

**TRAUMA NURSING CARE INTENSITY :**  
**A WORKLOAD MODEL**

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by

**Terrill Anne Babst**

**Supervisor : Prof. A Slabbert**  
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<b>SUMMARY .....</b>	<b>I</b>
<b>OPSOMMING .....</b>	<b>III</b>
<b>GLOSSARY OF DEFINITIONS AND ABBREVIATIONS.....</b>	<b>V</b>
DEFINITIONS .....	v
ABBREVIATIONS .....	vi
<b>CHAPTER ONE .....</b>	<b>1</b>
INTRODUCTION .....	1
1.1 <i>Current Situation</i> .....	1
1.2 <i>The Purpose of the Study</i> .....	6
<b>CHAPTER TWO .....</b>	<b>7</b>
LITERATURE OVERVIEW .....	7
2.1 <i>Introduction</i> .....	7
2.2 <i>Literature Review</i> .....	7
<b>CHAPTER THREE.....</b>	<b>16</b>
RESEARCH METHODOLOGY.....	16
3.1 <i>Introduction</i> .....	16
3.2 <i>Demarcation of Study Field</i> .....	16
3.3 <i>Main Problem</i> .....	17
3.4 <i>Sub Problem/s</i> .....	17
3.5 <i>Hypothesis</i> .....	17
3.6 <i>Research Objectives</i> .....	17
3.7 <i>Outcome of Research</i> .....	18
3.8 <i>Contextualisation of Study</i> .....	18
3.9 <i>Research Methods</i> .....	18
3.9.1 <i>Study Design</i> .....	18
3.9.2 <i>Study Population</i> .....	19
3.9.3 <i>Data Collection Tool</i> .....	19
3.9.4 <i>The Pilot Study</i> .....	20
3.10 <i>Data Collection and Handling</i> .....	20
3.10.1 <i>Data Collection</i> .....	20
3.10.2 <i>Statistical Analysis</i> .....	21
3.11 <i>Ethical Considerations</i> .....	21
<b>CHAPTER FOUR .....</b>	<b>22</b>
ACUITY CLASSIFICATION IN THE URGENT (TRAUMA) CARE SETTING.....	22
4.1 <i>Introduction</i> .....	22
4.2 <i>Developing a Classification System for Urgent Care</i> .....	24
4.3 <i>Components of the Classification System</i> .....	25
4.4 <i>Using the Classification System</i> .....	26
4.5 <i>Developing or Adjusting Basic Staffing Patterns</i> .....	27
4.6 <i>Making Patient Care Assignments</i> .....	27
4.7 <i>Monitoring Unit Productivity</i> .....	27
4.8 <i>Determining Nursing Costs and Cost Effectiveness</i> .....	28
4.9 <i>The Future</i> .....	28
4.10 <i>Skill Mix</i> .....	29
4.10.1 <i>Staffing Requirements</i> .....	31
4.10.2 <i>Workload Allocation/Scheduling</i> .....	32
4.10.3 <i>Effective and Efficient Workload Scheduling</i> .....	33
4.10.4 <i>Conclusion</i> .....	33

<b>CHAPTER FIVE .....</b>	<b>34</b>
<b>NURSING CARE INTENSITY WORKLOAD MODEL.....</b>	<b>34</b>
5.1 <i>Results</i> .....	34
5.1.1 Acuity Level of Patients.....	34
5.1.2 Type of Care Required.....	36
5.1.3 Types of Visits.....	38
5.1.4 Workload.....	38
5.2 <i>Staffing Norms based on the Acuity Level of in the Patients seen in the Trauma Unit</i> .....	42
5.2.1 Existing Staffing Norms.....	42
5.2.2 Revised Staffing Norms.....	43
5.3 <i>Resuscitation Area</i> .....	44
5.3.1 Diagnostic Groups.....	45
5.3.2 Time Spent by the various Diagnostic Groups in the Resuscitation Area.....	45
5.3.3 Critical Time.....	46
5.3.4 The mean number of staff involved in the resuscitation during the critical time.....	47
5.3.5 Activities during a resuscitation.....	48
5.3.6 Trauma Ward.....	49
5.3.7 Acuity Level of Patients in the Ward.....	50
5.4 <i>Staffing in Ward</i> .....	53
5.4.1 Summary of Findings.....	55
5.5 <i>Recommendation</i> .....	56
<b>CHAPTER SIX .....</b>	<b>58</b>
<b>CONCLUSION AND RECOMMENDATIONS.....</b>	<b>58</b>
6.1 <i>Conclusions</i> .....	58
6.2 <i>Recommendations for a Workload Model</i> .....	59
6.2.1 Recommended Workload Model.....	60
<b>REFERENCES: .....</b>	<b>67</b>

## DECLARATION

I the undersigned hereby declare that the work in this thesis is my own work and has not previously in its entirety or in part been submitted at any tertiary institution for a diploma or degree.

Signature: *TABabst*.....

Date: *23-03-2001*.....

Terrill Anne Babst

## SUMMARY

The current rationalisation of health care in the Western Cape may result in a decrease in the number of patients attending the Trauma Unit at Groote Schuur Hospital (GSH), one of the two large tertiary care hospitals in the Western Cape. This in turn may result in cuts in staff allocations to this unit. The nursing staff need to be proactive in preventing potential cuts which may compromise the services that they offer.

Current statistics collected by nursing managers in the trauma unit at GSH provide an indication of the volume of work handled, but do not necessarily capture the intensity of that work.

The purpose of this research project will determine the extent to which nursing care required by patients attending the trauma unit at GSH has increased and to establish appropriate staff workload scheduling.

The existing classification systems available for assessing patient acuity levels are no longer suitable as they use patient numbers to describe workload.

By using a classification system specifically developed for the use by nurse managers in high care units (trauma units), the appropriate staffing norms based on the acuity level of patients can be determined.

Finally, this research project will determine a suitable model for measuring the intensity of workload specific to a trauma unit environment for the effective and efficient allocation of staff.

## OPSOMMING

Die huidige rasionalisasie van gesondheidsdienste in die Wes-Kaap mag lei tot 'n daling in die getalle pasiente wat die Trauma-Eenheid in Groote Schuur Hospitaal (GSH), een van die twee groot tersiêre-sorg hospitale in die Wes-Kaap besoek. Dit kan tot gevolg hê dat personeel aanwysings aan hierdie eenheid gesnoei word. Die verpleegpersoneel moet proaktief optree om moontlike besnoeiings te verhoed wat dienste wat aangebied word in gevaar mag stel.

Huidige statistieke ingevorder deur verpleegbestuurders in die Trauma-Eenheid by GSH gee 'n aanduiding van die volume werk wat afgehandel word, maar sal nie noodwendig die intensiteit van die werk weergee nie.

Die doel van hierdie navorsingsprojek sal bepaal tot watter mate die omvang van die verpleegsorg wat benodig word deur pasiënte wat die Trauma-Eenheid by GSH besoek, toegeneem het en om 'n toepaslike personeel werkslading skedule in te stel.



Die bestaande klassifiseringstelsel wat beskikbaar is om pasiënte se vlak van erns te bepaal is nie meer toepaslik nie omrede hulle pasiënte getalle gebruik om werkslading te beskryf.

Deur 'n klassifiseringstelsel te gebruik wat spesifiek geformuleer is vir gebruik deur verpleeg bestuurders in hoë-sorg-eenhede (trauma-eenhede), kan die gepaste standarde (riglyne) vir personeel vasgestel word, gebasseer op die akuiteit van die pasiënte.

Ten slotte sal hierdie navorsingsprojek 'n toepaslike model vir die meting van die intensiteit van die werkslading spesifiek tot 'n trauma-eenheid omgewing bepaal vir die effektiewe en doeltreffende aanwysing van personeel.

# **GLOSSARY OF DEFINITIONS, TERMS AND ABBREVIATIONS**

## **DEFINITIONS**

Conceptual definitions

The following concepts are basic to this study and are defined as follows:

### **HEALTH**

Dictionary definition:

“Wholeness or soundness, especially of the body : general state of the body” ( MacDonald 1966:285)

Pertinent general definition:

Health is a state of physical, mental and spiritual wellbeing.

### **TERTIARY HOSPITAL**

Dictionary definition:

Tertiary “of the third degree” ( MacDonald 1966:662)

Pertinent general definition:

Tertiary Hospital refers to a hospital that treats illnesses of an acute or chronic nature or of a specialised nature which cannot be treated at primary or secondary levels.

## **ACUITY**

Dictionary definition:

“ sharpness “ ( MacDonald 1966:7)

Pertinent general definition:

Patient dependency on nursing functions

## **ABBREVIATIONS**

GSH - Groote Schuur Hospital

CEO - Senior Executive Officer

ECG - Electro cardio graph

JONA - Journal of the Nursing Association

ADL - Activity of Daily Living

# **CHAPTER ONE**

## **INTRODUCTION**

### **1.1 Overview of Current Situation**

The current health policy is to focus on primary health care which means that funding to “tertiary” institutions is decreased in an effort to provide funding for the establishment and ongoing maintenance of primary health care facilities. Inadequate funding for health care is a long-standing problem therefore the purpose of this policy is to spread the benefits of the health care budget across as broad a base as possible. This is illustrated by the fact that Groote Schuur Hospital (GSH), one of the 3 large tertiary care hospitals in the Western Cape, was planned with a capacity of 1734 beds of which only 1423 have ever been funded and at present only 1247 beds are being used due to financial constraints.

Decreased budget allocations and escalating costs of providing health care are compelling institutions such as GSH to introduce stringent cost containment measures.

The current rationalisation of health care may result in a decrease in the number of patients attending the Trauma Unit at Groote Schuur Hospital, one of the three tertiary care hospitals in the Western Cape. This in turn may result in cuts in staff allocations to this unit. Although such staffing

reductions may not currently be under consideration, nursing staff need to be proactive in preventing potential cuts which may compromise the services that they offer. This is especially true as for the past few years there have been indications that the workload, due to the severity of the injuries/illnesses of patients attending the unit is increasing, despite the potential decrease in patient numbers.

