TRANSFER TO HIGHER LEVEL OF CARE: A RETROSPECTIVE ANALYSIS OF PATIENT DETERIORATION, MANAGEMENT AS WELL AS PROCESSES INVOLVED

by

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DECLARATION

I declare that TRANSFER TO HIGHER LEVEL OF CARE; A RETROSPECTIVE ANALYSIS OF PATIENT DETERIORATION, MANAGEMENT AS WELL AS PROCESSES INVOLVED is my own work and all the sources I have used or quoted have been indicated and acknowledged by means of complete references.

This work has not been submitted before for any other degree at any other institution.

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SIGNATURE   **DATE**
(Estelle le Roux)

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ABSTRACT

In-patient deterioration is a global phenomena and timely recognition and action improves outcome. Intensive care facilities are scarce and expensive and therefore patient care must be optimal. A retrospective health record analysis was used for this study.

The findings indicated that nursing personnel do not recognize patient deterioration timeuously. However, the implementation of an outreach team and clinical markers training program improved the recognition of patient deterioration in general wards with three hours and 40 minutes.

It is recommended to implement a comprehensive hospital program that addresses the basic knowledge and skills of general ward personnel to observe, recognize, assess and intervene to patients with clinical deterioration. Together with an extensive training program, a basic physiological parameters guideline to activate a team of experts to the bedside, such as an Outreach team, assist nursing personnel to recognize and manage those patients timeuously and ensure treatment in an appropriate level of care.

Key words:

Patient deterioration, Outreach team, patient transfers, clinical markers, transfers to higher level of care, critical care nursing.

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DEDICATION

This dissertation is dedicated to
both my parents,
Josephus Johannes le Roux
(Seeph)
and
Helena le Roux

CHAPTER 1

"The man who does not read good books has no advantage over the man who cannot read them."
Mark Twain (1835-1910)
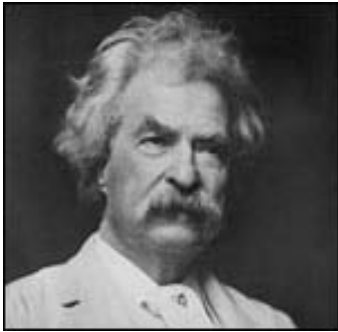
Mark Twain, American writer and humorist.

INTRODUCTION AND OVERVIEW OF THE STUDY

1.1   INTRODUCTION

There is evidence from ancient times to show that healthcare providers and patients have valued excellence in the quality of health care for millennia. According to Buchbinder and Shank (2007:86), the Codex Hammurabi (circa 1700 B.C.) makes provision for several forms of punishment – including, in some cases, the death penalty – for physicians and nurses who consistently deliver substandard or negligent patient care. The beginning of modern ideas of quality assurance can be traced back to the mid-19th century. According to Buchbinder and Shank (2007:86-87), most healthcare providers associate the notion of quality assurance in healthcare with the standards set by Florence Nightingale during the Crimean War of 1854. Building upon Nightingale's perceptions of quality, Ernest Codman, a Harvard Medical School surgeon, extended Nightingale's insistence on strict standards of patient care by means of his "End Result

System", which he introduced in 1910. This document articulates the following three core principles of quality assurance:

- All quality measures need to be examined so as to determine whether the problems concerned are related to the patient, the system or the clinician.
- Existing healthcare measures need to be examined in order to determine the frequency and prevalence of particular deficiencies in healthcare quality.
- Any deficiencies identified should be evaluated and corrected so that they do not reoccur (Buchbinder & Shank 2007:87).

Donabedian was responsible for introducing in 1960 the idea that the quality of health care could be analysed from a systems perspective that incorporated evaluations of structure, process, and outcome (Donabedian 1960, cited by Buchbinder & Shank 2007:83).

According to Graham (1995:20), the European Community nations of the World Health Organization decided in 1983 that they would implement the goal of quality assurance in their national healthcare systems by 1990. Graham (1995:20) notes that while these European nations were setting this goal for themselves, the ideal of quality assurance in the United States of America (USA) was still in its early stages of development. In the historical review of ideals of quality in health care provision in other countries, Graham (1995:20) found no references to this concept in the United Kingdom (UK) before 1980. When Graham (1995:20) was compiling his document in 1995, he noted that even Japan, which, at that time, was already the world's leader in industrial quality management, was only beginning to apply ideals of health care quality management to the health care sector in that country.

While Graham (1995:24) notes that the 20th century has been called the "Century of Quality", he also points to the fact that the field of quality assurance in healthcare today

continues to evolve rapidly and to expand the reach and scope of its concerns. DeLaune and Lundner (2002:492) have observed that contemporary healthcare consumers are sophisticated, knowledgeable and selective about the quality of care that they receive and the conditions in which they receive it. Gone are the days when clients blindly trusted their physicians. Modern healthcare consumers are aware that there are enormous variations in the quality of healthcare on offer and the abilities and expertise of those who offer it. Contemporary clients are deeply interested in the variables in practice and healthcare consequences that characterise different providers and operators in the healthcare industry. Because of this, all forms of healthcare now operate in an era of increased competitiveness with regard to the services they provide, the procedures they offer, the quality of their nursing and medical personnel, and the expectations of customers.

The constitution of the World Health Organization (2000:11) states quite unambiguously clearly that its ultimate ideal is "...the attainment by all peoples of the highest possible level of health." At the same time, the World Health Organization (2000: xii) noted that many variant healthcare systems are currently being put into practice in an experimental way in different places throughout the world, and that no single system of healthcare can therefore claim to be universally successful and appropriate for all people, in all conditions, in all places and at all times. In spite of this caveat, the World Health Organization (2000:34) notes that there are indeed some clear conclusions that had been reached about the kind of organisations, rules and incentives that are most effective in enabling a health system to use its resources effectively to achieve its goals.

In South Africa itself, a number of highly skilled practitioners and high-calibre institutions exist which are capable of restoring and maintaining the health and ability of South Africans who are able to afford their services. These institutions and practitioners provide a quality of care to patients that compares favourably with the

best in the world. At the same time, Department of Health (DoH) of the UK (2000:5) notes that there are far too many South African patients who are currently receiving substandard care and treatment and many who, through no fault of their own, find themselves beyond the reach of the healthcare provision is that exist in their environment. This means that the general quality of care that is provided for patients in South Africa is not yet what it should be. The DoH of the UK (2000:6) is therefore focusing its efforts on designing effective quality improvement interventions and the identification of all causes of sub-optimal performance so that all future interventions can be assessed in terms of the deficiencies that they are intended to remedy.

Nethononda (2005:1) described the progress of healthcare delivery in South Africa in 2005 in the following way;

> *In general there has been change and progress for the better in many sectors [of the country]. Nevertheless, it is clear to the health professionals that the public health sector has changed for the worse over the 11 years of our new dispensation. All these deficiencies [in healthcare] translate into perpetual poor management and poor service delivery. Unfortunately in healthcare, poor service leads to the unnecessary death of patients.*

According to the DoH of the UK (2004:37), *governance* is defined as a mechanism that enables an organisation to accept accountability for the way in which it manages itself. It is therefore essential for healthcare professionals to make ever greater efforts to improve the management efficiency of their organisations so that the levels of service they provide will continue to improve in tandem with the incremental improvements that are effected in management.

The Hospital Association of South Africa (2008:18) has noted that one of the greatest problems in South African healthcare is inequity in the delivery of services, in the

distribution of funding and in the extent to which all South Africans have access to healthcare. The challenge is therefore to address these concerns by means of effective partnerships between the public and private sectors in such a way that existing resources will be able to be shared and therefore optimised. According to statistics released by the National Department of Health in Pretoria (2000:10), 75% of all people in South Africa do not have any medical aid coverage and are thus reliant on whatever services the public sector is able to provide. The same source of information states that the general perception exists among South Africans that while the quality of care is perceived to be slowly improving in the public sector, it is still the *private* sector that offers a superior quality of healthcare in the form of superior facilities, resources, personnel and conditions (National Department of Health in Pretoria 2000:10).

1.2   BACKGROUND TO THE STUDY

The demands that are placed on healthcare facilities and resources, in combination with the increased complexity of modern medical and nursing care and the expectations of the public with regard to the treatment that they will receive, place immense pressures on healthcare systems, both in South Africa and throughout the world. This pressure is augmented by a general and growing public awareness of the problems and deficiencies in the provision of healthcare. In an age in which the public have increased access to information, their demands for quality services increased correspondingly, and this brings with it an escalation of the risk of liability in all spheres of healthcare provision (Cullinane, Findlay, Hargraves & Lucas 2005).

In the particular private hospital that was selected as the locus for this study, the routine clinical audit reports that are performed by the personnel of the general wards reflected a progressive increase over a specific period of time in the number of patient transfers to a higher levels of care. During the six-month period between December 2004 and May 2005, the researcher observed a gradual 2.45% increase in transfers from

the general wards to a high care unit (HCU) or an intensive care unit (ICU). While this placed an additional strain on the already overburdened schedules of the personnel who manage HCUs and ICUs, it also, in many cases, exerted a devastating effect on the prognosis and well being of the patients involved. An additional effect was that while the number of hospital admissions continued to rise, the availability of hospital beds decreased. It therefore became operationally imperative to conduct a detailed inquiry into the reasons for this increased demand for high care (HC) and ICU beds as well as the whole phenomenon of unplanned and unanticipated transfers of patients to higher levels of care.

One of the findings was what one might expect given the bare facts: some in-hospital ward patients were transferred to a higher level of care simply because of a variety of complications or deteriorations in the state of health of individual patients. But another trend was also observed by the investigator. There has been a tendency in the hospital industry during the last couple of years to adjust the *staffing composition* of the nurses who work in the wards because of the unavailability of a sufficient number of registered nurses and because of various financial constraints. In the years during which the study was conducted, the professional demography of the nursing compliment in the wards changed from being mainly registered nurses to enrolled nurses and also enrolled nursing auxiliary personnel who were detailed to undertake tasks involving basic nursing care. The practical effect of this is that nursing personnel who have received the less professional training and whose nursing skills and judgment are not yet fully developed are obliged to observe, recognise, assess and report any form of deterioration in the health status of a patient. While it is obvious that the correct and objective measurement of a patient's physiological status does indeed indicate the presence of deterioration, it is nevertheless the ability of an experienced professional to *interpret* the overall meaning of all these measurements and indications that is of vital importance to a patient's well-being. While it is indispensable for health professionals to understand the significance of basic physiological parameters, it is just

as important for nursing professionals to be able to assess a nurse's technical skills and ability to obtain vital information from the data they receive. The nurse should then be able to compare such data with normal physiological values in order to draw correct conclusions about the health status of a patient.

While the skills and competency audit undertaken by the researcher provided essential information for this study, it also became necessary for the researcher to assess the viability of the procedures by means of which the enrolled and auxiliary nurses reported back to the registered nurses in charge of the ward. Some of the most important elements in this latter investigation were the manner in the deterioration of a patient was reported to the treating specialist by the ward nursing personnel, the way in which the process of transfer to a high level of care was initiated. This included a record of the timescales involved in the deterioration of patients in general wards, the specific actions that were taken and the deterioration that occurred *before* patients were transferred to a higher level of care, and the general outcomes of these processes. Since the patients who were deteriorating in the general wards were at risk, they were therefore a source of a major concern to the nursing management and the medical personnel of the hospital in which this study was conducted.

The research also established that the health condition of the patients who were treated in the ICU frequently improved to such an extent that they could be transferred back to the HCU or to the general wards and that their treatment could therefore be scaled down until they were ready to be discharged from the hospital. In some such cases, the health condition of patients thus transferred would once again begin to deteriorate in the general wards. When this happened they would usually require intensive treatment and interventions, and would therefore have to be transferred back and readmitted to higher levels of care. Some of these patients were therefore involved in *double transfers*. This means that some patients who had been transferred from the general ward to the HCU would have to be transferred to ICU because of deterioration in their condition

that required immediate interventions that could not be conveniently administered in the general wards or HCU.

The data collected by the researcher from a clinical audit of the resuscitation team revealed a high incidence of in-hospital call-outs of the resuscitation team, of the number of cardio-pulmonary resuscitations performed, and of the number of in-hospital deaths that occurred. Since the patients who were resuscitated in general wards were nearly always transferred to higher levels of care, this placed an additional strain on scarce (and sometimes unavailable) ICU and HC beds. Details about the types of admission to a higher level of care, the conditions of the medical or surgical patients who were transferred and whether or not these patients were emergency or elective patients, were not always clear to the researcher from the audit of the hospital's records.

In order to improve the quality of care available to patients, to manage transfers to a higher level of care more efficiently, and to suggest viable solutions to the problem of patient deterioration in general wards, the hospital in which the researcher conducted her study established an outreach programme to deal with all these problems. In addition, the researcher was also required to devise a suitable training programme for their nursing personnel.

1.3   PURPOSE OF THE STUDY

The extent and rate of undetected deteriorations in patients that occurred because of transfers from wards to HCU level or to ICU prompted the researcher to undertake the study.

The purpose of this study was to explore, identify, and analyse various forms of patient deterioration, the management of such deterioration, and the processes and problems encountered while transferring patients from a lower to a higher level of care. The

researcher's purpose therefore also included the identification of measures that would assist hospital personnel to reduce the number of transfers to a higher level of care, to decrease the incidence of in-hospital cardiac arrests, and also to reduce the rate of readmissions.

These concerns may be summarised by saying that the purpose of this study was to affect alterations in the work-related behaviour of healthcare personnel by means of education and, by doing so, to enhance the outcome and quality of patient care.

1.4   PROBLEM STATEMENT

According to Burns and Grove (2005:70), a *research problem* is an area of concern about which nothing definite is as yet known because of a lack of research into the particular area of concern that gave rise to the research problem in the first place. Research generates empirical knowledge that allows professionals to address problems of practice, with the ultimate goal of providing evidence-based nursing care. The extent of what is not known about a particular clinical problem determines the complexity and number of studies that are needed to generate research-based knowledge that can be used to improve nursing practice (Burns & Grove 2005:70).

Both Polit and Hungler (1999:67) and Polit and Beck (2006:509) define *a research question* as "a statement of the specific query the researcher wants to answer in order to address the research problem". They add that "research questions are generated from the formal problem statement".

In this study, a range of problems and difficulties undermined the function and viability of the healthcare facility at the researcher used as the locus of her study. These problems included patient deterioration, a rapidly increasing number of transfers to a higher level of care, problems generated by the transferring process, and absence of

understanding about the underlying dynamics of these processes, and an unexpectedly high incidence of in-hospital cardiac arrests.

1.5   AIM AND OBJECTIVES

The overall aim of the study was to investigate and analyse the condition and progress of patients in the time period prior to, as well as after, their transfer to a higher level of care. A better understanding of these factors will contribute to identifying the processes and problems that are encountered in connection with the transfer of patients to a higher level of care. The researcher formulated the following objectives in order to answer the research questions:

- To determine the interventions that are required to decrease the number of in-hospital patients who are currently being transferred to a higher level of care and the details of the deterioration that made such transfers necessary (see chapter 6, sections 6.4 and 6.5).

- To conduct a retrospective situational analysis of actual problems in order to identify risk times and rates of patient deterioration (see chapter 6, section 6.6).

- To determine whether or not any interventions were applied (see chapter 6, section 6.7).

- To develop a management strategy for early interventions in the treatment of deteriorating in-hospital patients (see chapter 6, section 6.8).

1.6   ASSUMPTIONS

According to Burns and Grove (2005:39), *assumptions* are statements that are taken for granted or are considered to be true, even though they have not been scientifically tested or proven. Assumptions form the foundation of numerous intuitive beliefs and attitudes that inform and guide personal and public thought and behaviour, and it requires both a great deal of introspection and disciplined investigation to ascertain whether or not they are grounded in fact or fantasy.

The following assumptions guided this study:

- The early recognition, interpretation and reporting of deteriorating vital signs and symptoms of in-hospital patients will stimulate appropriate interventions on the part of senior nursing and medical personnel.
- Nursing personnel can be trained to recognise the first signs of crucial deterioration in patients, and they can make use of their observation of deteriorating vital signs to improve the care of acutely ill in-hospital patients.
- Early appropriate interventions that are designed to manage acutely ill in-hospital patients would minimise the number of transfers to a higher level of care.

1.7   SIGNIFICANCE OF THE STUDY

Because this study is based on clinical practice and because its purpose is to remedy deficiencies in existing clinical practices, the researcher anticipates that the following benefits will accrue from this research:

- This research will offer ways and means of improving the knowledge and skills that nursing personnel utilise to recognise, record, report and intervene in a patient's

deterioration. This will enable nurses to improve the standard of care that they offer to patients and also to improve the outcomes and quality of care in general.

- This research should lead to the introduction of systems and processes that will be able to address the problems associated with deterioration times and transfer waiting times.

- This research will lead to improvements in the management of at-risk patients in the wards.

- This research should reduce the number of times that the hospital resuscitation team and in-hospital cardiac arrest teams are called out to attend to emergencies.

- This research should lead to improvements in the management of patients' health records.

