brief summary of your findings so that we can close the research file.

Please note that the ongoing ethical conduct of the study remains the responsibility of the principal investigator.

**Please quote the REC. REF in all your correspondence.**

lemjedi

Yours sincerely

**PROFESSOR M BLOCKMAN**
**CHAIRPERSON, HSF HUMAN ETHICS**

Federal Wide Assurance Number: FWA00001637.
Institutional Review Board (IRB) number: IRB00001938

This serves to confirm that the University of Cape Town Research Ethics Committee complies to the Ethics Standards for Clinical Research with a new drug in patients, based on the Medical Research Council (MRC-SA), Food and Drug Administration (FDA-USA), International Convention on Harmonisation Good Clinical Practice (ICH GCP) and Declaration of Helsinki guidelines.

The Research Ethics Committee granting this approval is in compliance with the ICH Harmonised Tripartite Guidelines E6: Note for Guidance on Good Clinical Practice (CPMP/ICH/135/95) and FDA Code Federal Regulation Part 50, 56 and 312.

lemjedi