Current statistics collected by nursing management at Groote Schuur Hospital, on the number of patients attending the Unit, the number of resuscitations, and the number of major and minor operations undertaken at the Unit provide an indication of the volume of work handled, but do not necessarily capture the intensity of that work. (Information obtained from manual statistics for the period 1996 – 1998, kept by the nursing staff working in the Trauma Unit) Dunn, Norby, Courmoyer, Hudec, O'Donnell and Snider (1995:62) define workload as a function of two elements viz. The number of patients and a measure of work. Dunn et al (1995:62), however, cautions that staffing norms that focus on a single index of productivity should be avoided as they fail to capture the complex interactive nature of treatments.

In the current worldwide climate of cost saving and shrinking resources, it is essential that available resources be managed effectively and

appropriately. This need prompted the Sharp Rees-Stealy Medical Centres (a well known group of Urgent/High Care Centres in the USA) in 1991 to develop an Urgent Care Acuity System, for use in their urgent care centres, to ensure that staff allocations would be appropriate to both patient needs and volume. This system was seen as a means of defining the patient population, increasing the accuracy of workload assessment and allocating staff on the basis of patient care requirements. This system was found to be the most appropriate to use in this study as it was developed primarily for its use in an urgent (trauma) care centre. The systems investigated, for example, The South African Commission for Administration norms, looked at staffing allocations generally and not at trauma units specifically. The patient dependency system used in some hospitals in the United States, namely, The Robert Wood Johnson University Hospital in New Brunswick, was considered but this system did not take into account the severity of the patients condition.

The Sharp Rees-Stealy Urgent Care Classification system was initially developed from comparable diagnostic categories and care activities. It categorises patients into one of the following four levels which reflect the intensity of care required;

#### Acuity Level 1

Acuity Level 2

Acuity Level 3

Acuity Level 4

The intensity of care required is a composite measure of the amount of work or time involved in providing care and the level of that care with the indicators of care requirements being categorised on a structured form and scored under the following activity levels:

Assessment Need

Need for Monitoring

Need for Emotional Support/Counselling

Need for Education

Depth of Discharge Planning

Need for Medication/Fluid Administration

Need for Specific procedures/Treatment

Need for Co-Ordination

Hospital Admission Requirements

Pressing Complaint

An acuity level of one requires less time spent in direct patient care ( 15 minutes or less) and involves tasks such as recording observations. Acuity

allowed for patients requiring 13 – 20 hours of direct care and that 4.5 hours of indirect care be allowed for those requiring in excess of 20 hours direct care.

The significance of this study is in the fact that there are no appropriate norms for the allocation of staff in the Trauma Unit. The current system used for allocating staff is based on the Commission for Administration norms which bases its allocation based on patient numbers. It does not take into account the severity of the patients injuries/illnesses nor does it look at the patients dependency on the nursing staff. In order for the nurse managers of the Trauma Unit to utilise their staff efficiently and still provide the necessary cover over a 24 hour period a new method of staff allocation has become essential. This study proposes to provide such a system. The period over which data was collected was from June 1994 – June 1998. Although no further formal data was collected, informal observation showed similar trends.

## **1.2 The Purpose of the Study**

The purpose of the research study is to determine the extent to which nursing care required by patients attending the Trauma Unit at Groote Schuur Hospital has increased and to establish appropriate staff workload scheduling.



# **CHAPTER TWO**

## **LITERATURE OVERVIEW**

### **2.1 Introduction**

The study of relevant literature was undertaken with a view to gaining perspectives on the eventual devising of an appropriate workload model for the efficient and effective allocation of nursing staff. The literature review was carried out using Medline, Index of South African Periodicals, Articles from Nursing Journals and the Department of Health and Index of South African Theses and Dissertations.

### **2.2 Literature Review**

The health care system in South Africa is coming under increasing scrutiny. Its adequacy is in question because of: its technological ineffectiveness in improving the overall health status of large populations, its rising economic costs and the maldistribution of its resources. South Africa is not alone in facing these problems, but they are intensified by inappropriate development strategies resulting in the poor provision of basic services to much of the population, and are exacerbated by current political policies which impede their effective organisation (Savage, M. Benatar, S.:1990:148). As long ago as 1942 a Commission of Inquiry into the National Health Services under the chairmanship of Henry Glukman, later Minister of Health, was appointed to evaluate the need for the

'provision of an organised national health service for all sections of the people of the Union of South Africa'. It noted that three sets of public health authorities had spawned a "crazy patchwork of health services" emphasizing curative medicine over primary and preventative health care and concluded that there was a 'desperate need' for a fully planned national health service (Savage, M., Benatar, S:1990:165). Since the early eighties there has been noticeable changes in the health care delivery. The focus is geared more towards preventive and primary health care. The large state hospitals are downsizing and moving out to the communities to better serve these communities. Very few hospitals in America and in England have more than 800 – 1000 beds according to information received while on a study tour to visit various hospitals in these two countries. This information was obtained during discussions with the Chief Executive Officers of hospitals visited while on the study tour (CEO, Robert Wood Johnson University Hospital, New Brunswick , USA, 1993). Hospitals of this size are still running in South Africa today, but the trend is moving towards the international trend of decentralising health care to the communities. Although this process of rationalisation of the health services is still in progress, in the Western Cape the two large state owned academic hospitals have already closed more than 500 beds each since 1996/7.

A number of Day Hospitals are now open for 24 hours instead of just during the day. Thus more Trauma patients are being seen at these satellite facilities. This has resulted in a decrease in the number of trauma victims being seen at the large tertiary care hospitals. However the workload in the Trauma Unit has increased despite the reduction in patient numbers. With the reduction in the statistics re patient attendance it is anticipated that this will lead to a reduction in staff allocations to the Trauma Unit. The Nurse Managers of the Trauma Unit are concerned that the reduction in patient numbers is not a reflection of a reduction in workload. Dunn et al (1995:62) defined workload as not only the number of patients but as a measure of work as well.

The British Audit Commission (1991) found that decisions about size and composition of ward nursing establishments have often been made right at the top of the Nursing hierarchy, without either the unit manager or ward sister taking part. The profound changes in nursing and hospital management over the past decade have exposed nurse managers to a great deal of uncertainty about the experiences of others above and below them in the hierarchy. Many nursing managers are functioning with new titles or are in entirely new posts in structures that have not yet settled down. (Audit Commission:1992:30) This has led to inappropriate decisions being made regarding staff allocations and workload analysis.

It is axiomatic that, if patient care is to become more patient centered, ward staffing must reflect patients needs. (Audit Commission:1992:27)

Where there are pressures for additional resources, it is vital that existing staff are deployed in the most effective way taking into consideration the financial constraints. This means ensuring that ward establishments, skill mix and the availability of support staff are as closely aligned as they can be with workload. There is no clear answer to the burning question ‘ how many nurses are needed?’. It has been claimed by Maynard (1989:B9) that, “*nursing establishments are determined more by rhetoric, historical accident and well intentioned guesses than by scientific evaluation of the needs of the individual patient*”. According to the Audit Commission’s (1992:30) findings in 1991 in Britain, although staffing is related to patient numbers, a core of about a dozen staff (nursing and Admin) appear to be necessary simply to administer the ward and provide minimum safe cover over a 24 hour period throughout the year. Much of the variation in nurse-patient ratios seems simply to reflect differences in ward sizes. On average, an increased establishment of one additional nurse is provided for every three patients present. But there is still variation of over 20 percent in the staffing of wards with similar size and occupancy. ( Audit Commission: 1992:27) This is not explained by the throughput of patients, their age, sex, the mix of cases, patients lengths of stay or severity of illness ( Audit Commission:1992:31). This lack of

commonly accepted measure of patient dependency or nursing workload in both Britain and here in South Africa has resulted in inappropriate staff allocation and utilisation and is the primary reason for this study being undertaken. In South Africa as previously mentioned the system used in the academic hospitals and Regional Hospitals is based on The Commission for Administration norms which do not take into account the dependency of patient care on Nurses time. These norms were established by a team of work study personnel who established an average time a nurse spends with a patient in a particular type of unit/ward. At the end of this feasibility study they recommended standard norms based on the number of beds allocated to each unit/ward. They did not take into consideration any other factors when establishing the norms. Therefore, if the number of patients decreases in a unit/ward it is assumed that the number of staff allocated to the particular unit/ward can also be decreased. This system does not look at patient turnover, patient dependency or the severity of the patient's injuries/illnesses. This information was obtained during interviews with nurse managers who run general wards and high care units at academic hospitals. In Britain, the system for staff allocation used is based on the patient dependency on nurses time but does not take into account patient turnover or the severity of the patients condition. It was also found that ward/unit managers would allocate staff according to their own experiences and/or as

workload changed. This information was obtained from findings by the British Audit Commission (1992). The Audit Commission of Britain , during their site visits to 3 different hospitals, discovered the difficulty of changing ward establishments. They state that it is generally accepted that ward establishments should be reviewed regularly. But reviews are complex and the results are often difficult to implement. So in practice they happen infrequently. Instead, ward staffing is changed incrementally as different nurse managers, ward sisters and consultants bring their influence to bear or as workload changes. The current grade mix of staff on wards is frequently determined more by the way duties were performed at the time when clinical grading was introduced than by the needs of the patients ( Audit Commission:1992:31). Inappropriate duties carried out by nurses, especially the more qualified nurses, has resulted in nurses spending more and more time away from direct patient care and more time on non-nursing duties. These duties include clerical work, administration and housekeeping (Nursing Managers working in the Trauma Unit at GSH).