1.8   DEMARCATION OF THE STUDY FIELD

The period during which this study was undertaken extended from 28/04/2005 to 27/05/2005 (this represents admissions from between 14/04/2005 and 20/05/2005). The comparative study period ranged from between 1/10/2005 and 28/10/2005 (this represents admissions that occurred between 25/09/2005 and 26/10/2005). All of the patients who were transferred to a higher level of care during this period were incorporated into the study.

The study was conducted in a private, multidisciplinary hospital in the Gauteng Province of South Africa. All of the healthcare workers who recorded healthcare notes were indirectly involved in this study.

1.9   CONCEPTUAL FRAMEWORK

This study was guided by a conceptual framework that embraces the National Health Services (NHS) clinical governance model which, according to Nicholls, Cullen, O'Neill

and Halligan (2000:172), is a model designed to effect improvements in the quality of healthcare systems. The NHS clinical governance model, which was derived from Donabedian's model, requires continuous reviews of existing practice. The NHS clinical governance model is thus a vehicle for effecting continuous improvements to the quality of services and in for maintaining high standards of healthcare by constructing a therapeutic environment and culture in which excellence in clinical care prevails because it is expected, appreciated and rewarded (Donaldson & Gray 1998:37). *Clinical governance* is an organisational framework that addresses the quality of existing practice and suggests processes to improve patient outcomes and experiences.

The NHS model was used in this research which guided the researcher to explore, identify, and describe the structural input, processes and outcome standards that were relevant to the transferring of in-hospital patients from a lower to a higher level of care.

The conceptual framework is discussed in detail in chapter 2.

1.10   OPERATIONAL DEFINITIONS

For the purposes of this study, the following operational definitions were used.

1.10.1   Acuity

Acuity is defined according to the definition provided by Jennings (2008:1, 3). A patient acuity system classifies patients into care categories and quantifies the nursing effort that will be required to take care of the needs of each patient. Patient classification systems are commonly used to predict patient requirements for nursing care. These requirements (or patient acuity) can then be used to manage nursing personnel resources, costs and quality of care delivered.

In this study, *the acuity level* is expressed as the number of hours of nursing care that is required per patient for each 24-hour period. (Acuity levels include both direct and indirect forms of nursing care.) Time and motion studies measure acuity levels for budgetary purposes. An acuity level of 6.0 means that each patient in this category requires six hours of nursing care during every 24 hours. This could be expressed in another way by saying that one nurse could care for four patients during each 24-hour period provided that she or he was on duty for all that time.

1.10.2   Clinical audit

According to the *Oxford Dictionary* (2007:276), the word *clinical* relates to the examination and treatment of patients and their illnesses.

According the same *Oxford Dictionary* (2007:86), an *audit* is an official examination of quality or a standard. A *position audit*, according to the online *Collins English Dictionary*, is "a systematic assessment of the current strengths and weaknesses of an organization as a prerequisite for future strategic planning".

A *clinical audit* is a part of a quality improvement process that seeks to improve patient care and outcomes through a systematic review of the care that is delivered in terms of explicit criteria and benchmarks for the implementation of change. During this process, certain aspects of the structure, processes and outcomes of care are selected and systematically evaluated in terms of various explicitly defined criteria. Where it is indicated, change can then be implemented at an individual, team, or service level and further monitoring can be performed to confirm whether the expected improvements in healthcare delivery have in fact occurred or not. The National Institute for Clinical Excellence (NICE) endorses this particular definition of a clinical audit (NICE 2002).

In this study, the researcher made use of a clinical audit to review particular aspects of clinical practice in a systematic way and to implement whatever changes might be needed to prevent uncontrolled patient deterioration in the wards of the selected private hospital that was the locus of the study.

1.10.3 Continuous quality improvement

Continuous means "unbroken" – as in the line that forms a circle. *Improvement* means the manifestation of a better state than had hitherto existed in whatever is being considered. *Continuous quality improvement* therefore describes the unremitting efforts that are devoted to raising existing standards of health and social care (Pickering & Thompson 2003:4). According to the *Oxford Dictionary* (2007:331) *continuous* means happening or existing for a period of time that is without any interruption or break.

Quality is defined by Encarta (2003) as "excellence; the highest or finest standard". According to the *Oxford Dictionary* (2007:1233), *quality* means the standard of something when that standard is measured against some comparable or parallel phenomenon. It refers to the process of comparing something to other things that are like it, and it is usually expressed in terms of value judgments such as "good" or "bad".

Improvement is defined by Encarta (2003) as "getting or making better; the process of making something better or of becoming better". According to the *Oxford Dictionary* (2007:781), *improvement* means the act of making something better or the process making something better.

Continuous quality improvement is described by Lynn, Baily, Bottrell, Jennings, Levine, Davidoff, Casarett, Corrigan, Fox, Wynia, Agich, O'Kane, Speroff, Schyve, Batalden, Tunis, Berlinger, Cronenwett, Fitzmaurice, Dubler and James (2007:666) as "systematic,

data-guided activities designed to bring about immediate improvements in healthcare delivery in particular settings".

Quality improvement entails generating the necessary knowledge and expertise for ordering a specific practice setting so that it will be able to provide satisfactory and affordable care to consumers of healthcare (Kahn & Fuchs 2007:710).

In this study, continuous quality improvement programmes were applied on the basis of previous experiences at selected private hospitals. The was done in order to effect continuous improvement to the current practices of the hospital with a view to raising the current standards of healthcare to such a level that it would be possible to diminish the number of transfers of patients to a higher level of care (transfers that were all occasioned by a deterioration in the patient's condition).

1.10.4 Governance

Governance is a mechanism that provides accountability for the way in which an organisation manages itself (DoH of the UK: 2004). Governance can be deduced from the management of an organisation, a section or a system.

In this study, *clinical governance* was regarded as the system that the hospital in the study used to effect continuous improvements in quality. Such improvements would, if effective, permit the personnel of the hospital to manage patient deterioration in such a way that the number of transfers of patients to a higher level of care could be contained and diminished.

1.10.5 Healthcare professional

Healthcare is defined by the *Oxford Dictionary* (2007:719) as the service of providing medical care.

According to the *Oxford Dictionary* (2007:1204), *professional* refers to something or someone who is connected with a job that requires special training and skills, especially jobs that assume a high level of education.

According the DoH of the UK (2004:37), a *health care professional* is a person who is a member of a profession that is regulated by statutory law.

For the purpose of this study, the following categories of healthcare professional are all considered to be healthcare professionals: all categories of nursing personnel, nursing management, medical doctors, the outreach team and the resuscitation team. This multi-professional team directs all its activities towards delivering quality patient care that prevents patient deterioration and that therefore forestalls the necessity for a subsequent transfer of a patient to a higher level of care in the hospital that was selected for this study.

1.10.6 Health Quality Service

The Health Quality Service (2003:1-2) is a process that enables healthcare organisations to examine themselves critically against a nationally recognised framework of organisational standards. By engaging in this process, the healthcare organisation concerned will be able to identify good practice while at the same time devise an agenda for the development of services. It is the purpose of the programme to set up a continuous system of quality improvement within a hospital.

For the purpose of this study, *Health Quality Service* refers to the improvement of patient care in general wards and to the ability to manage the consequences of patient deterioration in such a way that the number of patient transfers to a higher level of care will be drastically minimised.

1.10.7 Level III hospital

The DoH of South Africa (2006:10) derived the following preliminary definition of a Level III (tertiary) hospital from the Republic of South African National Health Act's (Act 61 of 2003) classification of health establishments. Such a hospital includes facilities that provide in-patient services as well as specialist and sub-specialist care within the public sector.

A Level 1 Trauma facility refers to a comprehensive trauma facility that manages major and severe trauma patients. According to the American College of Surgeons (2009:1), a Level I trauma centre provides the highest possible level of surgical care to trauma patients and therefore requires a certain number of surgeons and anaesthetists to be on duty for all 24 hours of each day at the hospital. A brief description is provided in section 3.2.1.2 of chapter 3.

The hospital in which the study was undertaken has been granted the status of a level 1 trauma facility. The definition above was adopted for the purposes of this study.

1.10.8 Needs

The *Oxford Dictionary* (2005:979) defines *needs* as "what is required; necessities". In a healthcare setting, a *need* would refer to a lack of some necessary factor or condition that is required to maintain an adequate level of some biological, psychological and social function.

In this study, *needs* refer to the physiological and biochemical parameters that have been identified as missing in terms of a comparison between what is evaluated as the necessary or normal level of a physiological or biochemical condition and an abnormal level of those parameters. A specific deficiency that causes physiological and biochemical abnormalities interferes with a patient's normal physiological and biochemical status, and this may cause a patient to be transferred to a higher level of care. These needs have to be recognised if relevant care is to be ensured.

1.10.9 Nurse

According to the Nursing Act of 2005 (Republic of South Africa Act 33 of 2005), "nurse" means a person who has been registered in a category under section 31(1) so that they are entitled to practise nursing or midwifery in South Africa. A nurse is professional who has been licensed and registered with the South African Nursing Council (SANC) because he or she has completed an accredited and recognised education and training programme that entitles him or her to nurture, assist and treat clients. Such clients may consist of individuals, families or groups, the sick and the well. A registered nurse in South Africa is expected to perform those activities that contribute to the attainment and maintenance of health, to the optimal recovery of patients, to the rehabilitation of individuals, and to circumstances that result in a peaceful and dignified death for the terminally ill. By working with clients according to prescribed professional codes, registered nurses are acknowledged as equal partners [with the patient] by helping them to gain independence as rapidly as possible" (Republic of South Africa Nursing Act 33 of 2005, SANC Scope of Practice).

According to the Nursing Act of 2005 (Republic of South Africa Act 33 of 2005), the word "register" refers to a register that contains the names and other relevant particulars of all persons who have been registered in terms of section 31, 32 or 33 of the

act, and any additional qualifications that need to be registered in terms of section 34 of the Nursing Act 2005.

- *A registered nurse* with someone who holds either a nursing degree that has been conferred by a university or else a diploma that has been conferred by a nursing college. According to SANC (2005), "registered person" means a person who is registered as a nurse or as a midwife in terms of the Nursing Act of 1978 (Republic of South Africa Act 50 of 1978). According to SANC (SANC 2005) and SANC's Scope of Practice (2005), a "registered person" means a person who is registered as a nurse or as a midwife in terms of the Nursing Act of 1978 (Republic of South Africa Act 50 of 1978) or as a medical practitioner or dentist in terms of the Medical, Dental and Supplementary Health Service Professions Act of 1974 (Republic of South Africa Act 56 of 1974). An *intensive care nurse* is regarded as a registered nurse with a post-basic qualification in critical care nursing and who has been registered in this capacity by the SANC.

- According to SANC and the Nursing Act (Republic of South Africa Act 33 *of* 2005:47), *staff nurse* means a person who is educated and competent to practise basic nursing independently, who can assume responsibility and accountability for such practice, and who is registered and licensed as a staff nurse in terms of the Nursing Act of 2005.

- According to SANC (2005:5), an "auxiliary nurse" is means a person who is registered as an auxiliary nurse in terms of section 31of the Nursing Act of 2005 (Republic of South Africa, Act 33 of 2005). An auxiliary nurse is expected to possess functional competencies such as the ability to:
  - demonstrate an elementary understanding of nursing legislation and related legal and ethical nursing practices
  - conduct an elementary clinical nursing practice in accordance with the scope of practice and nursing standards that are determined by the relevant health facility and to promote the quality of elementary nursing care that is

determined by the professional scope of practice and standards set by the relevant health facility (SANC 2005:25).

In this study, it is the staff nurse and the auxiliary nurse who are regarded being responsible for providing quality elementary nursing care services under the supervision of a professional nurse within the scope of practice as defined by SANC (SANC 2005:1) and the Charter of Nursing Practice (SANC 2005:1).

1.10.10   Nursing

According to the International Council of Nurses (ICN) (1899-2009:1), *nursing* encompasses the autonomous and collaborative care of individuals of all ages, families, groups and communities, whether they be sick or well, and whatever the circumstances in which they find themselves. Nursing includes the promotion of health, the prevention of illness, and care for those who are ill, disabled and dying.

According to the Nursing Act of 2005 (Republic of South Africa, Act 33 of 2005), "nursing" refers to a caring profession that is practised by a person who is registered under section 31, and to a institution that supports, cares for and treats a healthcare user in order to achieve or maintain health and, where this is not possible, which will care for a healthcare user so that he or she is able to live in comfort and with dignity until death.

The descriptions of nursing found in the South African Nursing Act (Republic of South Africa Act 33 of 2005) and that which is provided by the ICN are applicable to the hospital that was the subject of this study.

1.10.11   Patient at risk team

According to Ball, Kirkby and Williams (2003:327), patient at risk teams in the UK and Wales tend to consist of nurses who are trained to respond to early physiological warnings. The Patient at Risk Team differs from the conventional medical team consisting of medical doctors only. This team is usually led by a professional nurse specialised in acute hospital medicine (also referred to as critical care) and other members of the healthcare team who are trained and experienced in critical care.

For the purpose of this research, the Patient at Risk Team functions as a team that responds immediately when the condition of a patient suddenly deteriorates in the ward. It is also the team that offers the necessary interventions and that accompanies a patient to the HCU or ICU.

1.10.12   Pro forma

Collins English Dictionary (2006:1044) defines a *pro forma* as a "standard document or form". The *Oxford Dictionary* (2005:1160) defines a pro forma as a document that has been prepared in order to demonstrate the standard way or method of performing some or other action or responding to an event or situation.

In this study, a *pro forma* refers to a document that was compiled by the hospital group management for retrospectively collecting data on the morning rounds at a patient's bedside.

1.10.13   Quality assessment

Quality is defined by the *Oxford Dictionary* (2007:1233) as the standard of something when that thing is compared to other things that are similar to it. Quality is usually expressed in terms of how "good" or "bad" something may be.

Assessment is defined by the *Oxford Dictionary* (2007:78) as an opinion or a judgement about somebody or something that has been arrived at after a reasonable amount of thought and investigation.

Quality assessment is defined as a measure of the quality of care that is provided in a particular setting. Donabedian (1980:1-4) notes that quality assessment is limited to the appraisal of whether or not standards of quality have been met.

For the purpose of this study, *quality assessment* refers to the measure of the quality of care provided to patients in general wards and to critically ill patients who have been transferred from HCU or ICU to the wards so that their subsequent progress or deterioration may be assessed.

1.10.14   Quality assurance

According to Donabedian (1980:1-4), *quality assurance* consists of an assessment or measurement of the quality of care and the subsequent implementation of any necessary changes to either maintain or improve the quality of the care they is rendered. Quality assurance is often used as a basis for funding and maintaining quality performance. According to the *Oxford Dictionary* (2007:1233), quality assurance is the practice of managing the way in which goods are produced or services are provided so that they can be guaranteed to be of the highest possible standard.

For the purpose of this study, quality assurance means monitoring the number of transfers of ward patients to a higher level of care and to implementing whatever systems may be necessary to maintain or improve the quality of care.

1.11   RESEARCH METHODOLOGY

Burns and Grove (2005:211) state that the research methodology of the study refers to a definite and detailed plan that a researcher intends to use for pursuing the study from its conceptualisation of the research problem to its final strategies of data collection. Holloway and Wheeler (2002:287) refer to a *research methodology* as the framework of theories and principles on which the methods and procedures for conducting the envisaged research are based. In this study, the researcher adopted a quantitative approach and augmented this with a non-experimental, explorative, descriptive, retrospective and applied or practical research design.

A brief overview of the research design and method that have been utilised in this study is summarised below. A detailed discussion of the research methodology is presented in section 4.2 of chapter 4.

1.11.1   Research design

This section provides a detailed definition of the research design as well as a description of how a suitable design was chosen. It also offers the rationale behind the choice of this particular research design as well as a description of the concepts that are used in the design.

1.11.1.1 *Definition of research design*

Brink (2006:92) defines a *research design* as "the set of logical steps taken by the researcher to answer the research question". The research design is therefore equivalent to a blueprint for the study, and it determines the methodology that will be used by the researcher to obtain sources of information such as subjects, elements, and units of analysis for the collection and analysis of the data and the interpretation of the results.

Creswell (2009:3) refers to a research design as a plan and procedures for research that span the decisions from broad assumptions to detailed methods of data collection and analysis.

1.11.2 Selected research design

This study was based on a non-experimental quantitative research design that was explorative, descriptive and retrospective in nature. This study was conducted within the ambit of applied or practical research.

- **Non-experimental**

Experimental research seeks to determine if a specific treatment influences an outcome (Creswell 2009:12), while Polit and Hungler (1999:155), state that a researcher who undertakes non-experimental studies observes various phenomena as they occur naturally within their own environment while taking care not to intervene in or otherwise influence in any way whatever it is that he or she is observing. The data in non- experimental studies is collected without any changes being made to the data and without the data being subjected to any kind of prior treatment. Non-experimental research is therefore eminently suited to the study of human beings in nursing because human characteristics are inherently immune to experimental manipulation. Non-

experimental research acknowledges that human characteristics such as health beliefs and opinions are not manipulated.

- **Quantitative research**

Burns and Grove (2005:27) define *quantitative research* as "a formal, objective, systematic process in which numerical data is utilised to obtain information and describe variables and their relationships". According to Stommel and Wills (2004:23), quantitative research is a numerical approach that subjects the analysis of data to the rules and general principles of evidence and logic. Creswell (2009:4) adds that quantitative research is an approach for testing objective theories by examining the relationship among variables. These variables in turn, can be measured, typically ion instruments, so that numbered data can be analysed using statistical procedures. The final written report has a set structure consisting of an introduction, literature and theory, methods, results and discussion (Creswell 2008:17).

- **Explorative design**

Explorative research is defined by Encarta (2003:1) as a project that is designed "to investigate or study something" or one that is designed "to make a careful investigation or study something". Polit and Beck (2006:500) refer to an explorative design as "a study that explores the dimensions of a phenomenon or that develops or refines hypotheses about relationships between phenomena".

- **Descriptive design**

According to Encarta (2003), the term *descriptive* is defined as an adjective that means to "to explain, to give an account of something by giving details of its characteristics". According Burns and Grove (2005:232), a descriptive design investigates the views and

actions of the participants in terms of the problem that is being investigated. The authors add that a descriptive design provides "an accurate portrayal of the characteristics of a particular individual, event, or group in real-life situations for the purpose of discovering new meaning, describing what exists, determining the frequency with which something occurs, and categorising information".

- **Retrospective study**

According to Burns and Grove (2005:235), the signal characteristic of retrospective studies is that both the proposed cause and the proposed effect have already occurred at some time in the past.

- **Applied or practical research**

Burns and Grove (2005:33) describe *applied research* as "practical research that is a scientific investigation to generate knowledge that will directly influence clinical practice".

1.11.3   Rationale for the choice of design

The researcher chose this research design for a number of reasons that are described below.

Firstly, the researcher chose this particular research design in order to describe and analyse the current situation in practice in a non-manipulative way that was appropriate because it involved no alterations to patient health records, and no experimental manipulations of the behaviour of the patients or that of the nursing personnel. Because of the ethical principles that govern this kind of research, the manipulation of a number of human variables is not regarded as morally acceptable

because of the potential for physical or mental harm to participants that is inherent in such an approach. It was for this reason that a non-experimental approach was deemed to be most feasible.

Secondly, the researcher collected quantitative data so that she could objectively determine the deterioration times of the patient, the time at which the problem was entered in the patient's health record, the time when the problem was reported, the nature of the actions taken, the times at which various entries were made, the time when the problem was reported to the doctor, the time of the transfer, and the length of time it took to stabilise the patient. Quantitative details such as these justify the use of a quantitative research design.

Thirdly, a retrospective analysis of the in-hospital patient health records was done to ascertain deterioration that needed care of a higher level.

Fourthly, this research is descriptive because it describes the quality of care in a general ward as well as in a higher level of care environment (as is indicated in the records).

Fifthly, the researcher chose these particular designs for this research because the problems that she investigated in this study included the frequency and nature of patient deterioration, the rapidly increasing number of patient transfers to a higher level of care over a short period of time, the problems that were generated by the transferring process, the lack of knowledge that sometimes rendered treatment and care ineffectual, and an unexpectedly high incidence of in-hospital cardiac arrests during the period under review. The researcher also expected that the insights that would be provided by this study would offer the hospital a sound basis for various interventions that result in an improvement of clinical practice in the healthcare setting. The intervention that was taken to improve the situation was of an interventative and applied nature.

Lastly, it was an important priority for the researcher to review the outcomes of the implementation of the clinical markers training programme and the Outreach programme. These two programmes were analysed by the researcher by means of a retrospective and comparative review of past health records.

1.11.4   Research method

In this section, the researcher describes the population, the sampling process, the sampling procedure, the setting, the development of the instrument and the ethical implications of this research.

1.11.4.1   Definition of the term method

According to the *Oxford Dictionary* (2005:463), the term *method* refers to "a special form of procedure; orderliness; orderly arrangement of ideas; a reliable/effective/scientific method of data analysis". Creswell (2009:15) states that the research method refers to the forms of data collection, analysis and interpretation that researchers propose for their studies.

1.11.4.2   Phases of the research

This study was conducted over three phases. In chapter 3, each phase and the appropriate steps that were taken within each of the phases, are discussed in detail. Table 1.1 (below) sets out a brief summary of the phases of the research for the convenience of the reader.

Table 1.1   Summary of the research phases

Time frame	Processes used	Description
Phase one	**Aim: The identification of trends in current practice and an extended situational analysis**	
December 2004 to May 2005	Clinical audit	The researcher observed a progressive increase in the number of in-hospital patient's who were being transferred to a higher level of care in the regular clinical audit reports that emanated from the general wards.
May 2005	Surveillance and audit	The research engaged in a surveillance and assessment of the nursing personnel's knowledge of clinical markers.
May 2005	Patient health record review	The researcher undertook a retrospective study of the patient records of those who had been transferred to a higher level of care.
November 2005	Assessment	The researcher performed a technical assessment of the competency of the nursing personnel as they went about obtaining and interpreting vital data from the patients.
May and June 2006	Surveillance	The researcher undertook a surveillance of the reporting structure and the processes that the nursing personnel were using to report abnormal values to shift leaders and the actions that were subsequently undertaken by the shift leaders concerned.
Phase two	**Aim: The improvement of current practice**	
June 2005	Progress assessment	The researcher implemented the clinical markers training programme for the benefit of nursing personnel.
15 August 2005	Implementation	The researcher implemented an Outreach programme.
Phase three	**Aim: The reassessment of the situation**	
May 2005 to October 2007	Progress assessment	The researcher assessed the progress that had been made in terms of the total number of call-outs of the local resuscitation team in the light of the total number of cardiopulmonary arrests.
May 2005 to October 2007	Clinical audit	The researcher calculated the number of in-hospital patients who had been transferred to a higher level of care.
October 2005	Patient health record review	The researcher compared the comparative study to the retrospective study of the patients who had been transferred to a higher level of care.
November 2005	Audit	The researcher assessed the extent of the knowledge that the nursing personnel had acquired with regard to clinical markers.

Time frame	Processes used	Description
January 2007 to December 2007	Clinical audit	The researcher reviewed the figures that reflected the number of readmissions to a higher level of care in the period from between January 2007 and December 2007.
2008	Data analysis	The researcher analysed the retrospective study and the comparative study of transfers to a higher level of care of in-hospital patients.
2008	Data verification	The researcher was assisted by a professional statistician to validate the correctness of the data analysis.

1.11.4.3 *Population and sample*

According to Burns and Grove (2005:342), a *population* is the total set from which the individuals or units of a particular study are chosen. Polit and Beck (2004:50) refer to a population as the aggregate of those who are able to comply with the requirements of a specific set of specifications. In this study, all the patients who were admitted to the HCU or ICU were identified as the population.

Burns and Grove (2005:350) refer to a *sample* as a subset of the population that is selected for a particular study. The members of such a sample are referred to as the *subjects*. In this study, the sample consisted of those patients who were transferred to a higher level of care because they began to manifest various signs of physiological deterioration in the general wards.

1.11.4.4 *Criteria for the selection of the sample*

The inclusive criteria that qualified someone to be a member of the sample included the following:

- The person had to be an adult patient who had been admitted to the general wards and who subsequently had to be transferred to either a HCU or ICU.

- The person had to be a patient whose general condition had deteriorated in one of the general wards.

1.11.4.5 *Sample size*

A brief discussion of the sample size is presented in section 4.3.3 of chapter 4.

During the period in which the pilot study was conducted (i.e. in May 2005), 31 patients who were transferred to a higher level of care were included in this study. Of the 31 patients who were included, six patients had been transferred more than once to a higher level. Thirty one patients (88.57% of patients) and 38 transfers (92.68% of transfers) were therefore included in this study.

During October 2005, out of the 29 patients who represented 37 transfers, five could not be used in the process analysis because of the impossibility of recovering their records from the hospital record storage system. These patients were, however, included in the demographic and time of day of transfer analysis because enough information could be retrieved from the electronic hospital information system as well as from the pro formas that had been filled in by the outreach registered nurse to make this information usable. Of these patients, 90.63% were therefore analysed in terms of their demographic data. Of the remaining 24 patients, six were transferred more than once to a higher level of care. The researcher therefore used 30 transfers (75% of all the transfers) in the final analysis.

1.11.4.6 *The setting*

The *setting* refers to the place in which the research data was collected (Burns & Grove 2005:34).

The study was conducted in a selected private hospital in Pretoria, the executive capital of South Africa that is situated in the Gauteng province. A brief description of the setting is provided in section 4.3.4 of chapter 4.

1.12   DATA COLLECTION PRO FORMA FOR GENERATING DATA

Data collection describes the process in which the researcher engages to gather a great enough quantity of quality material to address the research problem convincingly (Polit & Beck 2006:498). According to Burns and Grove (2005:431), data collection means obtaining the data that is needed from the subjects so that it can be utilised in the research. The steps involved in collecting the data depend on the research design and methods of measurement that are employed. The researcher is actively involved in this process, either because she personally collects the data herself or supervises the activities of the data collectors.

The collection of data in a quantitative study normally proceeds according to a pre-established plan. Collecting data for this study involved identifying the relevant data from the patient records and capturing it on a computer spreadsheet.

In this study, a pro forma was used as a data collection instrument at the time of identification of the patients. Throughout the study, this data collection instrument will be referred to as the "pro forma".

Collins English Dictionary (2006:1044) defines a *pro forma* as a "standard document or form". *Oxford Dictionary* (2005:1160) defines a pro forma as a document that is prepared in order to demonstrate the usual way of doing something in a standardised way or to familiarise others with a standardised method. A full description of the pro forma is given in section 4.6.1 of chapter 4.

A detailed description of the data collection process is given in chapter 4 section 4.6.

1.13   VALIDITY AND RELIABILITY

The reliability and validity of the instrument indicate the quality and sufficiency of the pro forma to collect valid and reliable information.

1.13.1   Validity

According to Joppe (2000:1215), *validity* in quantitative research determines whether the research data collection instrument truly measures that which it was intended to measure or how truthful the research results are. In other words, does the data collection instrument allow you to hit "the bull's eye" of your research object? Research generally determines validity by asking a series of questions, and will often look for the answer in the research of others.

1.13.2   Reliability

Golafshani (2003:597-607) quotes Joppe's (2000:1215) definition of reliability. Reliability is "the extent to which results are consistent over time and an accurate representation of the total population under study, and if the results of a study can be reproduced under a similar methodology, then the research instrument is considered to be reliable".

In this study, the researcher consultant a professional statistician in order to establish the reliability of the data. In addition, the researcher consulted with specialist medical doctors and senior nursing personnel at the hospital group in which the study took place, and requested them to assist with the reliability and validity measures that were developed in the pro forma (see Annexure D: Pro forma).

A detailed description of the reliability of the data collection pro forma and the medical records is provided in section 4.4 of chapter 4.

1.14 DATA ANALYSIS

Burns and Grove (2005:483) indicate that the purpose of data analysis is to describe the relationships that obtain between variables, to clarify the relationships among the theoretical concepts, and to assist the researcher to identify the existence of causal relationships.

According to Burns and Grove (2005:43), it is the purpose of data analysis to reduce, organise, and give meaning to data. According to Burns and Grove (2005:461), descriptive statistics allow a researcher to organise the data in ways that give meaning to phenomena, to obtain insight and to facilitate the examination of a phenomenon from a variety of different angles.

A more detailed description of the data analysis is presented in chapter 6.

1.15 ETHICAL CONSIDERATIONS

A detailed discussion of how ethical considerations were applied to this study is contained in section 4.8 of chapter 4.

Since nursing has historically been bought on the soundly ethical foundations, the researcher upheld the following ethical considerations during the conduct of this study:

- The researcher took great care about how she entered into the research setting.
- The researcher obtained the written consent of all the important participants.
- The researcher sought permission to conduct the study from the relevant authorities.

- The researcher secured informed consent and disclosed the nature and purpose of the study.
- The researcher emphasised the voluntary nature of participation in this study.
- The researcher ensured the competency to grant consent of those who were involved.
- The researcher took great care to maintain the anonymity and confidentiality of the participants in the study.

1.16   SCOPE AND LIMITATIONS OF THE STUDY

According to Burns and Grove (2005:39), *limitations* represent the restrictions or problems in a study that may decrease the generalisability of the findings.

The researcher identified the following limitations in her research:

- The study was only conducted in one specific private hospital in Gauteng.
- Only a limited number of patients were utilised for the purposes of this study.
- It is conceivable that the records of the patients might have been somehow limited, biased or incomplete.

The findings of this study would therefore not necessarily apply to other hospitals.

1.17   OUTLINE OF THE STUDY

This dissertation consists of the following chapters:

Chapter 1:   Introduction and overview of the study
Chapter 2:   Conceptual framework
Chapter 3:   Literature review

Chapter 4:   Research methodology

Chapter 5:   Situational analysis

Chapter 6:   Data analysis and findings

Chapter 7:   Conclusion and recommendations

1.18   CONCLUSION

This chapter presented an introduction and overview to the study and included various details about the background and problems that gave rise to the study. It also provided a short historical overview of the concept of quality. In addition to this, the conditions in which the research problem arose as well as the problem statement and the research questions were presented. The assumptions of a study and the demarcation of its scope were also briefly discussed. A brief discussion of the conceptual framework, the research methodology (including the research design and method), the issues of validity and reliability, and the methods data collection and data analysis were also presented. A brief mention of the ethical considerations and scope and limitations of the study concluded his chapter. The key terms that were used in this study were each defined, and the chapter concluded with a broad outline of the remainder of the study.

The following chapter (chapter 2) discusses the conceptual framework that the researcher constructed for the purposes of this study.

"We make a living by what we get we make a life by what we give."
Sir Winston Churchill (1874-1965)

"Sometimes it is not enough to do our best; we must do what is required."
Sir Winston Churchill (1874-1965)

British political leader. Prime Minister of the United Kingdom (1940-1945), (1951 - 1955).

CONCEPTUAL FRAMEWORK

2.1   INTRODUCTION

This chapter presents an overview of the conceptual framework of the research in the form of two selected models together with the components, standards, and criteria of each model. It also discusses the interdependency of the two selected models, and the relationships between structure, process, and outcome in each.

The hospital which was the locus of the study introduced the Health Quality Service International Accreditation Programme in 2003. The Health Quality Service programme supports a process that enables healthcare organisations to examine themselves critically in terms of an internationally recognised framework of organisational standards. This, in turn, enables a healthcare organisation to identify whatever good practices it has managed to establish in its particular sphere of operations. In line with

this procedure, the hospital selected for the study adopted the UK NHS Clinical Governance Model of Continuous Improvement as the template against which to assess all aspects of its present governance and operations.

The Donabedian model, upon which the NHS clinical governance model is based, guided and inspired the development of a model of clinical governance for the hospital in this study, and this model is described in section 6.3.6 of chapter 6 of this dissertation. The Donabedian model is therefore the basis and foundation of the NHS model of clinical governance. Because of their importance for this study, the Donabedian model and the NHS model of clinical governance of the UK will both be discussed in detail below.

The intention of this chapter was to provide a much more comprehensive discussion of the two models because of the integration of concepts. The description of the models in detail may provide readers a clear understanding of the problem statement namely that transfer to a higher level of care occurs in patients that deteriorate in general ward. A better understanding of these two models will contribute to identify the processes and problems that are encountered in connection with the transfer of patients to a higher level of care.

A clinical audit reflected a progressive increase over a specific period of time in the number of patient transfers to a higher level of care. The Donabedian model dimension namely, *structure, process and outcome* as well as the NHS clinical governance components and clinical audit gave the framework for the study objective (1) to *determine the interventions that are required to decrease the number of in-hospital patients who are currently being transferred to a higher level of care and the details of the deterioration that made such transfers necessary* (see chapter 6 section 6.6) and (2) *to determine whether or not any interventions were applied* (see chapter 6, section 6.7). The Donabedian model dimension of monitoring to determine the *outcome* and the NHS clinical governance

clinical audit gave the basis for the study objective to conduct a retrospective situational analysis of actual problems in order *to identify risk times and rates of patient deterioration*.

The Donabedian model form the basis of the NHS clinical governance model and together established a new model which gave a framework for the objective *to develop a management strategy for early interventions in the treatment of high risk and patients deteriorating in general wards*.

By understanding the full extent of the models, readers and future students may become aware of the importance of clinical audit and the application of a combined Donabedian and NHS clinical governance model as recommended in chapter 7 to improve quality care.

2.2   CONCEPTUAL FRAMEWORK

The Donabedian model of quality assessment and the UK NHS clinical governance model for the continuous improvement of healthcare were selected for this study. Since these two models are closely related to one another in terms of their aims, assumptions and methods, the researcher regarded them as ideal for the purposes of this study. The researcher selected these two models because they provide an organisational framework for examining the quality of existing practice and because they offer processes that can be used to improve patient outcomes and experience. Figure 2.1 depicts the main elements of the Donabedian model along with the section numbers in which each of these elements is described below.