Donabedian (1988:260) states that high quality of care refers to the delivery of health related to services that are appropriate, efficient and effective, resulting in the best outcomes for the clients. This definition implies that to provide quality care professionals are required to apply

knowledge in such a way as to benefit the client's health. To benefit the client's health, the care planned and implemented by professionals should be based on an adequate understanding of the clients problems, the mechanisms through which the health care services or interventions resolve the identified problem and the outcomes expected as a result of the implementation of the intervention. (Barden & Sidani:1998:3)

Inadequate knowledge in any of these areas jeopardizes the safety and the quality of health care, with the potential of untoward effects. (Barden & Sidani:1998:3)

Del Tognò-Armanasco et al (1995:99) states that the past decade has recorded the beginnings of a major shift in the health care paradigm. The patient care delivery model is transforming from one in which the system and organisation are designed around the needs of the care providers to a framework that places the patient at the centre of all care delivery decisions and activities. Lee and Clarke (1992:46) reported that the service structures of today's hospitals are operationally complex and fragmented. They further noted that its structure is dysfunctional in that it is organised according to operational specialisation and not according to the way patients needs are met. Murphy (1992:9) wrote that "hospital workers spend as an average 31% of their time overcoming roadblocks to services and cross-functional co-operation". Examples he cited include

clerical and communication activities, role confusion and fragmentation, inappropriate assignment of work responsibilities and structural territoriality.

In South Africa the increase in the crime rate has resulted in an increase in the severity of injuries sustained, with many patients presenting with multiple injuries, for example:

<b>Date</b>	<b>Assault Cases</b>	<b>Gunshot Wounds</b>
1996	5302	1162
1997	7903	7903

In 1998 the following statistics regarding the number of patients presenting with gunshot wounds is shown in table 1 below:

***TABLE 1. THE NUMBER OF PATIENTS PRESENTING WITH GUNSHOT WOUNDS***

<b>Month</b>	<b>Number of Patients presenting with Gunshot Wounds</b>
January	100
February	77
March	89
April	107
May	127
June	136



(Trauma Unit statistics, GSH, 1996 - 1998). These types of injuries require more intensive treatment and expertise. This once again increases the workload of the medical and nursing staff. To enable nursing staff to cope with this changing environment the appropriate allocation of nursing staff and the correct skill mix is essential for nurses to provide their patients with the care and expertise they require.

From the body of knowledge outlined and analysed in this chapter, it is evident that existing norms currently used to assess nursing allocations and skill mix, especially in high care units no longer meet the requirements of the changing health environment. Cost containment in healthcare demands the most effective and economic use of resources possible in a given situation. Nursing must develop methods of estimating the cost of nursing services based on patient acuity or intensity of services rather than on volume. The existing norms do not address the needs of a Trauma Unit whose patients essentially have critical needs, need high intensity nursing care, have a high turnover and have more complexity in their treatment. This study proposes to identify the need for a more suitable measure of workload intensity and establishing a workload model that specifically addresses the needs of the Trauma Unit.

## **CHAPTER THREE**

### **RESEARCH METHODOLOGY**

#### **3.1 Introduction**

This chapter explains the scope of the project, the main problem and sub problems, the research objectives and the possible outcome.

#### **3.2 Demarcation of Study Field**

This study is confined to Groote Schuur Hospital , Cape Town, South Africa which is world renowned and sees a large percentage of the Cape Town population, and as a consequence of the nurse managers in the Trauma Unit at GSH requesting this study. However, the results of this study are generalisable to the other academic hospitals in the region.

These academic hospitals are also subject to the same cost saving constraints and face the same reduction in nursing staff allocated to their Trauma Units. These hospitals use the same norms laid down by the Commission of Administration for allocating nursing staff to the Trauma Unit as Groote Schuur Hospital. The problems faced by Groote Schuur Hospital with regards to the changing profiles of the patients been seen and treated at the Trauma Units is also been experienced by these Academic Hospitals.

### **3.3 Main Problem**

There is no appropriate classification system available to determine the intensity of nursing care for patients in a Trauma Unit and therefore the appropriate allocation of nursing staff.

### **3.4 Sub Problem/s**

1. Determine the type of direct care required by patients attending the Trauma Unit
2. Determine the appropriate staffing norms based on the acuity level of patients

### **3.5 Hypothesis**

The following two hypothesis have been formulated.

- Patients attending the Trauma Unit at Groote Schuur Hospital are presenting with more acute injuries.
- Workload scheduling is inappropriate

### **3.6 Research Objectives**

The objectives of the study are to:-

1. Define the patient population attending the Trauma Unit;

### **3.3 Main Problem**

There is no appropriate classification system available to determine the intensity of nursing care for patients in a Trauma Unit and therefore the appropriate allocation of nursing staff.

### **3.4 Sub Problem/s**

1. Determine the type of direct care required by patients attending the Trauma Unit
2. Determine the appropriate staffing norms based on the acuity level of patients

### **3.5 Hypothesis**

The following two hypothesis have been formulated.

- Patients attending the Trauma Unit at Groote Schuur Hospital are presenting with more acute injuries.
- Workload scheduling is inappropriate

### **3.6 Research Objectives**

The objectives of the study are to:-

1. Define the patient population attending the Trauma Unit;

2. Determine the type of visits of patients attending the Trauma Unit;
3. Determine the dependency of patients on nursing care:
4. Determine the appropriate staff allocation

### **3.7 Outcome of Research**

To determine a suitable model for measuring the intensity of workload specific to a hospital Trauma Unit environment for the effective and efficient allocation of nursing staff.

### **3.8 Contextualisation of Study**

This study is of a multi-disciplinary nature. As such it draws from the disciplines of nursing management, clinical management and medical (management), and contributes most to the field of nursing management.

### **3.9 Research Methods**

#### **3.9.1 Study Design**

A predominantly quantitative research design was used. This design was chosen because the information to be gathered i.e. Visits, Number of

patients seen, intensity of care are all quantifiable elements which can be expressed in nominal and frequency terms.

### 3.9.2 Study Population

All patients attending the Trauma Unit at Groote Schuur Hospital over a two week period. This period was decided in consultation with the Nurse Managers of the Unit as they felt that a 2 week period was sufficiently representative of their workload in the Trauma Unit. Approximately 620 patients are treated over a two week period at the Trauma Unit at Groote Schuur Hospital ( Trauma Unit Statistics, GSH : 1998) The 2 weeks were selected randomly.

### 3.9.3 Data Collection Tool

The Sharp Rees-Stealy Urgent Care Classification described in the preceding pages was used. A minor adaptation regarding one of the procedures, such as expanding fractures to include open and closed fractures, carried out in the Trauma Unit was made to the structure of the tool to ensure compatibility with local circumstances as this instrument is not subject to copyright.

### **3.9.4 The Pilot Study**

The Sharp Rees-Stealy Urgent Care Classification was found to be reliable during its use by nurses classifying patients independently. (Sharp Rees-Stealy Medical Care Centres, USA) The reliability was tested by having two sets of nurses independently rating the acuity levels in a pilot study one week in duration one week prior to commencing the research project.

## **3.10 Data Collection and Handling**

### **3.10.1 Data Collection**

The nursing managers of the Trauma Unit informed the staff of the proposed study and instructed them in the use of the classification system. Staff were asked to indicate whether the patient is being seen by the day or night staff. Staff were then asked to tick each category based on the patient's need. No identification of the patient took place. The completed classification forms, each of which allows for the assessment of seven patients were placed in an allocation box. Acuity levels were determined once the information had been transcribed.

### **3.10.2 Statistical Analysis**

Data were coded using assigned scores and computerised. The statistical software packages Statistica and Quattro Pro were used to analyse the data.

### **3.11 Ethical Considerations**

This study was submitted to the Groote Schuur Hospital Ethics Committee for approval.

This study aims to gain information about the intensity of care required by patients attending the Trauma Unit. No identifying information of the patient was collected. The observational nature of this study is not intrusive and does not involve any direct contact with any patients. All information gathered was treated in the strictest confidence.



## **CHAPTER FOUR**

### **ACUITY CLASSIFICATION IN THE TRAUMA CARE SETTING**

#### **4.1 Introduction**

Viable urgent care centres must provide cost-effective care while maintaining quality. This requires staff allocation appropriate to patient needs as well as patient volume. Few articles have been written on patient acuity systems that permit optimal urgent care centre staffing. However the Sharp Rees-Stealy Medical Centres in California have developed an acuity system for use in the urgent care centres, also known as Trauma Units.

Cost containment in healthcare settings demands the most effective and economic use of resources possible in a given situation. One of the most important - and costly – of these resources is personnel, particularly nursing personnel. Nursing must develop methods of estimating the cost of nursing based on patient acuity or intensity of service rather than volume. Nursing personnel must be adequate to and qualified for the tasks required, but not superfluous or over-qualified.

Trauma units tend to provide care that consumers self-define as “urgent”.

Because what is considered as urgent will vary from individual to

individual, the type of care provided by a trauma unit will vary considerably from week to week, day to day, or even hour to hour.

In a similar vein, patient volume in the trauma unit will fluctuate with the season (e.g. holiday season), the day of the week, and even the time of day. For example, a large bus accident may temporarily cause a great increase in the demand for services provided by the trauma unit.

Given the wide variety of health needs addressed and the typical fluctuations in patient volume, the task of maintaining appropriate staffing levels and an appropriate personnel mix becomes especially critical in the cost-effective operation of a trauma unit. Classification of patients by acuity level is one way of determining a staffing mix appropriate to a given trauma unit and its clientele.

Acuity classification systems already are in use in many inpatient settings and provide information for staffing decisions, budgetary deliberations, and organisation assessments. Unfortunately, it is difficult to translate these classification systems for use in the trauma unit. Generally, one major determinant of acuity and consequent use of nursing services is the severity of patient health problems and the intensity of nursing care required for the differing health problems. In the trauma unit, however, patients with high intensity, critical needs may only remain in the setting

a short time before being admitted to the hospital, thereby reducing the length of time that nursing care is required, but not appreciably changing the complexity of that care while it is needed. Another factor in the trauma unit is the turnover of clientele. In inpatient settings, staffing for tomorrow can be based on today's estimates of patient care needs because many of the patients will remain in the ward. In the trauma unit, however, patients seen today most likely will not be the patients who require services tomorrow.