Continuous process for clinical governance

Donabedian's model outline (2.2.1)
- Introduction (2.2.1.1)
- Dimensions (2.2.1.2)
  - Structure
  - Process
  - Outcome

→ Skills of practitioners
→ Clinical performance
→ Monitoring

Standards (2.2.1.3)
- Type of standards
  - Structure
  - Process
  - Outcome
- Level of standards

Criteria (2.2.1.4)
- Type of standards
  - Structure
  - Process
  - Outcome
- SMART criteria
  - Specific
  - Measurable
  - Achievable
    - Relevant
  - Timely
  - Effective
  - Research

Indicators (2.2.1.5)
- Type of indicators
  - Structure
  - Process
  - Outcome

Targets (2.2.1.6)

The application of this model is Quality of care

Figure 2.1   An outline of the Donabedian model

2.2.1 Donabedian model

The Donabedian model offers a framework by means of which all the elements of the structure of an organisation can be separately identified and discussed.

2.2.1.1 Introduction

Donabedian (1966:166; 1981:409; 1990:1116) has devised and refined a model that can be used to monitor, examine and assess the quality of care in terms of the concepts of structure, process, and outcome. Schiff and Rucker (2001:170) are of the opinion that the Donabedian model describes the relationships that should prevail between the structure, processes and outcomes of a healthcare system that seeks to optimise and embrace a full range of preventive and medical treatment services. Donabedian (1988:1745) has demonstrated that quality in healthcare is an attribute of a system that he calls *structure*, and that structure is composed of a set of organised activities that he calls *process* and *outcome*. More particularly, Donabedian (1988:1745) defines the *structure* of a healthcare system as the environment in which the healthcare is provided. In the same source, he defines *process* as the method by means of which the healthcare is provided, and *outcome* as the result of the healthcare that is provided.

Table 2.1 sums up Donabedian's approach to describing and evaluating the quality of care – an approach that that has been widely accepted and used all over the world to assess the quality of healthcare. Traditionally, efforts to assess the quality of healthcare were predicated on certain obvious indicators of healthcare, such as the recognition of the professional qualifications and experience of an institution's personnel. More recently, however, and because of the seminal influence and pioneering work of Professor Avedis Donabedian (1919-2000) in this field over a number of decades, the focus has shifted towards developing measures of process and outcome.

2.2.1.2   *Dimensions*

Donabedian's approach to the assessment of healthcare relied on identifying the dimensions of quality of care. The preceding sections presented a range of systematic approaches to defining and classifying the quality of care. Donabedian pioneered this approach by proposing that the quality of health care can be measured by evaluating its *structure*, *processes* and *outcomes*. Donabedian argued that "good structure increases the likelihood of good process, and good process increases the likelihood of good outcome" (Donabedian 1988). Table 2.1 sets out the dimensions they are used for assessing the quality of care.

Table 2.1   Dimensions of the assessment of quality of care

Dimensions of the quality of care	
Structure (Input)	– How resources are allocated in terms of time, place and responsiveness to the needs of populations *(access)* – Fairness in sharing costs and benefits *(equity)*
Process	– How the resources are applied *(stewardship)* – Use of time and resources *(efficiency)* – Avoidance of waste *(economy)* – Reduction of risk *(safety)* – Evidence-based practice *(appropriateness)* – Patient-focused care *(continuity)* – Public/patient information *(choice, transparency, accountability)*
Outcome	– Population health *(health improvement)* – Clinical outcome *(effectiveness)* – Meeting the expectations of the public and the workforce *(cost–benefit)*

Source: World Health Organization (2008:41)

- **Structure**

Donabedian defined *structure* (or *input*) as the *attributes of the settings* in which care occurs and the *resources* needed for health care (as may be seen in table 2.1). Resources include *material resources* (facilities, capital, equipment, drugs, etc.), *intellectual resources*

(medical knowledge, information systems), and *human resources* (healthcare professionals) (World Health Organization 2008:14).

The delivery of healthcare is always based on a structure. The elements of a structure include the characteristics of healthcare systems (such as, for example, the organisation, personnel, the combination of specialities, the financial incentives, patient volume, access, facilities, and equipment) which are the resources that the system requires to deliver care, the environment in which the care is delivered, the facilities that are available for care, the equipment and the documentation of procedures, policies, and the guidance that is provided for nursing personnel. The other elements of a structure include the characteristics of a provider (such as, for example, the provider's socio-demographic profile, his or her specialty training, economic incentives, beliefs and attitudes, personal preferences and the degree of job satisfaction). Donabedian's (1981:409) approach to structure includes the skills of the nursing personnel, the buildings, and premises that are occupied and the equipment that the organisation makes available. This framework, which is based on Donabedian's (1988:1746) model, assumes that the characteristics of a patient (such as the diagnosis, the severity of an illness and co-morbidity) together with hospital resources (which are a part of the structure) affect the processes, the quality of care, and the outcomes of care. Donabedian's quality assessment approach includes a categorisation of structures. This categorisation encompass the availability of equipment, levels of nurse competency, the skills of the nursing personnel, and the procedures and standards that guide nursing personnel in their performance of quality nursing care.

▪ **Process**

Process denotes the *use of resources* or how resources are used in the giving and receiving of care. This use of resources can be classified into *patient-related processes* (intervention rates, referral rates, etc.) and *organizational activities* (such as the supply with drugs, the

management of waiting lists, the payment of health care personnel, and the solicitation and collection of funds) (World Health Organization 2008:14)

According to Donabedian (1981:409), the process comprises the methods that the organisation utilises in order to provide its services. The process consists of the actual procedures and practices that are implemented by nursing personnel when they prescribe, deliver and evaluate care, as well as the monitoring and evaluation of a variety of different actions so that they can be adjusted (if necessary) to comply with the way in which the hospital has conceptualised the provision of care. The process described by Donabedian (1988: 1746) therefore encompasses all the healthcare interventions that are provided for patients by doctors, nurses, and midwives. In addition to this, Donabedian (1988:1745) notes that the process includes the activities in which patients engage when they seek care and comply with its demands, as well as the activities of the healthcare provider in making a diagnosis and recommending or implementing treatment. The process includes the **technical** and **interpersonal** styles of the healthcare provider. The *technical style* of the healthcare provider refers to the specific service that the provider uses and the way in a provider manages the course of care (the course of care always includes continuity of care and its coordination). The process measures what is done for patients in terms of tests that are ordered, medication that is prescribed, referrals that are made, the rates of the hospital, and the revenue that is generated. The *interpersonal style* of the healthcare provider refers to the customary way in which the provider relates to its patients. Donabedian (1980:2) notes that the interpersonal style of a healthcare provider encompasses a healthcare provider's interpersonal manners, its ability to communicate as well as its distinctive style of communication style, whether or not a provider counsels patients about their health habits and the extent to which patients are included in decision-making processes.

- **Outcome**

Outcomes describe the *effects of health care* on the health status of patients and populations and consist of indicators and *final outcomes* such as mortality, morbidity, disability and quality of life, as well as *intermediate outcomes*, such as, for instance, blood pressure, body weight, personal well-being, functional ability, coping ability, improved knowledge and others (World Health Organization 2008:14).

In Donabedian's (1980:2) view, the outcome is an effect of the care received by patients as a result of the healthcare intervention, the benefits that accrue to nursing personnel during the process of providing this care, and the cost to the organisation of providing care. Patient outcomes consist of clinical endpoints (e.g. laboratory values, morbidity and mortality), functional status (e.g. physical, mental, social and role functions), general well-being (e.g. personal perception of health, energy levels, degrees of pain and quality of life satisfaction), and the degree of patient satisfaction with the medical care that is provided (in terms of access, convenience, financial coverage and quality). As already been noted above, Donabedian (1981:409) regards the outcome as the combined features of the structures and the processes that the organisation utilises to produce its services.

The assessment of outcomes, which takes place under rigorously controlled circumstances, is, of course, the method that is used to establish the desirability and advisability of alternative strategies of care. Quality assessment is an administrative device that is used to monitor performance so it can be determined whether or not the performance that is delivered conforms to the organisation's criteria of acceptability. In addition to all this, Donabedian (1988:1746) points out that quality assessment can contribute to research if, during the course of assessment, associations between the process and the outcomes are identified that seem inexplicable in terms of what is currently known by researchers and academics in this field as well as by those who administer the organisation.

Donabedian (1988:1746) has noted that *patient satisfaction* should be one of the primary desired outcomes of care. A patient's expression of satisfaction or dissatisfaction with the quality of care represents that patient's judgment about the quality of care in all its aspects, but particularly on the quality of care as it was mediated to the patient by means of the interpersonal relationships that prevail within the care system (the interpersonal process).

While Donabedian defined *quality* as "the ability to achieve desirable objectives using legitimate means", he defined *quality of care* as "that kind of care which is expected to maximise an inclusive measure of patient welfare, after one has taken account of the balance of expected gains and losses that attend the process of care in all its parts" (Donabedian 1980).

- **Skills of practitioners**

If one accepts Donabedian's (1988:1743) understanding of the definition of quality, one would inevitably begin with investigating and describing the performance of physicians and other healthcare providers. Donabedian (1988:1743-1744) describes two elements in the performance of healthcare providers: one element is *technical* and the other element is *interpersonal*. The interpersonal element influences the performance of physicians and other healthcare providers.

- **Technical performance**

Technical performance can be assessed in terms of the knowledge and judgement that a caregiver uses before deciding on a particular strategy of care and the skill of the provider manifests in the implementation of that strategy.

Donabedian (1988:1743-1744) asserts that the management of **interpersonal relationships** is the second component of a healthcare provider's performance. The skill

with which a healthcare professional manages the interpersonal process determines the manner in which the technical care is implemented and the success or otherwise of its implementation.

According to Donabedian (1988:1744), another element is the way in which a healthcare provider processes **information** in order to arrive at a correct diagnosis and to decide on an appropriate strategy of care (for example, the clinical audit and risk management).

- **Clinical performance**

The components or "pillars" of Donabedian's seven-pillar model are all predicated on the assumption that it is the outcome of treatment that is of primary importance. The major goal of Donabedian's work in healthcare management was to assure the quality of healthcare delivery by *monitoring* clinical performance. Donabedian (2003:27) developed steps or stages in the monitoring process. These steps consist of:

  o determining what to monitor
  o determining priorities before the monitoring process begins
  o selecting an approach to use in the assessment of performance
  o formulating criteria and standards
  o obtaining all the required information
  o choosing when and how to engage in the monitoring process
  o constructing a monitoring system
  o advocating a behavioural changes in the light of the findings

These steps offer a method of finding out whether the quality of care that has been delivered is *good, fair* or *poor*.

- **Monitoring**

Donabedian's (1991:104) quality assurance model consists of various distinctive offered approaches to monitoring. Firstly, he identifies the *loci of responsibility* in the upper reaches of professional-managerial hierarchy where criteria and standards are determined. The purpose of this is to achieve adherence to the criteria that have been accepted by the organisation. This method also enables an investigator to identify those who have failed to comply with the criteria had been set by the organisation. Failure to comply with these criteria is usually followed by some kind of action which is frequently punitive in nature.

Secondly, Donabedian (1991:104) notes that responsibility for quality is nearly always fairly widely dispersed throughout an organisation, but that it is mainly concentrated on those people (professional and other) who are most closely connected to the places and the clients for whom the care is being provided. Donabedian advocates methods of monitoring in order (1) to identify deficiencies in quality, (2) to analyse the details of the process that gives rise to such deficiencies, and (3) to redesign the processes so as to reduce and even perhaps to eliminate the identified deficiencies. The purpose of monitoring is therefore to achieve and maintain a continuous improvement in quality by means of self-evaluation and self-motivated participation.

Donabedian's model of quality assessment guided the researcher to assess the situation in the hospital selected for the study by means of a clinical audit of the hospital and a programme of monitoring the nursing personnel's knowledge and understanding of clinical markers. This programme reflected current practice for evaluating the outcomes of treatment, the competency of the hospital's healthcare workers and whether or not the hospital's standards of care were being met.

2.2.1.3   Standards of Donabedian model

The *Oxford Dictionary* (2007:1160) and the *Oxford Dictionary* (2005:1439) define a *standard* as a degree of excellence, [as something that] serves as a basis for comparison, as a minimum requirement, as a model for imitation, and as a benchmark of achievement that is based on a desired level of excellence.

▪ **Type of standards**

Standards of care are fundamental to quality assurance, and they should be characterised by a degree of flexibility that encourages innovation and creativity. Donabedian's model of structure, process, and outcome has provided a framework for the setting of standards by healthcare professionals.

According to Donabedian (1988:1745; 1966:166), the standards that are set can be divided into a *structure standard,* a *process standard,* and an *outcome standard*. He describes these three standards in the following way:

- **Structure standard**

  The structure standard consists of the human, physical and financial resources that are necessary for providing healthcare. When an organisation is set upon the achievement of quality care, it needs to identify structures such as a sufficient number of nursing personnel with appropriate skills and qualifications to achieve the standards of care that the organisation has defined for itself. Other structures include equipment, drugs, and buildings – all of which are needed to attain the for standards at the organisation has envisaged. Structure therefore refers to the environment, the resources, and the documentation that guides the performance of nursing personnel as they provide the required standard of care delivery.

- **Process standard**

   The process standard refers to the use of resources, including measurements of throughput, and to assessments of whether or not patients are being cared for according to the predetermined criteria of the hospital. The process standard can be identified by asking questions such as "What actions must happen so that the standard can be achieved?" and "When should such actions occur, and who is responsible for them?" Before an organisation can achieve quality care, it needs to identify a variety of nursing processes such as procedures, nursing practices, monitoring, and the evaluation of care.

- **Outcome standard**

   The outcome standard is the result of an intervention and determines the extent to which any change in a patient's health status or psycho-social well-being can be attributed to the healthcare that has been provided. Organisations need to be in a position to identify particular outcomes. Thus, for example, the result of specific nursing procedures that have been carried out on a patient represent an outcome. The outcome is dependent upon the nature of the structure and the process (Donabedian 1966:166). One can determine an outcome by asking a question such as "What will happen?" (The answer to an outcome question is usually very similar in form to a standard statement. The answer to a particular outcome question might be, for example, "Patients will be seen within 30 minutes of their appointment time." It should be borne in mind that a whole range of consequences might follow from the achievement of a particular standard, and all of these should be taken into consideration.

- **Level of standards**

Donabedian (1986:100) described *the level of standards* as the level of acceptability or the minimum standard that has been adopted by an institution. This is equivalent to the degree of excellence or the optimal standard that an institution has set for itself.

According to Donabedian (1986:99), a "standard" is a precise, quantitative specification of a criterion by means of which are certain degree of quality can be measured.

Standards in Donabedian's model for quality require a continuous **review** of existing practice, an advocacy of the responses that healthcare consumers make to healthcare policies, the evaluation of such responses, and a determination of extent to which professional accountability is practised within the organisation. These practices constitute a search for the different ways they can be used to create a supportive culture in which both quality care and relationships can flourish and in which the ethical dimensions of professional work are strongly emphasised (Schiff & Rucker 2000:169).

In the hospital selected by the researcher as the locus for the study, the *knowledge* that the nursing personnel possessed and their *ability* to recognise the onset of deterioration in a patient were of the utmost importance for ensuring improvements in quality care, in patient outcomes, and in professional experience. The *standard* was defined as a decrease in the number of transfers to a higher level of care, a decrease in the rate of re-admissions, and a decrease in the rate of in-hospital cardiopulmonary arrests. The *processes* that were used were the implementation of a specific training programme and the establishment of an outreach team for improving the quality of patient care.

2.2.1.4   Criteria

According to Donabedian (1980:409), *measurement* is indispensable for the improvement and monitoring of quality, and it can only operate on the basis of predetermined standards and explicit criteria.

The term *criteria*, as defined by Donabedian (1981:409), refers to predetermined elements against which various aspects of the quality of medical service can be measured and compared. Donabedian (1986:99) asserts that a *criterion* is a component of

the structure of a healthcare system, or of the process or outcomes of care, that enables an investigator to determine the quality of care that is being delivered.

- **Type of standards**

The types of standards that are selected are based on the approach that is selected by an investigator to assess for the quality of care. Such criteria may be classified in terms of structure, process, and outcome.

- **Structure criteria**

  Structure criteria describe the physical, organisational, and other characteristics of a system that provides care and its environment.

- **Process criteria**

  Process criteria refers to what is done when care is offered to patients.

- **Outcome criteria**

  Outcome criteria refer to what is achieved. (While such achievements usually indicate an improvement in some aspect of a patient's physical health, they may also refer to improvements in attitudes, and increase in knowledge and to the adoption of forms of behaviour that are conducive to the maintenance of future health).

- **SMART criteria**

According to Saul (2004:42), organisations need to make sure that the criteria that they adopt correlate directly with the outcomes that they expect. When they search for appropriate criteria, organisations make use of the elements of the SMARTER paradigm. SMARTER is an acronym that translates into the following components:

- **Specific**

  Criteria need to be specific. This means that criteria have to indicate exactly what result is expected so that the corresponding performance can be accurately judged. Criteria statements should always be clear, easily comprehensible and unambiguous. The usefulness of criteria depends on the extent to which they are delineated in precise and accurate language (Saul 2004:42).

- **Measurable**

  Criteria need to be measurable. Best practice involves making the standard in terms of which the performance of the nursing personnel and the process will be judged, explicit. This implies some that criteria can be measured or identified in some precise manner so that compliance with the criteria that have been selected can be adjudicated. The measure of any particular kind of performance should define how it will be audited in practice. It is necessary to be able to measure the intended results or performance so that compliance with the criteria can be measured and reported in precise and unambiguous quantitative and qualitative terms (Saul 2004:44).

- **Achievable**

  Criteria need to be achievable. Standards define performance criteria that are, by definition, achievable or attainable in practice. The ways in which criteria will be used in practice for judging, for example, all degrees of achievement between the minimum standard and the highest standard that could realistically be achieved, should be negotiated (Saul 2004:44).

- **Relevant**

  Criteria need to be relevant. The criteria that are being negotiated by common consent need to be relevant to the stated outcome (Saul 2004:45).

- **Timely**

  Criteria need to be timely. A specific timescale should be included for the achievement of a particular criterion wherever this might be appropriate. An example of the importance of a time specification in a criterion is contained in a statement such as, for example, "This treatment should be administered once every four hours"(Saul 2004:45).

- **Effective**

  Criteria need to be effective. A criterion statement should describe care that is effective and that is based on the best available current scientific evidence. Effective care may be based on general agreement about what constitutes best practice rather than on the results of research studies (Saul 2004:46).

- **Research**

  Criteria need to be squarely based on the evidence of credible research and on the professional, legal, statutory and ethical consensus of the society (or the group of the society) in which they operate. Saul (2004:46) asserts that both standards and criteria should be theoretically sound. This requirement is reflected in the following statements:

  o Clinical criteria should, wherever possible, be based on reputable research findings.
  o Criteria should reflect the professional code of conduct that has been drawn up by the professional body that controls the profession.
  o Criteria should comply with the legal and statutory requirements of the profession concerned and the society in which the profession operates.
  o Criteria should comply with the ethical standards that have been promulgated by the statutory body that sets standards for the profession.

The researcher devised the criteria for this study in order to assess the vital data and biochemical values of a sample of patients in order to be able to observe deviations from normal or standard values and so to be able to identify all signs of incipient physiological deterioration in patients. The researcher also used clinical markers and quick response parameters as criteria for recognising the onset of patient deterioration so that the Outreach for intervention could immediately be activated (see table 4.2 and table 4.3 in chapter 4).

2.2.1.5   *Indicators*

The Oxford English Dictionary (2005:759) defines an *indicator* as an object or sign that indicates the position or presence of something or the direction in which somebody is to go. Idvall, Rooke and Hamrin (1997:6) define a clinical indicator as "a quantitative measure that can be used as a guide, to monitor and [to] evaluate the quality of important patient care and [to] support service activities".

- **Type of indicators**

One widely accepted and useful method for categorising indicators of healthcare quality is the approach that was first popularised by Donabedian in his model that utilises the concepts of structure, process and outcome (Donabedian 2003; Donabedian, 1980).

The first two elements are indirect measures that determine the third direct element, namely *outcome*. Even though all these elements are inextricably linked with one another, a comprehensive evaluation of just one of these three elements is insufficient to measure and evaluate the overall quality of the phenomenon that is being evaluated (Postema 2005:1).

- **Structure indicators**

    Structure indicators enable one to assess the characteristics of a healthcare system that affect the system's ability to meet the healthcare needs of patients or a community. Three examples of structure indicators are the nurse-to-bed ratio in a particular hospital, whether or not it is appropriately equipped for its tasks, and the quality of the resources that have been made available to it for the achievement of its goals (Postema 2005:1).

- **Process Indicators**

    Process indicators are defined as some of all the activities and communications that take place between institutional team members and patients. Process indicators are used to assess what a healthcare provider has done for a patient and how well it was done (Postema 2005:1).

- **Outcome indicators**

    Outcome indicators define the effects (outcomes) of the preliminary processes on the health and well-being of both employees and consumers. Donabedian writes: "Outcome means a change in a client's current and future health status that can be attributed to antecedent healthcare" (Donabedian 1966: 166).

2.2.1.6   Targets

When standards are described in terms of this model (Donabedian 1981:106), it is usual to set the target at either 100% or 0%. This means that a standard statement refers to something that you will *always do* (100%) or *never do* (0%). In certain circumstances, however, this kind of formulation may be inappropriate and unusable, particularly when one is writing about standards for outcomes. When setting targets or standards for outcomes, their formulation is usually more complex and relative. When describing standards for wound infections, for example, the available evidence suggests that a national rate of 5% should be set as the target.

2.2.2 NHS clinical governance model

The NHS clinical governance model is constructed in terms of four key attributes, namely recognisably high standards of care, transparent responsibility, accountability for standards, and a constant dynamic of improvement.

Figure 2.2 (below) depicts an outline of the NHS clinical governance model.

Continuous process for clinical governance

NHS Clinical governance model outline (2.2.1)

    Introduction (2.2.1.1)

    NHS clinical governance components (2.2.1.2)

- Patient and professional partnership
- Seven pillars
  - Clinical effectiveness
  - Risk management effectiveness
  - Patient experience
  - Communication effectiveness
  - Resources effectiveness
  - Strategic effectiveness
  - Learning effectiveness
- Culture components
  - System awareness
  - Teamwork
  - Communication
  - Ownership
  - Leadership
  - Patient and public involvement

Assessment of NHS clinical governance model (2.2.1.3)

- Strategic capacity
- Resources and processes
- Use of information
  - Learning, innovation and improvement
  - Strategic capacity
  - Resources and process
  - Use of information
  - Results: Patient experience and outcome

Clinical audit (2.2.1.4)

- Stage 1: Need for change
- Stage 2: Establish criteria for best practice
- Stage 3: Measure current practise
- Stage 4: Feedback findings and set target
- Stage 5: Implement change
- Stage 6: Re-evaluate practice and feedback

Continuous process for clinical governance

Standards of HNS clinical governance model (2.2.1.5)
- Standard setting
- Patient and public involvement
  - Clinical effectiveness
  - Risk management
  - Nursing personnel management
  - Education, training and professional development
  - Use of information

Criteria (2.2.1.6)
- Structure criteria
- Process criteria
- Outcome criteria
- Patient and public involvement
- Clinical effectiveness
- Risk management
- Adverse clinical incidents
- Compliments and complaints
- Professional development
  - Education, training and professional development
  - Use of information

Indicators (2.2.1.7)
- Quality indicators
- Patient safety indicators
- Clinical indicators
- Outcome indicators
- Nursing-sensitive indicators
- Performance indicators

NHS performance rating system (2.2.1.8)
- Professional development
- Use of information
- Key performance indicators

Targets (2.2.1.9)

⬇

The application of this model is
Quality of care

Figure 2.2   NHS clinical governance model outline

2.2.2.1 *Introduction*

Donaldson and Gray (1998:37) define clinical governance in the following words:

> [Clinical governance is a] framework through which NHS organisations are accountable for continually improving the quality of their services and safeguarding high standards of care by creating an environment in which excellence in clinical care will flourish (Donaldson & Gray 1998:37).

According to the DoH of the UK (2004:37), the word *governance* describes as a mechanism as an organisation can use to demonstrate its accountability for the way in which it manages itself. Campbell, Braspenning, Hutchinson, and Marshall (2003:816) have noted that quality improvement forms part of the daily routine for healthcare professionals, and that it its pursuance is a statutory obligation in many countries. According to Pickering and Thompson (2003:5), people have ideas about what *practice-related quality* means. The *manager* is a person who is ultimately responsible for the efficient use of resources and the targets that a service has to meet. The *people who use the service* are concerned with how effective a treatment or intervention is for them personally, and in the difference that it might make to their quality of life. It is therefore important for an organisation to make quality visible to all who work in and make use of its services.

Pickering and Thompson (2003:7-8) state that the concept of quality has tended to become associated with auditing, with quality assurance and with total quality management. For those who understand the achievement of quality in this way, these goals are synonymous with rigorous monitoring, with the identification of problems, with the setting of standards, with life-long learning and with continuous professional development. According to Tomson and Berwick (2006:551), medical errors, a proliferation in costs and evidence of overspending on healthcare provided some of the numerous reasons why healthcare organisations were compelled to focus their

intentions on the ways in which they would improve their overall performance in the management of their finances. This created a salutary impetus for those who wish to effect changes and increase efficiency. In order to re-establish the confidence and trust of the public and of the professionals who work in healthcare, the NHS put systems in place that dominate current thinking about how to manage the quality of care.

Pickering and Thompson (2003:8-9) confirmed that if improvements in the quality of health care were essential, health professionals needed to participate in a continuous quality improvement service that involved the implementation of processes and mechanisms for management – both of which are difficult to identify and measure.

Pickering and Thompson (2003:8-9) are of the opinion that one of the most effective ways of measuring quality is simply by asking people how satisfied they are/were with the service that they received. Satisfaction, like quality, is a subjective judgment that reflects people's hopes, expectations, values and beliefs – both as individuals and as members of society.

2.2.2.2   NHS clinical governance components

For the purpose of this study, the components of the NHS clinical governance model components that were used are illustrated in figure 2.3. What now follows is a brief description of the components of this model for the benefit of the reader.

Nicholls et al. (2000:175) have devised a "temple" model that sets out the components that are necessary for successful clinical governance. Each of these components will now be described in turn.

Patient–Professional Partnerships

Clinical Effectiveness

Risk Management Effectiveness

Patient Experience

Communication Effectiveness

Resources Effectiveness

Strategic Effectiveness

Learning Effectiveness

CULTURE COMPONENTS

| System Awareness | Teamwork | Communication | Ownership | Leadership |
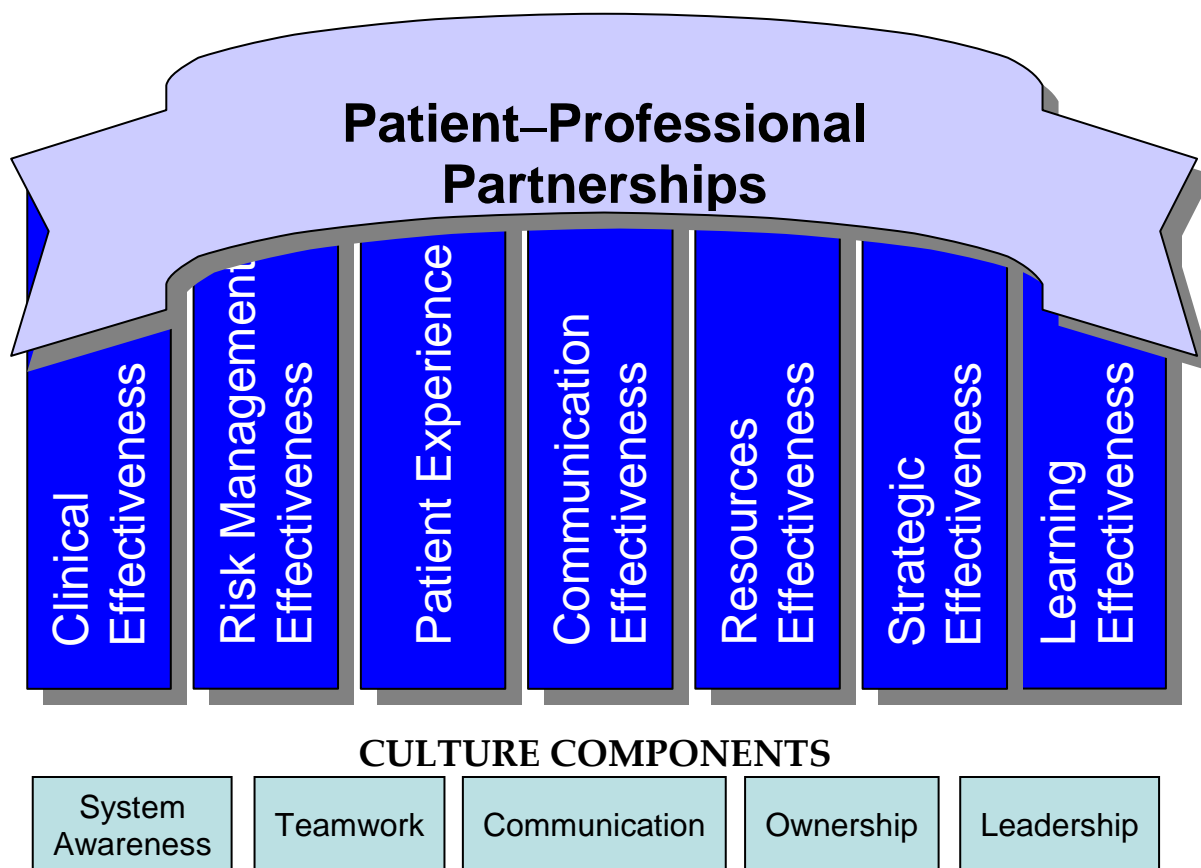
Figure 2.3   The "Temple" paradigm

Source: Nicholls et al. (2000:175)

▪ **Patient and professional partnership**

The Royal College of Nursing (RCN) (1998:7) stated that clinical governance can only be successful if an effective relationship can be established between all the professional groups involved – between clinical nursing personnel and managers, and between patients and clinical nursing personnel. The involvement of the public and patients is an indispensable requirement for effective clinical governance.

According to the Scottish Government (2005: chapter 3), a partnership between healthcare providers and professionals enables the organisation to understand a person's condition and to make correct decisions about treatment and care. Weston

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(2001:438) has produced evidence that the involvement of patients (or patient-centred care) are associated with improved patient outcomes, better emotional health and a more satisfactory patient experience of the healthcare system.

- **The seven pillars**

It is a function of the "pillars" of the temple to support the patient-professional partnerships that enable sound clinical governance (see figure 2.3 above).

- **Clinical effectiveness**

NHS Scotland (2007: section 2: b) stated that clinical effectiveness has been widely used to improve the quality of healthcare treatments and services since the late 1980s. Pratt, Morgan, Hughes, Mulhall, Fry, Perry, and Tew (2002:17) define *clinical effectiveness* as the extent to which specific clinical interventions actually achieve what they were designed to achieve. Pratt et al. describe clinical effectiveness as:

- o the right person (*you)* doing
- o the right thing (evidence-based practice)
- o in the right way (with the necessary skills and competence)
- o at the right time (by providing treatment or services when patients need them)
- o in the right place (the location of treatment or services)
- o with the right result (clinical effectiveness and the maximisation of health)

According to NHS Scotland (2007:section 2:b), clinical effectiveness consists of thinking critically about what you are doing, questioning whether it is creating the desired result, and making whatever changes might be necessary to achieve the desired result. Clinical effectiveness is based on a consideration of what is effective in order to improve patient care and experience. In addition, NHS Scotland (2007:

section 2: b) states that clinical effectiveness is a measure of the extent to which a particular intervention actually *works*. Evidence-based clinical practice is an approach to decision-making in which the clinician uses the best available evidence to select an option that will best suit the needs of the patient.

Scally and Donaldson (1998:61-65) point out that while the measure on its own is useful, it may be improved by considering whether the intervention is appropriate to the circumstances and whether it is cost-effective.

- **Risk management effectiveness**

Because modern healthcare systems are highly complex and convoluted, mistakes can generally be attributed to organisational, technological or human errors. Risk management is a key element in proactive prevention and control strategies because of failure to control potential crises such as the emergence of rampant or drug-resistant infections can have disastrous consequences for healthcare organisations, practitioners, and for the patients themselves. Errors and accidents can maximise discomfort, deplete financial reserves, result in a loss of jobs and vocations, and, in the most extreme cases, be a cause of avoidable human deaths.

According to NHS Scotland (2007:section 3:c), a proper understanding of risk management enables NHS Boards to accept their statutory responsibility for managing and monitoring health and safety as well as corporate and clinical risks in their organisations. Risk management is a standardised set of protocols that are applied in business and industry to reduce the incidence of injuries, errors, faults and accidents while, at the same time, improving quality.

The National Audit Office (NAO) (2003:28) state that the ongoing cycle of risk management involves a continuous and systematic assessment of the factors that are able to give rise to avoidable risks, as well as an assessment of the methods that have

been put in place to control such risks. The effective reporting of adverse events, errors and "near misses" is essential for the ongoing identification of risks and for developing risk-management responses. Risk management is a highly important component of clinical governance that allows organisations to effect changes in practice and improvements in patient care. The adoption of a "fair blame" culture that analyses all incidents in terms of "What went wrong?" rather than "Who was wrong?" is a sound response to a problem because it serves to warn people to be careful not to repeat the same mistakes in the future.

- **Patient experience**

According to the NHS (2004:14), "users and their healthcare providers should have choice, voice and control over what happens to them at each step in their care". The values of humanity, respect, justice, empowerment and partnership that underpin clinical governance should be reflected in every aspect of the patient experience.

Pratt el al. (2002:18) note that the participation and involvement of patients in their own care can make a powerful impact on the quality of that care and on patient outcomes, and that it can effect improvements in the quality of a patient's life and shorten periods of hospitalisation. Since clinical governance aims to change the culture of an organisation, it strives to make an organisation more patient-centred. According to NAO (2003:23), the NHS developed a system of soliciting feedback from patients and from the public about the quality of the service that is being delivered by their hospitals.

According to DoH of the UK (2001), cited by the NHS (2004:16), the NHS is therefore moving towards a patient-centred system in which the voice of the patient can be heard at every level of the service, and in which the opinions of patients and the public act as a powerful lever for effecting change and improvements. The goal of the NHS is to move away from a paternalistic model of decision making towards a partnership model in which citizens form more meaningful relationships with their

local services and in which they have a say in how services are designed, developed and delivered.