#### **4.2 Developing a Classification System for Urgent Care**

Patient classification is a method for categorising patients into acuity levels that reflect the amount of direct and indirect nursing care required. The development of an urgent care classification system is seen as a means of defining the patient population, increasing the accuracy of nursing workload assessments and allocating staff based on patient requirements. Appropriate allocation of staff is defined as matching staff time and expertise to patient need.

The intent of the system is to provide information for the following purposes:

- a) To define the patient population served;
- b) To aid in budget development;
- c) To determine basic staffing patterns;

- d) To determine equipment needs;
- e) To assist with patient care assignments;
- f) To monitor nursing productivity;
- g) To identify staff education needs.

### **4.3 Components of the Classification System**

The Sharp Rees-Stealy Urgent Care Classification System is comprised of four acuity levels (refer p.3) and a set of decision rules in the application of specific indicators for each level. The acuity levels reflect the intensity of nursing care required. Intensity is a composite measure of the amount of work or time involved in providing care and the level of complexity of the care needed. Nurses determine each patient's acuity level based on their assessments relative to a series of indicators that include the following:

- a) Assessment needs;
- b) Need for monitoring;
- c) Need for physical assistance;
- d) Need for emotional support/counseling;
- e) Need for education;
- f) Need for medication/fluid administration;
- g) Need for specific procedures/treatments;

- h) Need for coordination of care;
- i) Hospital admission requirements;
- j) Presenting conditions.

Indicators of the level of complexity of care needed and the estimated time over which care will be provided are used to determine a specific patient's level of acuity. The acuity level is assigned on the basis of the highest level of indicator present in a given situation.

#### **4.4 Uses of the Classification System**

The acuity classification system can be used for several purposes. These include developing or adjusting basic staffing patterns by assessing the average volumes of patients at each acuity level and thereby allocating the appropriate nursing staff , adjusting staffing patterns on a day-to-day basis according to the current patients acuity level requirements , making actual patient care assignments to trauma unit staff according to the 4 levels of care requirements, assisting in budgetary decision making by assessing the required skill mix of nursing staff, monitoring unit productivity and determining costs and cost effectiveness of nursing services.

#### **4.5 Developing or Adjusting Basic Staffing Patterns**

Average volumes of patients in each of the four acuity levels are used to calculate typical nursing staff requirements. Knowing the average patient volumes at each level, the nurse manager can determine the mix of personnel needed. Patients at acuity levels 1 and 2 can be cared for by auxiliary or enrolled nurses under the supervision of the registered nurse. Patients classified at acuity levels 3 and 4, however, require the expertise of a registered nurse.

#### **4.6 Making Patient Care Assignments**

When acuity determinations are made by nurses on patient entry into the trauma unit, patient care assignments can be made on the basis of patient needs. The nurse manager can then allocate staff skill mix appropriately according to these needs. For example, a patient presenting in the acuity level 4 category will have been assigned to an experienced registered nurse.

#### **4.7 Monitoring Unit Productivity**

Nursing productivity in a trauma unit is more accurately measured when both patient acuity and patient volume are considered than when volume is the sole criterion of productivity. An acuity classification system

contains an inherent standard for measuring productivity. Reporting of acuity level, as well as time spent with patients with specific diagnoses, allows the nurse manager to monitor the appropriateness of the use of nursing hours.

#### **4.8 Determining Nursing Costs and Cost Effectiveness**

The acuity classification system has the potential for use in monitoring expenditures for nursing services and determining their cost effectiveness. This can be calculated by ensuring the correct skill mix of nursing staff for the type of patients to be cared for in the Trauma Unit by assessing the acuity of the patients accurately. Patients conceivably could be billed on the basis of acuity levels, a far less time consuming process than accounting and billing for each discrete nursing service rendered.

#### **4.9 The Future**

The use of the urgent care acuity classification system would allow nurse managers to become much more efficient in making basic and day-to-day staffing assignments, budgeting for nursing personnel, monitoring and enhancing unit productivity and developing appropriate plans for disaster events. Use of the system may lead to some additional developments, including expansion of nursing roles and a proposal for the creation of a

nurse triage position to facilitate use of the system and improve the quality and efficiency of services provided in the trauma unit. Triage means to assess the patient before any intervention takes place. This practice facilitates the correct and efficient treatment of the patient by the appropriate medical staff.

The use of the acuity classification system would lead to recognition of the many aspects of urgent care that nurses are qualified to implement independently.

Finally, use of the acuity classification system could result in the development of a proposed triage nurse position in the urgent care setting.

The intent of this position is the rapid identification of patient acuity level, followed by routing of the patient to appropriate providers of care, whether a registered nurse or a physician. Again, intent is to streamline operation of the trauma unit and enhance the ability of the system to provide high quality care in an efficient and cost effective manner.

#### **4.10 Skill Mix**

Skill mix is the mix of nursing skills employed or deployed ( on a ward, in hospitals, in the community or other sphere of healthcare activity) for all the tasks that need to be carried out. Traditionally it has been used simply to denote the ratio of trained to untrained staff (where trained refers to registered and enrolled nurses and untrained refers to student



nurses and other support staff). (Skill Mix Management:1991:12) In South Africa the category of nurses are as follows: registered nurses, enrolled nurses, student and pupil nurses and auxiliary nurses, with the registered and enrolled nurses being the trained staff. The registered nurse undergoes a four year training course at a Nursing College. This course includes General Nursing, Midwifery and Psychiatry. The enrolled nurse undergoes a two year training course at a Nursing College which includes General Nursing. On completion of the enrolled nurse course, the enrolled nurse can then undertake to do the 4 year course and qualify as a Registered Nurse. The auxiliary nurse undergoes a one year course run by the Academic Hospital where the nurse is working. They are taught basic nursing skills. The student nurse, once qualified becomes a Registered Nurse. The pupil nurse, once qualified becomes an Enrolled Nurse.

Skill mix should describe the whole range of grades or skills employed or deployed. For example, two registered nurses, 3 enrolled nurses, one student and four auxiliary nurses. This raises a further point, however – grade for nursing staff does not necessarily equate to skill and competency. Two nurses employed in the same unit in the same speciality with the same grade and doing the same type of work may have different skills. These differences may be due to one nurse attending an additional

training course or simply having different skills intrinsic to an individual. At GSH a Trauma/Emergency post basic certificate course is run over a 6 month period. Such differences need to be taken into account when preparing staffing allocations if specific skills or competencies are known to be required at a particular time.

According to Skill Mix Management (1991:12), skill mix can be planned within four overlapping time frames: the operational, the short, medium or long term. Operationally, it is the mix of staff actually deployed on duty. In the short term, it is the plan for the mix of skills to be utilised on the allocation roster. In the medium term it is the plan to make adjustments to an establishment's skill mix to reflect changing priorities, changing case mix, or changing workload. In the long term it is the strategic plan of the number of staff and skills required.

#### 4.10.1 Staffing Requirements

The determining and reviewing of staffing requirements is a key responsibility for many nurse managers. The traditional way in which staffing requirements are expressed is as an establishment – a list of:

- the category of staff – skill
- the number of staff

required for a defined area such as a unit or ward.

In setting establishments, the main aim is to meet the needs of:

- the patients
- clinicians
- other professional staff
- the nurses themselves

within the management and financial constraints that exist.

Historically, establishments were based on norms (i.e. nurses per bed specific to a speciality). This is a relatively inflexible approach and as resources become more and more scarce alternative means of workload allocation need to be considered.

#### 4.10.2 Workload Allocation/Scheduling

A workload schedule for nursing is the plan showing on duty and off duty for staff within a defined area such as a unit or ward. The plan should reflect the peaks and troughs of expected workload, ensuring that nursing staff are available at the times they are required. For example, at times when the workload is heavy or more complex, more skilled staff are made available.

### 4.10.3 Effective and Efficient Workload Scheduling

Many factors impinge on the scheduling process but the over-riding requirement is to have:

- the right skill mix
- in the right place
- at the right time
- at the right cost

and to ensure that nursing care can be provided

- to the agreed standard of nursing care

### 4.10.4 Conclusion

A number of issues and initiatives have focused attention on nursing skill mix, in particular:

- increasing demands on healthcare
- a decreasing supply of new recruits
- less funding for teaching nurses at the enrolled and auxiliary levels
- increase in technology requiring specialised skills and training

An effective workload schedule will ensure that the right skills are available where and when required to provide nursing care to an agreed standard and at an appropriate cost.

## **CHAPTER FIVE**

### **NURSING CARE INTENSITY WORKLOAD MODEL**

#### **5.1 Results**

The nursing staff in the Trauma unit were required to fill out classifications for the patients that attended the Trauma Unit during the testing period. The nurses were trained in the method of data capturing and what was required for each patient.

A total of 392 patient classifications were completed by the nursing staff. 55% were completed by staff on day duty and 45% by staff on night duty. (n = 389).

##### **5.1.1 Acuity Level of Patients**

The objective of defining the patient population attending the Trauma Unit over a two week period was measured by the acuity level derived from the Sharp Rees-Stealy Urgent Care Patient Classification system. The acuity level reflects the intensity of care required. The intensity of care required is, in turn, a composite measure of both the amount of work or time involved in providing care and the level of that care. An acuity level of one requires little time spent in direct patient care (15 minutes or less) and involves simple tasks such as recording observations. Acuity

level two requires about 30 (thirty) minutes of care and may include recording observations on a confused patient. Acuity level three requires about 60 (sixty) minutes of care and may involve a patient who has a head injury without neurological symptoms. Acuity level four requires more than one hour of care and usually involves complex care with a variety of tasks such as a resuscitation.