- **Communication effectiveness**

Pratt el al. (2002:18) note that the effectiveness of clinical governance depends largely on communication skills and, more specifically, on healthcare providers who have the ability first to understand others and then to move people from understanding to active involvement and commitment. The key to mutually beneficial partnerships and clinically effective care is good communication. Wherever communication is poor or even non-existent, the utility and effectiveness of treatments are significantly reduced and the experience of patients is generally disappointing and unsatisfactory.

NHS Scotland (2007:section 4:d) states that communication creates links between every part of the healthcare system and every health-promoting practice. Even though being able to communicate effectively with patients and their carers when they are anxious and vulnerable is a difficult skill, it can be improved by constant practice and with thoughtful care and attention. A failure to communicate can exert a very decisive impact on an individual's experience of treatment and general wellbeing. Effective communication at all levels of healthcare is therefore an essential skill.

NHS Scotland (2007: section 4: d and e) expects its employees to be proficient in the skills that constitute good communication. These skills are openness and honesty, the use of language that is appropriate for each group or individual, sensitivity and understanding, the use of appropriate methods of communication for particular situations or individuals, being able to listening attentively and without interruptions to what is being said, being sensitive to the reactions of others and being able to provide effective feedback to whoever needs it. A patient-focused NHS

therefore emphasises the maintenance of good communications (including listening and talking to patients, public and members of different communities), becoming acquainted with those who use their services and being able to understand the particularity of their needs, being able to keep the consumers of services properly informed and involved, adopting clear and explicit standards of service, maintaining politeness and mutual respect (even in difficult circumstances), having the ability to respond flexibly to the specific needs of individuals, being able to ensure that effective action is taken to improve services wherever such improvement is required, and being able to talk to users, the wider public and members of different communities without condescension or superiority. All of these principles are incorporated into training and development activities.

- **Resources effectiveness**

Clinical governance is about quality. Pratt et al (2002:19) point out that good quality services are resource-effective and cost-effective in the long run because the waste and failure that result from poor quality services and goods can add 10% to 35% to the cost of healthcare. If there is reliable evidence about the efficacy of improving quality, the evidence has to be made available to practitioners so that they can incorporate it into clinically effective practice. Pratt et al. (2002:20) have noted that surveillance systems that monitor patterns and trends represent one method of promoting resource effectiveness because a careful analysis of feedback allows clinicians to investigate situations that have run out of control before they institute remedial interventions.

- **Strategic effectiveness**

Pratt et al. (2002:20) note that strategic effectiveness is dependent upon the attitude that a service or an organisation takes towards the future and the mechanisms that they develop to deliver their agenda and their outcomes. The government's strategic

plan for the NHS reaffirms the continuing importance of clinical governance in the development of a culture that is focused primarily on its patients as consumers of healthcare. This focus encourages the NHS to work across traditional organisational boundaries.

- **Learning effectiveness**

Pratt el al. (2002:22) state that clinical governance is about creating a "learning" environment. Continuing professional development underpins the delivery of quality service by encouraging professionals to take all opportunities to improve their skills and knowledge base. Continuous professional development is therefore effective in bringing about change.

▪ **Culture components of NHS clinical governance model**

Underpinning the successful implementation of clinical governance is an awareness of the need to establish solid foundations for the construction of a culture of clinical governance. The five cultural components of clinical governance are systems awareness, teamwork, communication, ownership, and leadership (Nicholls et al. 2000:175). Davies, Nutley and Mannion (2000:111) point out that these cultural components represent the areas in which "beliefs, attitudes, values, and norms for behaviour" are shared.

Nicholls et al. (2000:173) believe that only systemic cultural changes can enable organisations to deliver a sustainable, accountable, and patient-centred form of healthcare. The challenge is therefore to construct a non-blaming, learning, and development culture on a basis of system awareness, teamwork, participation in communication and leadership.

According to Davies et al. (2000:111), an improvement-focused approach to quality in healthcare needs to create an enabling culture that celebrates success and learns from mistakes if it envisages measurable improvements in clinical governance. Clinical governance also represents a culture shift in that it moves away from the dynamics of a blame culture and attempts to create a culture in which active learning and attentive listening are much in evidence and in which an attitude of questioning that promotes a spirit of learning and development among all role players is encouraged. Nicholls et al. (2000:174) state that they are steadily moving toward a reflective, non-blame culture in which questions such as "What went wrong?" rather than "Who was wrong?" are the first response to a problem, and in which the same mistakes are not monotonously repeated by different people on a regular basis.

- **System awareness**

Nicholls et al. (2000:175) are of the opinion that it is most often a system that fails rather than individual human beings. Effective management aligns itself naturally with people and patient flows because effective managers desire to promote the centrality of the consumer and to understand the significance of the interconnections that operate throughout the system. Clinical governance provides opportunities for reviewing and streamlining activities and procedures because it is intent on eliminating components that (at best) add no value and (at worst) cause palpable and measurable harm.

- **Teamwork**

In the understanding of Nicholls et al. (2000: 176), effective *teamwork* will result in experienced and multidisciplinary teams that have the potential to leverage desirable changes in the system. As teams grow and develop, they become able to both deliver and drive improvement initiatives that focus on quality. Since all the members of the team are aware of what others are striving to achieve, they become

more and more aware of how dependent they are on one another to achieve the goals that they set for themselves.

- **Communication**

Nicholls et al. (2000: 176-7) take note of the fact that communication in a system as complex as the average healthcare service, a great deal of effort is expended in passing information from those who have it to those who need it. As the organisation redesigns its systems, they will also need to incorporate methods of communication that will enable the transmission of accurate, accessible, and timely information.

- **Ownership**

Ownership is concerned with the degree to which nursing personnel actually participate in all important developments. It refers to the creation of a working environment that supports individuals so that all individual professionals and teams become empowered to own, and therefore to solve, problems.

- **Leadership**

According to Halligan and Donaldson (2001:1414) effective leadership creates a culture in which the vision, values, and methods of clinical governance are effectively communicated to all nursing personnel. Effective leadership empowers teamwork and ensures that clinical governance remains an integral part of every clinical service. While an effective leader understands the importance of what is happening in the present, he or she also has an ability to inspire colleagues and co-workers to focus on the needs of the future and thus to contribute towards the realisation of a common vision. Nichols et al. (2000: 176) state that people who work within functional systems need to be empowered and supported so that they will be encouraged to grow, to increase their

wisdom and knowledge, and learn how to apply the lessons that they have learned from experience.

- **Patient and public involvement**

Although the model also addresses the involvement of both the patient and the public, these items are not relevant to this study.

2.2.2.3 *Assessment of NHS clinical governance model*

The NAO (2003:37) states that the Commission for Healthcare Improvement (CHI) uses a systematic framework for assessing clinical governance.

The CHI evaluates clinical governance by exploring the following three key areas: strategic capacity, resources and processes, and the use of information.

- **Strategic capacity**

  CHI investigates whether leaders have determined a clear and specific direction that focuses on patients, and how well this attitude has been integrated into the organisation.

- **Resources and processes**

  CHI determines the robustness of processes that are used for achieving improvements in quality. These processes include consultation, patient involvement and clinical audit. The question that should be asked to is: "How effective are the trust's arrangements for nursing personnel management and development?"

- **Use of information**

  CHI monitors the quality of information that is made available about patient experiences, outcomes, processes and resources, and asks whether the trust uses this information strategically in order to promote quality patient care.

CHI of NHS in the UK (2000:172) uses clinical governance in the organisation to systematically collect information and review the problems that affect each component of clinical governance. Figure 2.4 depicts the clinical governance assessment model.
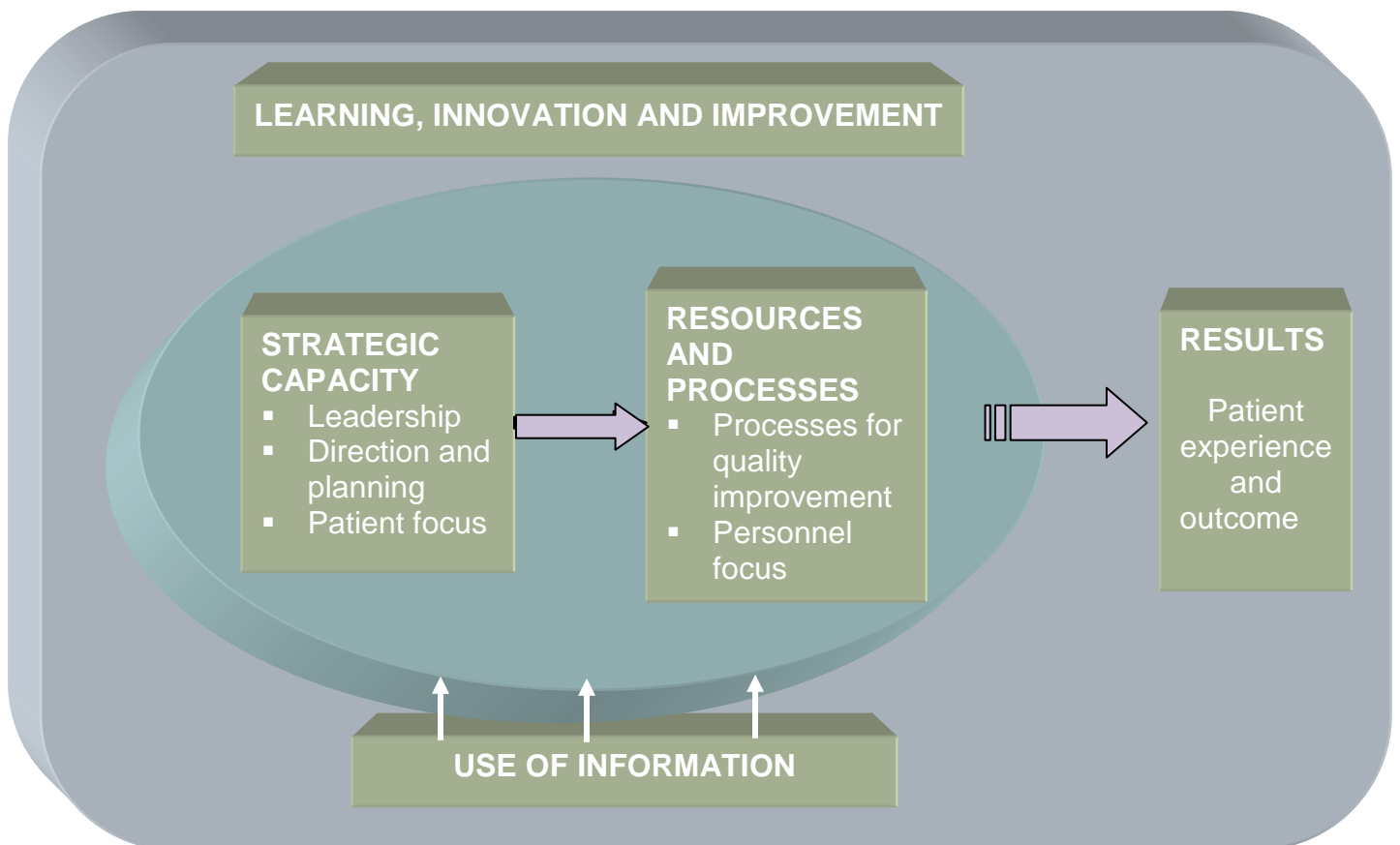

Figure 2.4   Clinical governance assessment model
Source: National Audit Office (2003:37)

- **Learning, innovation and improvement**

The CHI assessment model for clinical governance illustrates its commitment to the belief that effective clinical governance depends upon the establishment of a culture

of continuous learning, innovation and development, and the fact that it improves the experiences of care and treatment that patients have in hospitals.

- **Strategic capacity**

According to NAO (2003:37) and CHI (2000: 172), *strategic capacity* refers to the way in which the leaders of an organisation function to set clear goals such as the importance of focusing on patients and the need to integrate clinical governance throughout an organisation. Correct strategy and implementation mean that the organisation has comprehensive systems and processes in place to ensure that the quality of care and services are adequate. The *strategy* of an organisation refers to systems for improving the quality of care and services by means of systematic learning and development.

- **Resources and process**

The NAO (2003:37) and CHI (2000: 172) are illustrated in the model of resources and processes, which reveals how effective nursing personnel management and development together with robust processes for achieving quality improvement such as clinical audit and risk management work together to achieve their goals.

- **Use of information**

According to NAO (2003:37) and CHI (2000: 172), it is important for an organisation to construct information and to use it strategically. This involves a systematic collection of information about patient experiences, outcomes, processes, and resources. It is vitally important to use this information to support clinical governance and healthcare delivery.

NHS clinical governance models are predicated on the belief that the correct use of information can lead to beneficial changes in organisational strategy and training programmes, and ultimately therefore to improved patient outcome and experiences.

- **Results: Patient experience and outcome**

The outcome is represented by the results of the strategic capacity and the processes that are used in the delivery of healthcare. Nicholls et al. (2000: 172-178) believe that effective clinical governance depends upon a culture of continuous learning, innovation, and development, and that it improves patient experience and outcomes.

2.2.2.4 *Clinical audit*

Although *clinical audit* is not included in the temple paradigm in figure 2.3, the clinical audit is the component of clinical governance that offers the greatest potential for establishing and maintaining quality of care, and is actually referred to as "the heart of clinical governance systems" by NICE (2002:vi).

In this study, the clinical audit played a central role in identifying the increases in the number of patients that were being transferred to a higher level of care. A clinical audit refers to a review of clinical performance and records, and can result in the refinement of clinical practice as performances are measured against agreed standards. The clinical audit is therefore a foundational component of the cyclical process that leads to the improvement of the quality of clinical care.

- **Clinical audit cycle**

Figure 2.5 depicts the clinical audit cycle and reveals the different stages of the cycle.
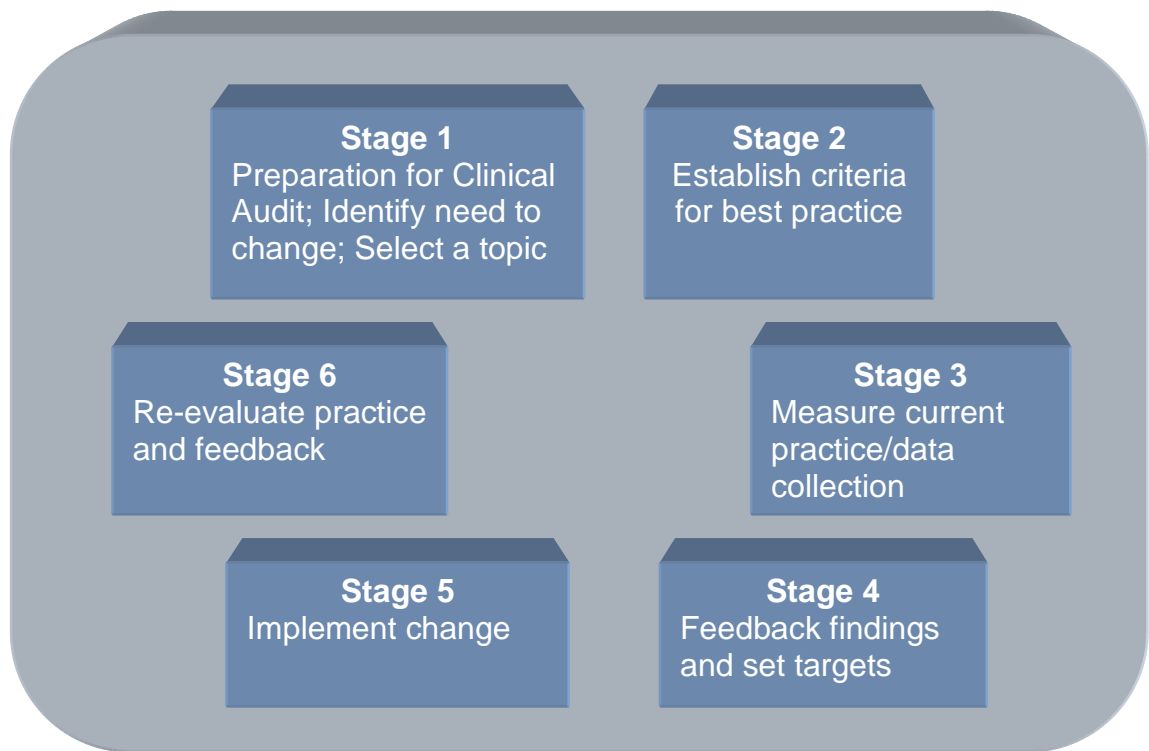
Stage 1
Preparation for Clinical Audit; Identify need to change; Select a topic

Stage 2
Establish criteria for best practice

Stage 6
Re-evaluate practice and feedback

Stage 3
Measure current practice/data collection

Stage 5
Implement change

Stage 4
Feedback findings and set targets

Figure 2.5   The clinical audit cycle

Source: Adapted from NHS (2005) and NICE (2002:5)

- **Stage 1: Establish the extent of the need for change**

According to NICE (2002:101), **a clinical audit** investigates the state of programmes and the effectiveness of their leadership, the extent of the participation of nursing personnel, teamwork, funding, and the degree of participation in a variety of topics, the involvement of clinicians, and the overall state of the organisation. A successful clinical audit requires a careful management of all the stages of audit and the adoption of established protocols to guide the phases of the audit. According to NHS (2005), stage one of the clinical audit involves identifying any **need for change** that may emerge from the personal experience of individuals or from problems that have been identified in everyday practice. Very often these problems are represented by an intuitive feeling that something could have – or should have – been done better.

Donabedian's model shows that problems can be identified in three basic areas of practice, namely structure, process and outcome.

- **Structure** refers to the input of care such as personnel, premises and facilities. An example relevant to this study could be identified by asking the question: "Are there sufficient numbers of nursing personnel and are their knowledge and qualifications adequate enough to enable them to recognise signs of patient deterioration?"

- **Process** refers to the provision of care (looking at what and how activities are carried out).

- **Outcome** refers to the result of a clinical intervention (what were the outcomes for the patient after activities were carried out by the nurse).

According to NHS (2005:1), stage 1 represents the identification of a problem, which, in turn, involves the **selection of a topic** that requires to be audited. This stage is likely to involve measuring the extent of adherence to specific healthcare processes that have been shown to produce the best outcomes for patients.

- **Stage 2: Establish criteria for best practice**

NICE (2002:22) defines *criteria* as a systematically developed statements that enable workers to achieve a standard (in this case, the broad objectives of care) and to evaluate whether or not the goal represented by this standard has been achieved or not. Criteria also enable personnel to assess the appropriateness of specific healthcare decisions, services, and outcomes. The following definition of *best practice* has been adapted from Donabedian's model of structures, processes, and outcomes of health care: *A best practice is a process that has been demonstrated to produce superior results, such as better patient outcomes.*

NICE (2002:22-23) notes that criteria can be classified into structure (what you need), process (what you do), and outcome of care (what you expect).

- **Structure criteria** refer to the resources required to deliver superior health care. These resources include a particular number of nursing personnel who possess the necessary combination of skills and knowledge, and also to the provision and adequacy of equipment, and the amount of physical space for the processes involved in health care to take place without environmental interference or stress.

- **Process criteria** refer to the actions and decisions taken by healthcare providers in conjunction with healthcare users. Such actions may include communication, assessment, education, investigations, prescribing, surgical and other therapeutic interventions, evaluation, and documentation. It has been argued that the use of process criteria encourages clinical teams to concentrate on the things they do best, and this contributes directly in the long run to improved health outcomes.

- **Outcome criteria** are usually measures of physical or behavioural responses to interventions and levels of knowledge and satisfaction.

Decisions about the overall purpose of the audit (in the context of the results that one hopes the audit will achieve and the questions that need to be answered by the audit) should all be formulated (written) as a series of statements or tasks. Collectively, these statements and descriptions are adapted to function as the *criteria* that will be used in the audit. These criteria are explicit statements that define exactly what is being measured and therefore represent elements of care that can be objectively measured. These *standards* define the way in which some aspect of care and be measured, and they should always be based on the best available evidence.

- A *criterion* is therefore a measurable outcome of care, an aspect of practice, or a capacity.

- A *standard* is the threshold of expected compliance defined by each criterion (compliance with these standards is usually expressed as a percentage).

- **Stage 3: Measure current practice (data collection)**

The third stage of a clinical audit is the process of data collection. According to NHS (2005:1), if one wants to be certain that the data will be collected in the form of precise and essential information, exactly what it is that needs to be audited must be derived from the outcome. One therefore needs to consider precisely what data will be collected, where such data will be found, and who will collect the data. Ethical issues should always be taken into account during the processes of data collection.

- **Stage 4: Derive findings from feedback and set targets**

In this stage, the researcher assesses performance in terms of predetermined criteria and standards. According to NHS (2005:1), this is the analysis stage, the stage in which the results of the data collection are compared with the predetermined criteria and standards. The final stage of analysis is involves a decision about how well the standards were met and, if applicable, an identification of reasons why the standards were not met in all cases. It may indeed be decided that certain standards were not met because of reasons that are acceptable. This information could be inserted as exceptions to the criteria for future standards, or else they will suggest measures that could result in improvements.

- **Stage 5: Implement change**

NHS (2005:1) states that once the results of an audit have been published and discussed, agreement must be reached about recommendations for change. These agreements should include the designation of a particular person who will be responsible for the changes as follows an agreed timescale for their institution. NICE (2002:101-104) mentions that changes that are implemented with a view to improvements in patient care need to be monitored, evaluated, sustained, and reinforced within a supportive environment. Structures and systems need to be

developed to enable organisations to integrate improvements within a planned strategy. The culture of the organisation needs to encourage sufficient confidence in their nursing personnel so that they are not fearful about reporting or confronting inadequate performance and personnel. Such nursing personnel will always operate from a base of clearly defined and constant objectives.

- **Stage 6: Re-evaluate practice and feedback**

A subsequent re-audit should be able to show that the intended changes have been properly implemented and that improvements (where demonstrable) have been effected. Re-audits sustain improvements because they indicate the seriousness with which change is desired. NHS (2005:1) states that an audit should be repeated after an agreed interval.

2.2.2.5 *Standards of NHS clinical governance model*

The Oxford English Dictionary (2005: 1438) defines a standard as "a level of quality or excellence that is accepted as the norm or by which actual attainments are judged". The DoH of the UK (2004) stated that standards can be used as a means for describing the different kinds of quality that healthcare organisation are expected to meet or to aspire to. The performance of a particular organisation can be assessed in terms of these standards of quality.

The NICE (2002:22) defines a *standard* as the level of care that has to be achieved to meet a particular criterion, as well as an objective (along with guidance about how to achieve it) in the form of criteria that specify the required resources and the activities that have to be performed in order to achieve outcomes.

- **Setting standards**

According to the DoH of the UK (2004:1) and the NHS, the setting of *standards* represents the most important means that can be used for effecting and measuring continuous improvements in quality. Whether or not the standard that has been set will be achieved ultimately depends on resources such as the combination of skills that are available in the organisation's personnel, the ratio of desired skills to the number of nursing personnel employed by the organisation, and other factors such as the state of the organisation's finances, the education of its personnel, and the availability and quality of equipment within the organisation. Standards on their own can only provide the operational framework within which improvements can be effected if all the necessary conditions and requirements can be met.

NHS set standards for each of the seven following components: patient and public involvement, risk management, clinical effectiveness, staffing and nursing personnel management, education, training and continuous professional development, and use of information. Each of these will now be described in turn.

- **Patient and public involvement**

Although the NHS model also addresses matters of patient and public involvement, these are not relevant to this study. NHS clinical governance sets standards which, if they can be made, will empower both patients and the public.

- **Clinical effectiveness**

According to NHS (2004:34), clinical effectiveness is an essential component of clinically facilitated care and is, to some extent, a product of clinical governance in action. In clinically effective care:

- patients become active partners in the care process

- processes are characterised by humanity and by compassion

- all clinical risks are identified, managed and minimised

- the outcomes of research and of training are routinely implemented

- one finds routinely high levels of concordance between treatment and the conditions for which patients are hospitalised

- efficacy is justly and transparently balanced against cost

NHS (2004:34-35) also maintains that clinical effectiveness is a significant contributor to the most prudent and equitable use of financial and scarce resource. Such judgments take into account the total costs for which the taxpayer, ultimately, will be liable. Wherever necessary, clinical effectiveness challenges long-established clinical habits and shares the lessons that are learned from such a investigations.

The RCN (1998:7) notes that if one wishes to ensure that superior standards of clinical effectiveness are met in the provision of care, advice, and standard operating procedures, all the relevant protocols have to be put in place. Clinical standards incorporate clinical guidelines, pathways, policies, and standard operating procedures that are based on quality-of-evidence criteria. Key standards needs to be clearly defined and communicated so that all nursing personnel understand their relevance to the work that they are required to do. Even though clinical governance does not replace the requirement for individual clinical judgement and professional self-regulation, it complements these and provides a framework within which they can operate.

- **Risk management**

Scally and Donaldson (1998:61-65) provide risk management into the four following categories:

- *Risks to patients*: Proper compliance with statutory regulations can serve to minimise risks to patients. In addition, patient risks can be minimised if one ensures that systems are regularly reviewed and interrogated by means of, for example, critical event audits and discussions about what has been learned from legitimate complaints.

- *Risks to healthcare providers*: The minimisation of this category of risk helps to ensure that clinicians are able to work in safe environments. It requires clinicians could be kept up to date with significant developments in the field of quality assurance.

- *Risks to the organisation*: Standards that enable poor quality threaten the integrity of any organisation. Organisations need to reduce their own risks by insisting on the implementation of high-quality employment practices (including locum procedures and reviews of individual and team performances), the maintenance of a safe environment, and the production of carefully thought considered and well-designed policies.

NHS (2004:24) insists that an optimal organisational culture is one that promotes the identification of emergent clinical errors, serious and untoward incidents and "near misses" so that all of the parties involved will be able to learn from such events and implement whatever measures might be needed to improve systems, processes and procedures.

- **Nursing personnel management**

Scally and Donaldson (1998:61) suggest that all existing methods of improvement, such as the utilisation of research findings in practice, the education and training of healthcare professionals, the measurement of performance against standards, and learning how to respond to and deal with complaints from patients, should be brought together under the aegis of clinical governance. Other ways in which standards in clinical government are managed include the remediation of poor performances, the

management of risks, clinical supervision, a consideration of what excellent supervision might mean, and the cultivation of leadership skills in the context of practice and clinical audits.

The organisation manages nursing personnel performance in terms of organisational and workforce development and appraisals that have been carried out according to set standards. NHS organisations have introduced performance rating systems as a way of acquiring quantitative and qualitative summaries about the overall performance of particular organisations. By making these appraisals and ratings available to the public, the state that the public has in standards of performance is tacitly recognised. The assessment of performance in terms of set standards makes it clear how well (or otherwise) organisations have performed in terms of the specific standards, criteria and targets to which they have committed themselves.

- **Education, training and professional development**

In the rapidly changing clinical and technological environment that characterises the modern environment, it has become increasingly clear to all professional bodies that the foundations that are first laid by basic professional education need to be reinforced and strengthened by regular, systematic and continuous in-service education and training throughout the course of all professional careers.

The DoH of the UK (1998:1) licences various bodies and organisations to provide the necessary continuing education that is a compulsory requirement for all members who wish to renew their official annual registration with the statutory body that controls their particular professions. These requirements encourage professionals to expand their knowledge base and to remain up to date with new developments. It is no longer considered to be an acceptable practice for any clinician to abstain from participating in opportunities for obtaining continuing education qualifications or credits because so much of what is learned during basic training (or even from year to year) rapidly

becomes outdated and redundant in professional cultures that are expanding the scope of their practice at an exponential rate. While the NHS has designated the continuing professional development of clinicians as their own responsibility, it nevertheless also requires all professional clinicians to remain up to date with all the most recent and developments in their sphere of practice and theory.

Any organisation should be able to guarantee that all their employees are provided with the necessary information, resources, training and professional development that they require to support the organisation's clinical governance activities. Whether or not an organisation has complied with this requirement can be determined from its training records. Training records are properly stored, monitored and reviewed. Unsatisfactory attendance rates are rectified and induction (orientation) programmes are organised for all new nursing personnel. These programmes provide an overview of the organisation, its mission and purpose, its forms of clinical governance, its policies and the strategies that it uses to accomplish its aims.

Scally and Donaldson (1998: 61-65) point out that it has always been good professional practice if an organisation seeks to effect desirable changes in the light of evidence that emerges from investigating studies and in-depth research. Techniques such the development of guidelines, protocols and the implementation of strategies all represent instruments for promoting changes that are indicated by research practice and studies.

Organisations need to develop systematic methods for identifying the **training needs** that are implied by their clinical governance priorities. Organisations can also identify training needs from other elements of clinical governance such as audits, clinical risk management and clinical effectiveness activities.

- **Use of information**

Halligan and Donaldson (2001:1416) are of the opinion that a health organisation has to establish a culture of clinical governance that will enable it to develop excellence in the selection, management, and effective use of information and data to support policy decisions and processes. Good data and information can be used to identify, for example, differences in outcomes, deficiencies in standards, comparisons with other similar kinds of service providers, and the acceptability or otherwise of timescales and schedules. This information is vital if the nursing personnel are to be kept informed about the standard of their performances and advised about where they might be room for improvement.

The researcher used various standards to develop a clinical audit system so that she would be in a position to monitor current practice and, ultimately, improve standards of patient care. She also developed a set of standards by means of an outreach programme to reach conclusions about existing resources and processes, the extent of ward nursing personnel's knowledge, and whether or not continuous professional development was taking place for the purpose of raising standards of care.

2.2.2.6 Criteria

The DoH of the UK (2004) defines *criteria* as the means for demonstrating compliance with stated standards and whether or not current performances are complying with those standards. An organisation establishes criteria in order to be in a position to say what they expect to be happening in any particular situation. A criterion can be devised for any aspect of care and can be used to assess quality and compliance.

A criterion is normally contained within a statement. The three criteria that were used as structure criteria, process criteria and outcome criteria are set out below. For the purpose of this study, only the following criteria are applicable:

- **Structure criteria**

  The vital data of all patients will be monitored on a four-hourly basis.

- **Process criteria**

  All high-risk patients with clinical markers that exceed the normal parameters will be reported to the outreach team for interventions so that the increasing number of transfers of in-patients to a higher levels of care can be forestalled.

- **Outcome criteria**

  Early interventions are required for all high-risk patients so that their deterioration can be arrested and so that the number of patient who are currently being transferred to higher levels of care can be prevented.

Pickering and Thompson (2003:11) noted that there was a general consensus about the criteria that were identified by all three groups when healthcare professionals, managers and patients were asked to evaluate the quality of care. There were, however, some significant differences in emphasis. Managers tended to focus on the importance of resource control while practitioners, patients and clients tended to lay more emphasis on the lack of necessary resources to meet the needs of patients and the standards of care that had been articulated prior to the inquiry.

In the research conducted by Pickering and Thompson (2003:11), care resources criteria referred to the human, environmental, physical/material, and financial factors that affect the quality of care, and suggestions for more nursing personnel, time and equipment were presented but all three groups of participants. The **process criteria** of care can be used to effect improvements in the way in which nursing personnel practise and in the abilities of practitioners to perform better – that is to say, "what they do and how they do it". The **outcome criteria** of care described the benefits that result from what is being done. Practitioners and managers tended on the whole to focus on the care process and on the outcomes of care. These are typically interpreted as the length

of stays in a hospital and inappropriate or inadvisable admissions. The patients in the research group were more interested in the first and second criteria.

- **Patient and public involvement**

Although the model also addresses patient and public involvement, these factors are not relevant to this study.

Pickering and Thompson (2003:11-12) state that if one wishes to effect particular improvements in the quality of care, when she be careful to involve "patient and service users in making decisions about their [own] care". This means listing to what they have to say and presenting them with choices in all stages of the care processes, But in order to make informed choices, patients have to be sufficient information to understand what is involved in the treatment that they are receiving. Pickering and Thompson (2003:11-12) are of opinion that it is vitally important to make it clear to patients and service users that their opinions had been carefully listened to and considered. It will also obviously encourage patients to continue to remain involved in their care and treatment if they are convinced that their opinions are important to those who are treating them. Pickering and Thompson (2003:34) observed that nearly all patients desired helpful information and wanted to be asked to make choices about the course of their treatment.

- **Clinical effectiveness**

Clinical effectiveness is a measure of the extent to which a particular intervention maintains and improves health and secures the greatest possible health gains from available resources. While this measure is useful in itself, it can be enhanced by considering whether the particular intervention that is being applied is appropriate and whether it represents good value for money (cost-effectiveness). Although all clinical practice needs to be refined in the light of emerging scientific evidence about

effectiveness, it also needs to be assessed in terms of its *efficiency* and safety for patients (NICE 2002:70).

According to NHS Scotland (2007 section 2: b) clinical effectiveness is comprised of a range of quality improvement activities and initiatives. These activities include evidence as well as guidelines and standards for identifying and implementing best-practice quality improvement tools (such as the clinical audit) for the review and improvement of treatments and services. Since reviews are based on input from patients, service users and personnel, and on evidence about incidents, "near misses", clinical risks and risk analysis, and outcomes from treatments or services, performance is measured in order to assess whether a team/department/organisation is achieving its desired goals and is being successful in identifying areas of care that need further research. Other quality improvement activities and initiatives are information systems that can be used to assess current practice and provide evidence of improvement, and also be used to assess evidence about whether particular services or treatments and the development and use of systems and structures that promote learning within an organisation, are cost-effective.

- **Risk management**

NHS Wales (2001:13) reports that risk management is a method for reducing risks, and that clinical risk management is concerned with reducing the risk of an unacceptable frequency of undesirable clinical events. Risk management involves the identification of risk, systematic assessment and reviews, and particular protocols for risk reduction and management. Organisations need to have a clear understanding of their high-risk areas of operation. The use of incident reporting to identify the frequency and intensity of risks, attention to complaints from clients and from the public, the provision of information that can assist organisations to assess levels of risk, and well-functioning information management and reporting systems, should all support the efforts of management to reduce risk to pay desirable minimum level.