As appears from Table 2, 67% of the patients seen in Trauma Unit required intensive levels of care, with acuity levels of three and four, while 32% of patients required moderate care, with an acuity level of two.

*TABLE 2 . OVERALL ACUITY LEVEL OF PATIENTS SEEN IN TRAUMA UNIT (N=345)*

ACUITY LEVEL	Number	%
Level 1	3	0.87
Level 2	109	31.59
Level 3	153	44.38
Level 4	80	23.19

From the acuity level it is apparent that the more severe cases are presenting at the Groote Schuur Hospital Trauma Unit. This is in line with the changing health policy and the rationalisation of health services

As can be seen from the Table 3 there is no significant difference in the acuity level of patients admitted during the day shift and those admitted during the night shift.

**TABLE 3. OVERALL ACUITY LEVEL OF PATIENTS SEEN IN TRAUMA UNIT DURING THE DAY AND NIGHT SHIFTS.**

ACUITY LEVEL	Day (%)	Night (%)
Level 1	0.63	1.21
Level 2	30.38	31.52
Level 3	48.10	40.00
Level 4	20.89	27.27

### Hospital Admission Requirements

A total of 57% of the patients seen in Trauma Unit required admission. As appears from table 4 below, a noticeably higher percentage of those seen during the night shift required admission than those seen during the day shift.

**TABLE 4. ADMISSION REQUIREMENTS BETWEEN THE DAY SHIFT AND NIGHT SHIFT**

	Day (%)	Night (%)
No Admission	48.40	37.36
Admission	51.60	62.64

### 5.1.2 Type of Care Required

The objective of determining the type of direct care required by patients attending the Trauma Unit was determined by the care requirements

specified in the Sharp Rees-Stealy Urgent Care Classification. It showed that;

1. 60% of patients had a complete history taken and routine head to toe assessment done. Some required special checks (e.g. multiple or complex procedures)
2. 70% of patients had their vital signs taken once, this included recording the patient's temperature, pulse and blood pressure.
3. 60% of patients and/or their families required mild reassurance, the remainder required moderate to extensive support. This included counseling by one of the Trauma Registered Nurses.
4. 70% required education; the extent of which ranged from education relating to one medication, minor treatments and home care to extensive education relating to health problems, medications or treatments.
5. 85% of the patients required either a single or multiple referral. This could include referrals to the Xray department, Outpatients department or another hospital, for example a day hospital.
6. 48% of the patients required a single dose of medication, the remainder required multiple medications and/or intravenous therapy.
7. 75% of the patients required active treatment, of which 58% needed more intensive treatment.



8. 87% required 2 or 3 in-house services or extensive co-ordination of services.

The percentages above, gives a clear indication of the amount of direct nursing intervention and care that is required by patients attending the Trauma Unit when using the Sharp Rees-Stealy Urgent Care Classification System as a measure to assess the nursing staffs workload.

### 5.1.3 Types of Visits

Table 5 illustrates the incidence and type of injury sustained by a random sample of 178 patients.

*TABLE 5. INCIDENCE AND TYPE OF INJURY*

<b>% of patients</b>	<b>Type of injury treated</b>
23	Limb injury
21	Assault
20	Motor vehicle accidents
13	Stab wounds
12	Miscellaneous injuries, e.g. Needlestick injury, sports injuries, bites, train accidents, etc.
11	Gunshot wounds

The above information illustrates that 88% of patients being treated in the Trauma Unit presented with major injuries in comparison to only 12% of patients presenting with minor injuries.

### 5.1.4 Workload

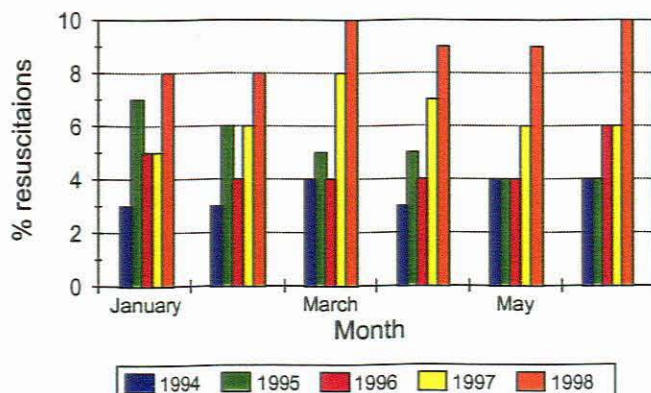
Routine data indicates that the number of patients attending the Trauma Unit at Groote Schuur Hospital has decreased from 2176 patients in June 1994 to 991 patients in June 1998. This decrease is due to the new health policy where the more severe cases are seen at the Academic hospitals only. Despite decreasing numbers of patients, the staff have been complaining that their workload is increasing. The acuity level of patients attending the Unit supports this statement, although there are no comparative figures from previous years.

For comparative purposes in this study it was therefore decided to review routine data collected. It was decided to use the number of resuscitations seen as a sample to indicate that the workload in the Trauma unit has indeed increased. This indicated that the percentage of resuscitations (which is graded as an acuity level of four) has increased from 4% in June 1994 to 10% in June 1998. As can be seen from Table 6 and its accompanying graph below, there has been a progressive increase in the number of resuscitations since 1994. A resuscitation of a patient requires a minimum of 2 nursing staff and 2 medical staff to stabilise the patients before further intervention can take place.

**TABLE 6. PERCENTAGE OF RESUSCITATIONS IN TRAUMA UNIT FROM JANUARY 1994 TO JUNE 1998.**

	1994	1995	1996	1997	1998
January	3	7	5	5	8
February	3	6	4	6	8
March	4	5	4	8	10
April	3	5	4	7	9
May	4	4	4	6	9
June	4	4	6	6	10
July	4	4	4	7	
August	5	3	4	6	
September	4	4	5	6	
October	4	5	5	9	
November	2	5	5	8	
December	5	4	7	7	

**% of Resuscitations in C14  
from Jan 1994 - June 1998**



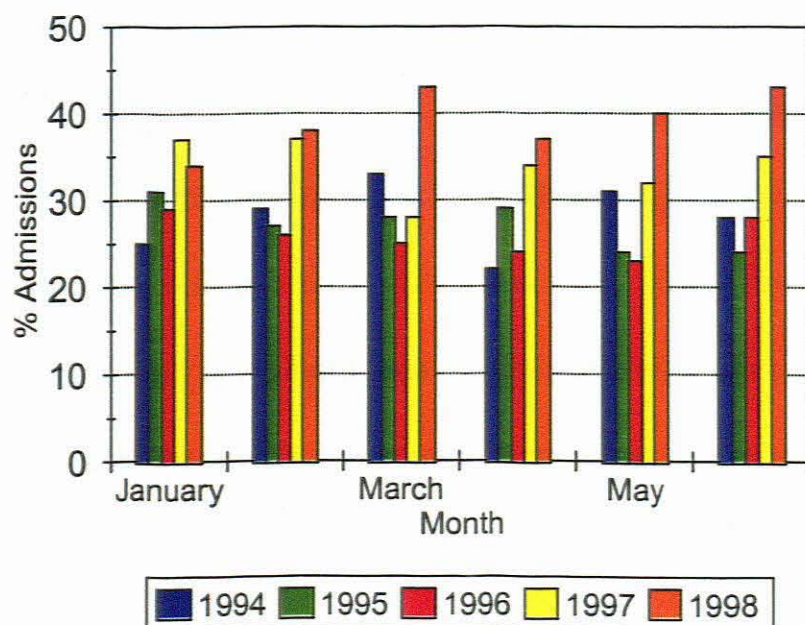
Similarly, and as appears from Table 7 and its accompanying graph below, the percentage of patients requiring admission has also increased from 28% in June 1994 to 43% in June 1998. An admission is when a patient is considered too ill to be sent either to another institution such as a day hospital or home. The patients are admitted into the Trauma ward

eg C14 and from there are either transferred to an Intensive Care Unit or a General Ward.

**TABLE 7. PERCENTAGE OF PATIENTS REQUIRING ADMISSION IN TRAUMA UNIT FROM JANUARY 1994 TO JUNE 1998.**

	1994	1995	1996	1997	1998
January	25	31	29	37	34
February	29	27	26	37	38
March	33	28	25	28	43
April	22	29	24	34	37
May	31	24	23	32	40
June	28	24	28	35	43
July	34	27	22	34	
August	30	25	28	35	
September	34	24	25	37	
October	31	30	33	37	
November	28	24	34	39	
December	34	24	40	36	

**%Admissions occurring in Trauma Unit  
From Jan 1994 to June 1998**



The above information supports the Nursing staff's perception that their workload has increased. As such numbers alone should not be considered in the review of staffing norms. Any decision to reduce the staff allocated to Trauma Unit requires careful consideration.

## **5.2 Staffing Norms based on the Acuity Level of Patients seen in the Trauma Unit**

### **5.2.1 Existing Staffing Norms**

The staffing norms currently in use in the Trauma Unit are a combination of norms taken from the Surgical Pavilion, which are based on the Commission for Administration's staffing norms. The Surgical Pavilion is a suite of wards which only admit patients who have had or need surgical intervention. As seen below these norms differ for the Resuscitation and Appraisal areas in the trauma unit viz.

**RESUS A + B:** 180 hours \* Patients

(as for the Intensive Care Unit) 40 (nursing hours available per week)

RESUS A + B are the two rooms used solely for patients requiring resuscitation. The whole area is equipped with the necessary equipment and surgical packs needed to treat these types of patients

**APPRAISALS:** 32.82 hours \* Patients

(as for Surgical Wards) 40 (nursing hours available per week)

APPRAISALS is the area in Trauma Unit where the patients are assessed and then either seen by the Doctor or sent home or admitted. The type of patients seen in this area do not require “critical” care.

The number of staff required for the Unit, using these norms initially exceeded what was thought to be required by the Nurse Manager so a reduced number of staff was allocated. Over time this reduced number was inadequate and the number of staffing units required gradually increased to its current recommended norm for a 24 hour period.

#### 5.2.2 Revised Staffing Norms

One of the objectives of the study was to determine staffing norms based on patient acuity or intensity of care required. The instrument found most suitable to measure patient acuity especially in the urgent (trauma) care setting was the Sharp Rees-Stealy Urgent Care Classification system.

The Urgent Care Classification determines staffing needs by multiplying the average number of patients per hour by the number of hours in a shift.

This is then multiplied by the percent of the total patients assessed at each acuity level. The number of patients at each acuity level is multiplied by the time frame for that level viz.

An acuity level of one requires 15 minutes or less of direct patient care.

Acuity level two requires 30 minutes of direct patient care

Acuity level three requires 60 minutes of direct patient care

Acuity level four requires 75 minutes of direct patient care

An indirect care component, derived from time and motion studies, recommends that 1.5 hours of indirect care be allowed for patients requiring less than 12 hours of direct care, 3 hours be allowed for patients requiring 13 - 20 hours of direct care and 4.5 hours be allowed for those requiring in excess of 20 hours direct care.

### **5.3 Resuscitation Area**

The information presented below, further clarifies the unique situation of the Trauma Unit at Groote Schuur Hospital.

Earlier on in the report it was noted that the number of resuscitations has nearly doubled since 1994. Data routinely collected in June 1998 was reviewed and is reported on below.

The Trauma Unit is routinely informed of the arrival of patients in a critical condition. On arrival these patients are taken into the resuscitation area where a team of doctors and nurses stabilise the patients.

### 5.3.1 Diagnostic Groups

The importance of the diagnostic groups is to highlight the increase in these particular types of injuries which require more intensive nursing and medical care.

As appears from Table 8 below 37% of patients seen in the resuscitation area were as a result of motor vehicle accidents (MVA), 20% stab wounds, 19% gunshot wounds, 7% assaults, 5% head injuries, the remainder being as a result of a fall, petrol bomb, train or hyperthermia.

*TABLE 8. DIAGNOSTIC GROUPS OF PATIENTS SEEN IN THE RESUSCITATION AREA (N=111)*

Diagnostic Group	Number	%
MVA	42	37.17
Stab	23	20.35
Gunshot Wound	21	18.58
Assault	8	7.08
Head Injury	6	5.31
Train	6	5.31
Hypothermia	3	2.65
Petrol Bomb	1	0.88
Fell	1	0.88

### 5.3.2 Time Spent by the various Diagnostic Groups in the Resuscitation Area

As appears from Table 9 below the mean time patients spend per diagnostic group, in the Resuscitation area, ranges from one hour and twenty-two minutes to more than five hours. This means that at least one



Registered Nurse needs to be present with the patient for that duration of time providing intensive care. This requires a ratio of 1:1 (one registered nurse to one patient).

**TABLE 9. THE TIME SPENT BY THE VARIOUS DIAGNOSTIC GROUPS SEEN IN THE RESUSCITATION AREA (N-111)**

Diagnostic Group	Mean Time (minutes)
Hypothermia	345.00
Head Injury	236.00
MVA	234.04
Petrol Bomb	175.00
Train	153.75
Gunshot Wound	148.08
Stab	110.00
Assault	82.83
All	183.84

### 5.3.3 Critical Time

As appears from Table 10 below the mean critical time spent to stabilise the patient per diagnostic group, ranges from 35 minutes for a train casualty to 15 minutes for a patient with injuries related to assault or head injuries. This means that the number of nursing staff required to effectively treat these patients has in fact increased despite the reduced number of patients been seen in the Trauma Unit at Groote Schuur Hospital.

**TABLE 10. CRITICAL TIME IN MINUTES PER DIAGNOSTIC GROUP (N=58)**

Diagnostic Group	Critical Time (minutes)
Train	35.00
Hypothermia	32.50
Stab	23.57
MVA	22.37
Gunshot Wound	17.50
Assault	15.00
Head Injury	15.00
All	22.00

**5.3.4 The mean number of staff involved in the resuscitation during the critical time**

As appears from Table 11 below the amount of staff involved in the critical time, per diagnostic group, in a resuscitation varies from four to nine. This at minimum usually involves at least two members of nursing staff and two doctors.

**TABLE 11. THE MEAN NUMBER OF NURSING AND MEDICAL STAFF INVOLVED IN THE RESUSCITATION DURING THE CRITICAL TIME SPENT ON THE VARIOUS DIAGNOSTIC GROUPS SEEN IN THE RESUSCITATION AREA (N=68)**

Diagnostic Group	Mean Staff
Train	9
Petrol Bomb	7
MVA	5
Stab	5
Gunshot Wound	5
Assault	5
Hypothermia	5
Head Injury	4
All	5

### 5.3.5 Activities during a resuscitation

Many of the following activities occur simultaneously during a resuscitation to stabilise the patient.

1. Ventilation, if the patient requires intubation at least two (2) people are required and three (3) for a cricthyodectomy.
2. Fluid resuscitation requires at least one person to commence the intravenous therapy and one to monitor the fluid balance. If a cutdown (surgical intervention when the doctor or nurse is unable to locate a vein to commence intravenous therapy) is needed at least three people are required.
3. Bleeding (internal or external) needs to be stopped and monitored using a variety of means viz. elevation, pressure using a catheter, nasogastric tube, cardiac and blood pressure monitoring, splinting, transfusions, pressure bandages. The patient needs a haemoglobin check after every three litres of intravenous fluid that is administered.
4. A thoracotomy for a cardiac tamponade as a result of a stab requires a minimum of five people and while this in process the rest of the unit ceases to function.
5. Just the task of undressing the patient requires at least two people.

### 5.3.6 Trauma Ward

The Trauma Unit only sees trauma patients and not medical emergencies. There is a separate unit for these patients. The area known as the “front” in Trauma Unit is where patients go to when they come into the Trauma Unit. The patients are assessed, treated and sent home or admitted to one of the trauma wards, as appropriate.

The staff working in the Trauma Wards, also complain about an increased workload. This appears to be related to the increased severity of injuries the patients have that are presenting to the Unit. In addition, the medical staff in the Trauma Unit are responsible for caring for the patients from arrival in the unit until discharge. If a patient requires admission or intervention, the patient is admitted to the Trauma Ward (C12, C14 or C5). Should the patient be admitted to the Intensive Care Unit, after surgery, he/she will be transferred to the Trauma ward once stabilised. If the Intensive Care Units are full, the patients that require admission there are nursed in the 6 bedded “high care” cubicle in the ward. Patients that require supportive care in that they have a poor prognosis, are also nursed in the ward and require high levels of specialised care. All patients with spinal injuries are admitted to the ward and these patients require high levels of care, but also remain in the ward for up to seven weeks. This situation is further aggravated by the shortage of beds available both in and out of the hospital. All spinal patients are admitted to Conradie

Hospital which specialises in spinal injuries. As Conradie is the only hospital offering this type of care there is often a shortage of beds. This means that the patients with spinal injuries have to remain in one of Groote Schuur's trauma wards until a bed is available. This results in valuable nursing resources having to be used for treating and caring for these patients who are no longer trauma patients.

### 5.3.7 Acuity Level of Patients in the Ward

As a result of the changing situation described above and to establish how the workload of the staff has increased, routine data collected, on the Activities of Daily Living (ADL), was reviewed. The ADL is a measure of a patient's dependency on nursing assistance required and is the current system used to assess workload. The patients are scored twice a day as to their dependence on nursing care. The patient is scored as an A, B, C, D, E or F category.

1. A patient with an A score requires minimal assistance.
2. A patient with a B score is ambulant but requires assistance with basic functions such as walking, bathing, etc.
3. A patient with a C score is confined to bed and requires minimal assistance with bathing, feeding, taking medication, etc.

4. A patient with a D score is confined to bed and requires more intensive assistance such as feeding, bathing, regular turning (changing of position), taking medication, etc.
5. A patient with an E score is unconscious and requires continuous nursing care.
6. A patient with a F score requires specialling (continuous care by a registered nurse or enrolled nurse) who remains at the patients bedside at all times.

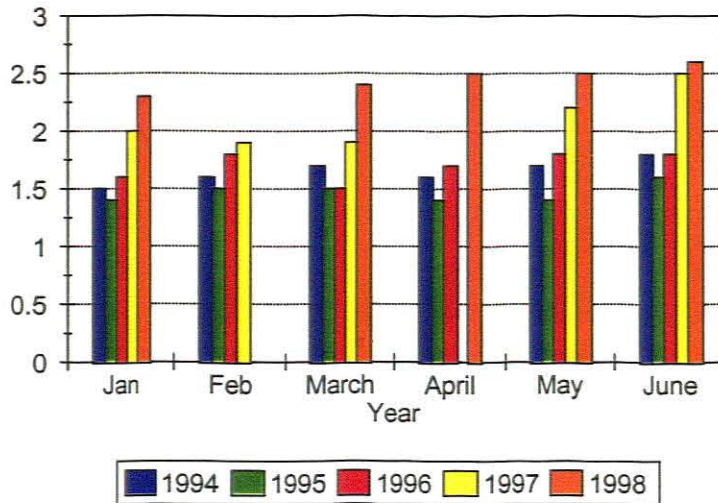
An acuity level was calculated from the Activities of Daily Living (ADL). The acuity level was obtained by summing a ratio applied to the different care categories, and dividing the total by the number of patients. As appears from Table 12 and its accompanying graph below, the acuity level of the patients in Ward C12 has increased from 1.5 in January 1994 to 2.6 in June 1998. An acuity level of one is equivalent to the care required for “one bed”. Ward C12, one of the Trauma wards was used as the sampling “area”.

*TABLE 12. THE ACUITY LEVEL OF PATIENTS IN WARD C12 BASED ON THEIR ADL MEASUREMENT FROM JANUARY 1994 TO JUNE 1998.*

	1994	1995	1996	1997	1998
January	1.5	1.4	1.6	2	2.3
February	1.6	1.5	1.8	1.9	
March	1.7	1.5	1.5	1.9	2.4
April	1.6	1.4	1.7		2.5

May	1.7	1.4	1.8	2.2	2.5
June	1.8	1.6	1.8	2.5	2.6

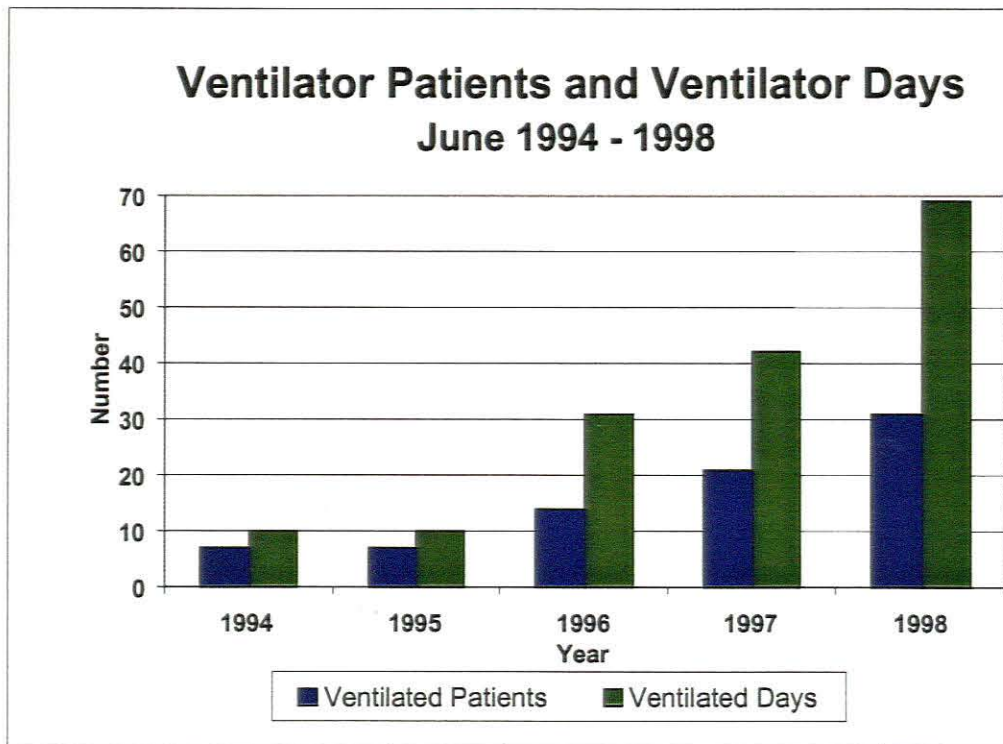
### Acuity Level of Patients in C12 based on ADL's



In addition, as appears from Table 13 below and its accompanying graph, the number of ventilated patients nursed in ward (C12) has increased four fold from seven (7) in June 1994 to thirty one (31) in June 1998. The number of ventilator days has increased dramatically from ten (10) in June 1994 to sixty nine (69) in June 1998.

***TABLE 13. THE NUMBER OF VENTILATED PATIENTS AND THE NUMBER OF VENTILATOR DAYS FOR THE MONTHS OF JUNE 1994 TO JUNE 1998.***

	1994	1995	1996	1997	1998
Ventilated Patients	7	7	14	21	31
Ventilator Days	10	10	31	42	69



This above data supports the staff's perception that their workload has increased dramatically. It was hence necessary to review their staffing norms.

#### 5.4 Staffing in Ward

Currently, wards in hospitals in the Cape Province are staffed with nurses in accordance with the Commission for Administration (CFA) guidelines which only take into consideration a fixed number of nursing hours required per patient, the number of actual beds and the number of nursing hours available per week. So, for example, in Ward C12, which is a 24 bedded ward the nursing hours per patient per week are determined as 36



hours per patient (“bed”) per week, which indicates a need for 22 nursing units (nursing hours x number of beds/40). It is not clear how the Commission for Administration determined that a high care Trauma ward requires 36 hours care per patient (“bed”) per week, except that C12 has some high care beds, and this is the norm used in the Neurosurgical and Cardio-Thoracic wards which also have high care beds.

A typical nursing shift covers a 12 hour period. On day duty this is split into two types of shifts ie 07:00 – 19:00 or 07:00 – 16:00 with 2 days off per week. On night shift there is only one type of shift, 19:00 – 07:00 with 3 nights off per week.

In light of the increasing acuity level of patients in the ward and the dramatic increase in the number of ventilated days and the comparatively low staffing norms it might be prudent to reconsider the staffing norms of the Trauma Ward to minimise the potential medico-legal implications. To illustrate the staffing on one shift: On day duty there are three Registered Nurses allocated, while on the other shift on day duty, there are only two Registered Nurses allocated. If one Registered Nurse is absent this can potentially leave only one Registered Nurse to care for six ventilated patients, in addition to the other patients in the ward. This situation has been observed to have happened, leaving the patients at great risk.

#### 5.4.1 Summary of Findings

The current rationalisation of health care services in the Western Cape has resulted in a decrease in the number of patients attending the Trauma Unit at Groote Schuur Hospital. However, the intensity of care that the patients require is higher. The number of patients attending the Unit should therefore not be used in isolation when reviewing staffing norms. Dunn et al (1995) define staffing as the process of determining the appropriate number and mix of nursing resources necessary to meet the workload demand for nursing care; and workload as the function of two elements i.e. the number of patients and a measure of work (Dunn: 62).

The acuity level of the patients being seen in the Trauma Unit, supported by other measures of workload, like the increase in the percentage of resuscitations support the staff's perception that their workload has increased.

The Sharp Rees-Stealy Classification to determine staffing norms is very dependent on the number of patients seen, but considers the intensity of care that they require as well. Based on the average number of patients and staffing for the time the patients spend in the Unit, the current staffing norms appear adequate, but the number of patients seen in a 24

hour period is not constant. For instance, in April 1998, on day duty the numbers of patients seen in a day ranged from 6 (six) to 22 (twenty-two) with an average of 13 (thirteen). On night duty, the numbers of patients seen ranged from 4 (four) to 40 (forty) with an average of 12 (twelve); in May it ranged from 4 (four) to 31 (thirty one) with an average of 14 (fourteen) and in June it ranged from 2 (two) to 47 (forty seven) with an average of 18 (eighteen) patients seen. Therefore, if minimum staffing is going to be used, staff allocation needs to accommodate the quiet and busy periods. It can be fairly accurate to predict, using figures of patient attendance over a period of time.

## **5.5 Recommendation**

To provide adequate cover an option could be to use the flexitime approach in which staff determine the shifts they want to work. Prior to doing this though, parameters need to be built in to accommodate the peaks and troughs in workload. The flexitime system would work well as it would ensure that the majority of staff are working when they are needed. However, the problems with this approach are the distances staff need to travel, lack of adequate public transport and the increase in crime especially for staff who work the night shift.

Another approach could be to have a central pool of staff and allocate them either to the Trauma Unit, or to the Trauma ward. This needs to be a voluntary process as recommended in research done by Johnston (1995) on Needs Based Staffing. If this process is considered it needs to be evaluated constantly to establish whether the staff and units' needs are being met.

It might be prudent to reconsider the staffing norms for the Trauma Ward in view of the increasing acuity level of patients, particularly in the high care beds, to minimise the potential medico-legal implications. At one stage it was under consideration to have a Trauma Intensive Care Unit, and this idea needs to be reconsidered. The alternative is to increase the allocated staff to the Trauma Ward. However, just increasing the number of staff without taking into consideration their qualifications and experience will not relieve the situation. The correct skill mix must also be appropriate to the particular needs of the ward.

## CHAPTER SIX

### CONCLUSIONS AND RECOMMENDATIONS

#### 6.1 Conclusions

The current rationalisation of health care services in the Western Cape has resulted in a decrease in the number of patients attending the Trauma Unit at Groote Schuur Hospital. But, the acuity level of the patients, being seen in the Trauma Unit, supported by other measures of workload, like the increase in the percentage of resuscitations, and that more than half of the patients attending the Trauma Unit require admission, support the staff's perception that their workload has increased. Therefore any decision to reduce the staff allocated to Trauma Unit requires careful consideration. The number of patients attending the Trauma Unit should not be used in isolation when reviewing staffing norms. The current CFA norms used throughout the hospital must be reviewed as to their appropriateness in light of the changing socio economic environment of the country. The cost saving measures imposed on health care countrywide and shrinking resources has resulted in healthcare managers having to re assess the usage and allocation of resources, especially human resources. Therefore the effective and appropriate allocation of these resources is essential to provide the care required to meet the patients needs and volume of patients seen within budget.

## **6.2 Recommendations for a Workload Model**

The indicators that are currently collected provide meaningful information about the workload. However, to obtain a more accurate reflection this research recommends using the raw data with denominator like the number of patients attending the Unit. The computerisation of the data will also save time and provide the information as needed.

Presently, the severity of illness ie the ADL's, as a means of measuring the intensity of care patients require is captured by the Medical Informatics department at GSH. This information can be reviewed at regular intervals to establish a pattern to assist the nurse managers to plan staff allocations proactively.

Alternatively, patients can be triaged on arrival in the Unit and depending on their presenting complaint, referred to either the Resuscitation Area, Appraisal A or Appraisal B. The numbers of patients seen in the area can be recorded and translated into an acuity measure. This can be done periodically to review the intensity of patients attending the Unit.

The various approaches to staffing need to be explored in consultation with the staff to ensure the Trauma Unit is adequately covered particularly as resources are diminishing.

## 6.2.1 A Recommended Workload Model

### Purpose

A patient classification system is a method for categorising patients into acuity levels that reflect the amount of direct and indirect nursing care required. The use of an accurate and appropriate method of patient categorisation was developed to accommodate the increase in the intensity of nursing care required by patients seen in the Trauma Unit. The concept of assigning the correct acuity level to each patient is central to this model and is accomplished through the correct assessment of each patient to determine the amount of direct and indirect care they require.

### Goals

- to define the patient population served
- to aid in budget development
- to determine basic staffing patterns
- to allocate staff appropriately
- to determine the skill mix requirements
- to assist with patient care assignments

### Objectives

- develop an accurate system for nursing workload assessment

- assign the appropriate skill mix and number of nursing personnel to patient care needs
- define patient population

### Developing Basic Staffing Patterns

Average volumes of patients for each of the four acuity levels are used to calculate typical nursing staff requirements for the Trauma Unit using the Sharp Rees - Stealy classification system. To determine the basic staffing needs the nurse manager would begin by multiplying the average number of patients seen per hour in the Trauma Unit, by the number of hours in a shift. The result of this calculation is then multiplied by the percent of total patients assessed for each of the four acuity levels. The number of patients at each acuity level for an average shift is multiplied by the time frame for that level ( 15 minutes for level 1, 30 minutes for level 2, 60 minutes for level 3, 75 minutes for level 4) and divided by 60 to derive the number of hours typically required for providing direct care to that category of patient . Hours of care required for each of the 4 levels of patients are then summed to provide an estimate of the total number of direct hours required for the Trauma Unit.

Because nurses also spend time in indirect care activities additional time must be allocated for these activities. Using the Sharp Rees – Stealy



Classification system the following formula as shown in the table 14 below, for apportioning time spent in indirect care activities is used :

**TABLE 14. SHARP REES – STEELY CLASSIFICATION OF LEVELS OF CARE ACCORDING TO THE AMOUNT OF DIRECT AND INDIRECT CARE REQUIRED BY THE PATIENT.**

<b>Level of patient acuity</b>	<b>Hours of direct care per 24 hours</b>	<b>Hours of indirect care per 24 hours</b>
1	Less than 12 hours	1,5 hours
2	13 – 20 hours	3 hours
3 & 4	More than 20 hours	4,5 hours

The appropriate number of indirect care hours can be added to the direct care hours to determine the total number of nursing hours required. Then this figure is divided by the number of work hours available in a shift for a given nurse to determine the minimum number of staff required for the Trauma Unit. An example of the use of the system for determining basic staffing:

The Trauma Unit provides care to an average of 6 patients per hour in a typical 8 hour shift, for example, as shown in table 15 below:

TABLE 15. AVERAGE DISTRIBUTION OF PATIENTS SEEN PER ACUITY LEVEL

<b>Acuity Level</b>	<b>% of Patient Seen</b>
1	50
2	30
3	15
4	5

This converts to the following numbers of patients at each level over a shift:

Level 1 = 24 patients

Level 2 = 14 patients

Level 3 = 7 patients

Level 4 = 2 patients

To calculate the nursing staff hours needed for a typical shift, the nurse manager would multiply the number of patients at each level by the time frame for that level and divide by 60 minutes as follows:

Level 1 = 24 patients x 15 minutes = 360 minutes/60 = 6 hours

Level 2 = 14 patients x 30 minutes = 420 minutes/60 = 7 hours

Level 3 = 7 patients x 60 minutes = 420 minutes/60 = 7 hours

Level 4 = 2 patients x 75 minutes = 150 minutes/60 = 2.5 hours

Adding the number of staff hours for each acuity level, the total number of direct nursing hours required per shift is 22.5.

The number of indirect care hours needed would be 4.5, for a total of 27 hours of staffing needed.

Given roughly 7 hours of working time per nurse per shift, this would equate to a need for four nursing personnel per shift.

Knowing the average volumes at each acuity level, the nurse manager can determine the skill mix of personnel needed as follows:

1. Patients at acuity level 1 and 2 can be cared for by enrolled nurses and auxiliary nurses under the supervision of a registered nurse.
2. Patients classified at acuity levels 3 and 4, however, require the expertise of a registered nurse.

The basic skill mix can be determined by first adding the total estimated nursing time needed to care for the average number of patients seen at acuity levels 1 and 2 and dividing by the average number of work hours per nursing shift (say 7 hours) to determine the number of enrolled/auxiliary nurses needed. The same would be done for patients at acuity levels 3 and 4 to determine the need for registered nurse staffing.

An example of the calculations involved is as follows:

The trauma Unit has identified the following hourly requirements for direct nursing care of patients at each acuity level as shown in table 16 below:

TABLE 16. DIRECT NURSING CARE REQUIRED AT EACH ACUITY LEVEL

<b>Acuity Level</b>	<b>Hours Required for Direct Nursing Care</b>
Level 1	6
Level 2	7
Level 3	7
Level 4	2.5

The nurse manager would use this information to determine the appropriate skill mix for the Trauma Unit. To determine the number of enrolled/ auxiliary nurses needed per shift, the manager would total the nursing hour requirements for acuity level 1 & 2 , arriving at a figure of 13 hours of direct care required. He/she would then add the 3 hours indirect care required, for a total of 16 hours of care needed. Dividing this figure by the number of work hours available in a shift, 2 enrolled/auxiliary nurses could provide most of the care for these patients. Totaling the number of direct care hours required by patients at acuity level 3 and 4, the nurse manager would arrive at a figure of 9.5 hours of

direct care needed. Adding 1.5 hours for indirect care results in 11 hours of registered nurse time needed.

If the nurse manager assigns two registered nurses per shift, they will be able to care for the needs of all of the patients at acuity level 3 and 4 as well as supervise and assist the enrolled and auxiliary nurses in the care of patients classified at levels 1 and 2.

Thus, two registered nurses and two enrolled/auxiliary nurses would be the appropriate mix for staff assigned to the Trauma Unit on a regular basis (Sharp – Rees Stealy Urgent Care Classification System : 1991).

It is essential that the staffing in the Trauma Ward are reviewed to accommodate the increasing acuity levels of the patients nursed there to establish a suitable workload model. By using the Sharp Rees-Stealy Classification system as a workload model for assessing patients attending the Trauma Unit the nurse manager will have a valuable tool for managing her Unit efficiently and cost effectively. The patients will receive the care they require as the staffing mix and number allocated to each shift will be indicative of the workload.

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**TABLE 1 ACUITY CLASSIFICATION CATEGORIES**

<b><u>Level</u></b>	<b><u>Time Requirements</u></b>	<b><u>Nursing Care Requirements</u></b>
1	15 min or less	Minimal care
2	16 – 30 min	Routine care of low complexity
3	31 – 60 min	Extended care of moderate complexity
4	More than 1hr	Intensive care of high complexity

**TABLE 2 SAMPLE INDICATORS FOR ACUITY LEVELS 1 – 4**

<b>Indicators</b>	<b>Level 1</b>	<b>Level 2</b>	<b>Level 3</b>	<b>Level 4</b>
Assessment needs	Problem focused history and vital signs	Problem-focused history and physical assessment	Complete history and routine head to toe assessment, routine laboratory tests	Complete history and head to toe assessment with special checks (e.g., in-depth neurological) multiple or complex laboratory/x-ray procedures, hospital admission assessment
Need for Monitoring	Vital signs taken once	Vital signs repeated a second time	Vital signs taken several times	Vital signs every 5 – 15 min., repeat ECG, repeat oximetry
Need for physical assessment	None needed	Assistance to get onto examination table, go to bathroom, wheelchair transport or assistance with ambulation	Needs assistance with ambulation, dressing, undressing, etc	Needs assistance with all but simplest tasks
Need for emotional support/counseling	None needed	Mild reassurance (family or patient)	Moderate support to relieve anxiety (patient & family)	Extensive support needed to relieve anxiety deal with guilt (patient or family), uncooperative or combative patient, psychiatric patient
Need for education	Health maintenance education only	Education related to one medication, minor treatments, home care, etc	Education related to several medications, complex treatment instructions, etc, crutch training, cast care	Extensive education related to health problem, medication or treatments, admission education, client with impaired mental ability/language, barrier

Depth of discharge planning	None needed	None needed	Single referral needed	Multiple referrals needed
Need for medication/fluid administration	Need to administer single dose of one medication	Need to administer single dose of one medication and observe for effect	Multiple medications or short term intravenous therapy required	Multiple medications, repeated medication administration, long term intravenous therapy required, chemotherapy
Need for specific procedures/treatments	None needed	Dressing change, blood sample, minor injury dressing, suture removal	Splinting, casting, simple dressing, ECG	Debridement of multiple or major lacerations, complex casting, multiple sutures, etc
Need for coordination	None needed	None needed	Minimal coordination of 2 to 3 in-house services (e.g., laboratory, social work, etc)	Extensive coordination of several services inside and outside institution, coordination of hospital admission
Hospital admission requirements	None needed	None needed	None needed	Admission required
Presenting complaint	Minor injury, rash, upper respiratory infection	Gastrointestinal upset, sprain, back pain, bronchitis, controlled epistaxis, foreign body in eye, Minor burns, closed fracture	Head injury without neuro symptoms, bleeding, open fracture with adequate circulation, sexual assault, mild respiratory distress, haemophilia, cardiac failure, severe abdominal pain, lacerations	Moderate to severe chest pain, respiratory distress, severe bleeding, extensive burns, penetrating chest or abdominal wound, head/spinal trauma, severe eye trauma, unconsciousness, severe dehydration, multiple fractures, sepsis, suicide attempt, hyper/hypothermia, cyanosis, psychological trauma, allergic reactions, hypertension, acute abdomen, gun shot wounds