- **Adverse clinical incidents**

NHS of Wales (2001:13) reports that in order to improve overall standards of health, an open, sharing and learning culture needs to be sanctioned and encouraged from the highest levels of healthcare management. Organisations need well-developed reporting mechanisms that will be able to provide feedback about the outcomes of incidents to the teams and personnel who were involved in particular incidents. They should also be asked to share the results of internal inquiries with the rest of the organisation and to ensure that continuous professional development, audit and complaints monitoring are geared towards increasing the likelihood that an error or a failure of the system will not occur again. Professionals should feel safe enough to reflect critically on their own practice and to admit their mistakes and shortcomings in an organisational culture that is based upon mutual professional trust and support. Such a cultural can only be based upon a clear rejection of the small-mindedness and pettiness there is inherent in blaming, self-justification and the vindictiveness of compulsive fault-finding and criticism. Such an approach should be fuelled by a desire to improve practice, to learn from errors (one's own and others') and to other professionals so that they will be able to avoid similar errors in the future.

- **Complaints and compliments**

NHS Wales (2001:14) points out that the NHS Cabinet Office defined *complaints* as "any expression of dissatisfaction that needs a response" and a *compliment* is "any expression of satisfaction that has been relayed to the organisation". The kind of information that is contained in complaints and compliments should be regarded as welcome feedback about the kind of service that one has provided – and this represents the best form of market research that is available because it has offered freely and spontaneously by the clients themselves. During the process of dealing with complaints, the organisation should also utilise the feedback contained in such complaints to its fullest extent. *Information* from an analysis of complaints can provide excellent insight into the need

for risk assessment and risk management, and can help service providers to identify potential risks. A thorough analysis of complaints will also provide opportunities for improved services, and lessons learned in this way should be shared freely across the organisation (and even more widely where applicable) so as to ensure that the information obtained from complaints can benefit the whole service. Analysis of this kind should also be incorporated into the *continuous professional development* programme. In the same way, a record should be kept of all compliments, and an analysis of such compliments are valuable for emphasising established areas of good practice and should be widely and freely shared with other professionals owe something one's own organisation and within the profession as a whole.

- **Professional development**

Criteria for professional development include evidence of nursing personnel development in clinical governance, attendance at workshops or seminars, the results of a training needs analysis, training course evaluation reports, and documented training and professional development programmes.

Scally and Donaldson (1998:62) assert that the key to how well an organisation rises to the challenges are reflected in the quality of the personnel of a healthcare organisation. This quality is reflected in three different ways. Firstly, the most importantly, it is reflected in good recruitment, in personnel retention, and in the purposive development of the personnel. Secondly, it is reflected in the support that personnel receive in skills training, in the use of the most widely used forms of contemporary information technology, and in access to evidence. Thirdly, it is reflected in the manner in which personnel participate in developing quality strategies and in the extent to which they are encouraged to look critically at existing processes of care and to find ways of improving them. Finally, it is reflected in whether or not personnel are valued as human beings and in whether or not they are explicitly informed of their value to the organisation. Explicit appreciation of personnel and of the contribution that they make

to an organisation is a common feature in all organisations that demonstrate a record of sustained excellence.

Halligan and Donaldson (2001:1416) state that systems that enable an investigator to assess and to examine concerns about a doctor or nurse's practice will enable poor performance to be recognised at an early stage so that it can be tackled by means of a range of flexible interventions that correct errors and contribute to organisational and personnel development.

- **Education, training and development**

Rosen (2000:551) states that evidence-based practice, audits and risk management mechanisms that monitor the outcomes of care and the extent of lifelong learning among clinicians, contribute to improvements in the quality and development of personnel. Halligan and Donaldson (2001:1416) add that health organisations need to plan exactly how they propose to develop the quality of their clinical services. Such a plan, they maintain, should be based on an objective assessment of the needs and opinions of patients, on an assessment of the extent of exposure to clinical risks, on an investigation into whether the organisation complies with regulatory requirements, on an assessment of the capabilities of nursing personnel and the unmet training needs of personnel, and on a realistic appreciation of how the current performance of the organisation compares with that being provided by similar services. Best practice standards are defined in terms of extent to which the organisation makes use of relevant and up-to-date forms of information technology, the regularity of education and training programmes, and the importance of is accorded to research and development activities. And all of these factors serve to strengthen and develop standards of quality assurance and quality improvement.

Halligan and Donaldson (2001:1416) note that the criteria that ordinary people use when they do extraordinary things are criteria that can be used by all nursing personnel

as they develop and make use of their full potential, which should always be aligned with the objections of the organisation. Education and training support the organisation's implementation of clinical governance so that knowledge, skills and best practice can all be reinforced in the workforce. The development of a dedicated and efficient workforce means ensuring that nurses feel valued and appreciated. This is accomplished by making sure that they are invited to participate in policy discussions about the development of clinical governance, and by making sure that they know that management is paying attention to their particular problems, and by soliciting their ideas and opinions for improvement and innovation. An effective workforce also requires appropriate and up-to-date technical support as they attempt, for example, to gain access to the best current evidence that is available to support their clinical decisions. The creation of a culture that is free from blaming and encourages the open and objective examination of errors and failures is also a key feature of services that are dedicated to quality improvement and to learning.

Halligan and Donaldson (2001:1416) have noted that a good service design always examines how the processes of healthcare delivery can be improved, expedited and made more efficient. In order to achieve this, delivery processes need to be coordinated and tested so that it can be demonstrated that they have the capacity to instigate and deliver trouble-free and timely services. Such delivery processes include patient and public involvement, clinical audits, risk management and the introduction of clinical effectiveness programmes. Field and Lohr (1990:37) state that the establishment of clinical guidelines provide criteria that assist practitioners and patients to make *evidence-based* decisions about appropriate treatments for specific conditions. RCN (2003:1) note that these guidelines do not supersede clinical judgment. Instead, they support health professionals to make complex decisions about necessary treatments. Such guidelines support nursing personnel in the development and improvement of patient care. Walshe (2001:250) points to the growing focus on clinical effectiveness and evidence-based healthcare, and has noted that an acceptance of the idea of quality improvement has became increasingly more widely accepted in the healthcare industry.

According to NICE (2006:1), clinical excellence also encourages an exchange of evidence-based research and practice and raises standards of care.

Halligan and Donaldson (2001:1416) point out that an ability to measure the quality of services is essential for the successful implementation of the kind of culture and ethos that supports clinical governance. According to NICE (2002:1), the clinical audit lies at the heart of clinical governance and is indispensable for quality improvements that include measurements of effectiveness. Measurements of effectiveness might include measurements of benchmarks such as waiting times and turnaround times, the reduction of repeated tests, the introduction of strategic indicators such as rates of innovation, assessments of the effectiveness of innovations that have been introduced, and the allocation of sufficient time to introduce new services and to prepare the ground for their acceptance among nursing personnel. All of these criteria can be monitored during the course of a clinical audit of an organisation. The criteria that experts include in a clinical audit need to support the goals of clinical governance. Thus, for example, a clinical audit that monitors the transfer of patients to a higher level of care can be a potent indicator of the quality of care.

Policies that deal with poor practitioner performance and help practitioners to learn from undesirable outcomes and errors have been added to clinical governance structures so that the safety of the clinical environment can be improved (DoH of the UK 2008, 1999).

- **Use of information**

According to NHS Wales (2001:18), information and information systems should be regarded as necessary toolsets or instruments for clinicians who wish to provide, assess, and seek continuous improvement in the quality of the care that they offer. One advantage of having such information tools is that they enable an investigator, for

example, to capture, share and analyse whatever information may be needed to provide proper support.

2.2.2.7 *Indicators*

The Oxford English Dictionary (2005:759) defines an indicator as "a sign that shows you what something is like or how a situation is changing; and observation or calculation that is used to show the presence or state of a condition or trend".

NHS Quality Improvement Scotland (2006(a):6) points out the main purpose of indicators is to supply information to clinicians and managers so that they can improve the quality of their patient care. NHS Quality improvement Scotland (2006(a):6) also point out that indicators can be used as instruments for the assessment of performance management and as a method for tracking accountability. It follows from this that there is a whole range of potential uses to which indicators can be put. These indicators enable a researcher to collect useful data about the performance of clinicians, health service managers, policy makers, the media, and the general public.

Savitz, Jones and Bernard (2006:377) point out that indicators can be used to guide, to monitor, to assess and to improve the quality of patient care, support services, and all other organisational functions that affect patient outcomes. Measures of quality in healthcare are generally indicators of the elements that represent structure, process, and/or outcomes.

Quality indicators, patient safety indicators, clinical indicators, outcome indicators, nursing indicators, and performance indicators are discussed below in more detail.

- **Quality indicators**

Pickering and Thompson (2003:9-10) point out how useful quality indicators are for service providers and those who commission or purchase service. NHS Quality Improvement Scotland (2006(a):21) state that quality indicators for nursing enable an investigator to determine whether the level of care that is being offered is of an acceptable standard or not. NHS Quality Improvement Scotland (2006(a):17) note that one of the ways of judging effectiveness is by developing measures of quality that can be used to assess whether or not a particular nursing intervention has achieved what it was intended to achieve, and, if not, the way in which improvements can be introduced. This is the most conventional way of determining and improving healthcare outcomes. Indices of patient outcomes measure the effectiveness of the service that is being delivered. Given the importance of nursing to the whole community, it is only right that stakeholders, elected representatives and the senior nursing personnel within a healthcare service should be given opportunities to judge the effectiveness of a nursing service. NHS Quality Improvement Scotland (2006(a):17) indicates that one way of measuring the effectiveness of the nursing service is by developing a system and processes such as quality indicators for measuring the effect that the nursing service is having on the improvement of outcomes and improvements in the experience of its patients or clients.

- **Patient safety indicators**

The Oxford English Dictionary (2005:1289) defines *safety* as the lack of danger, inability to cause or result in harm, injury, or damage.

Savitz et al. (2006:377) note that indicators can be used to monitor the extent and appropriateness of safety practices and to implement improvements that are designed to eliminate or mitigated the impact of damaging events. Risk management is a dynamic process by means of which risks are identified and analysed, and practices are

put in place to neutralise them or eliminate them altogether (Kavaler & Spiegel 2003:8-9).

- **Clinical indicators**

The Oxford English Dictionary (2005; 265) defines *clinical nursing* as the examination and treatment of patients and their illness The *Encarta Dictionary* (English (U.K.) [online]) defines *clinical medicine* as "medicine based on or involving medical treatment, practice, observation, or diagnoses". *Clinical* also means scientific, medical, experimental and quantifiable. According to the NHS Quality Improvement Scotland (2006(a):1), a clinical indicator is an explicitly defined and quantitatively measurable statement that captures information and serves as a pointer for identifying problems and for suggesting opportunities for improving a service or treatment. Indicators can therefore be used to compare variations in how the same services are provided in different institutions or areas or when different national benchmarks are used to measure the same phenomena.

In addition, NHS Quality Improvement Scotland (2006(a):10) states that *clinical indicators* are used to continually improve the quality of clinical care that is provided as part of a programme of wider clinical governance activities.

NHS Quality Improvement Scotland (2006(b):13) states that clinical indicators relate either to the *process* or to the *outcomes* of clinical care. A focus on outcomes directs the attention of an investigator towards the experience and treatment of patients rather than directly towards the service itself. Clinical indicators evaluate services (such as the central line infection rate, rates of patient deterioration, etc.), safety issues (such as the incidence of patient falls), or the appropriateness of the kind of care that is provided (for example, an appendectomy with normal histology). Clinical indicators improve processes such as, for example, placing central lines to decrease infection rates.

NHS Quality Improvement Scotland (2006(b):6-7) believe that clinical indicators are useful for stimulating reflection on clinical practice, for learning, and deciding on future lines of investigation. In this way, clinical indicators become part of the performance of performance management. There are a variety of users to whom clinical indicators can be enormously useful. These users include clinicians, health service managers, policy makers, workers in media organisations, and members of the general public.

- **Outcome indicators**

According to NHS Quality Improvement Scotland (2006(a):23), Joint Commission on the Accreditation of Healthcare Organization's definition of an *indicator* is "a valid and reliable quantitative process or outcome measure related to one or more dimensions of performance such as effectiveness and appropriateness and a statistical value that provides an indication of the condition or direction over time of an organisation's performance of a specific outcome". NHS Quality Improvement Scotland (2006(a):23) offers an alternative definition that defines an *outcome* as a measurable change in patient health that is related to the receipt of nursing care.

Outcome indicators attempt to capture the quality and presentation of a nursing intervention and the impact that it makes on patient care, and it measures such interventions and impacts in terms of qualitative and quantitative statements and indices. Outcomes are what are most important in the health services. The ultimate test of the quality of a particular clinical practice resides in extent to which a patient's well-being has been maintained or indeed improved, whether this well-being has been adversely affected by the presence or absence of nursing interventions (NHS Quality Improvement Scotland 2006(a):18).

- **Nursing-sensitive indicators**

Savitz et al. (2006:376) note that *nursing-sensitive indicators* reflect the kind of patient outcomes that are affected by nursing practice. Measures of quality in healthcare are those indicators that represent structure, process, and/or outcomes. Montalvo (2007: section 2) points out that quality measurement in healthcare has evolved through numerous phases and over many years. The work that was undertaken by the American Nurses Association in the 1970s, the wide dissemination of the Quality Assurance model, and Donabedian's structure, process and outcomes model (Donabedian 1988,1992) have all offered comprehensive methods for evaluating the quality of healthcare.

Nursing-sensitive indicators is a comprehensive term that focused mainly on the relationship between nursing performance and negative or undesirable or even disastrous patient outcomes such as errors in the administration of medication, an undue incidence of patient falls, and the extent of nosocomial infections in patients (Savitz et al. 2006:376).

Nursing-sensitive indicators are used by an investigator to determine possible correlations between the nursing interventions that patients have received and their consequent health status. They represent an attempt to measure the effectiveness of nursing care by measuring the desirability or otherwise of patient outcomes. It is often easier to detect linkages when diagnosis, intervention, and outcomes are considered in conjunction with one another. Along with the quest for healthcare cost-effectiveness and quality of care, the growing sophistication of healthcare systems has an effectively increased the extent to which healthcare providers are interested in evidence and outcomes. These elements, together with a growing concern about the desirability of certain combinations of skills, has prompted nursing managers, researchers and administrators to focus on identifying outcome indicators that are sensitive to nursing

inputs and to the number of personnel who have been employed to accomplish the goals of the organisation (Savitz et al. 2006:376).

- **The importance of nurse-sensitive indicators**

According to the ICN (1899-2008:1-2), nursing-sensitive outcome indicators are used to identify correlations between the nursing interventions that patients have received and their resultant health status. They represent an attempt to measure the effectiveness of nursing care by measuring a range of patient outcomes. Linkages can be more easily identified when diagnosis, interventions and outcomes are all considered together and in relationship to one another. Since registered nurses are central to healthcare delivery systems, nursing sensitive indicators need to identify what nurses actually do, the outcomes that they achieve, and the cost to the organisation of the patient care that it is delivering by means of nursing services. This is an important step that needs to be performed before expensive healthcare resources are allocated, and it also serves to demonstrate and exposed to view the unique contribution that nurses make to the delivery of healthcare.

The use of nursing-sensitive outcome indicators also helps to focus attention on the effectiveness of *safety* measures, the quality of patient care and the measurement of care outcomes (ICN 1899-2008:1-2).

In addition to those, ICN (1899-2008:1-2) points out that the articulation of nursing-sensitive quality indicators and the correlation of nursing activities with health **outcomes** provide the evidence that most managers need to support the allocation of their organisation's healthcare resources. Thus, for example, research that has compared staffing levels and patient outcomes provide clear evidence that when more registered nurses are employed, patients experience fewer complications, shorter lengths of stay in hospital, decreased mortality rates, and even lower overall costs both for the patient

and for the hospital. This indicates that higher levels of nurse staffing are associated with fewer adverse effects on patients and discreditable incidents.

- **Performance indicators**

Once an investigator has defined a suitable vision, strategy, and objectives for a company, the next step is to make these objectives measurable by setting up a series of carefully devised performance indicators. Performance indicators measure levels of service efficiency.

Postema (2005:1) points out that performance indicators and objectives increase both the internal and external control of an organisation. Internally, they reflect the accountability of clinicians to patients and managers. Externally, they enhance the accountability of the organisation to external parties, among whom are included the service users and the government.

According to Bauer's theory, the institution of such measures represent the only efficient way of achieving a proper alignment between initial objectives and actions (Postema 2005:1). Bauer's theory discusses the following four critical performance areas:

- *Performance measurement.* The measurement and determination of performance takes place by means of suitable performance indicators.
- *The establishment of performance standards.* This can take place either internally or externally.
- *Reporting of progress.* Insight into what indicator values actually measure is essential for designing proper feedback.
- *The process of quality improvement.* This process includes the formulation and implementation of those actions and measures that are designed to adjust indicator values (Postema 2005:1).

Postema (2005:1) also point out that the strategic management of any health institution prefer the insight that is offered by outcome indicators – mostly because those indicators provide give an integrated view of preceding **process** elements. By doing this, such indicators create incentives for the adjustment of objectives, policies and action initiatives.

Postema (2005:1) also notes that insights into **structure** and **process** indicators on a strategic level are crucial for achieving a much more integral and effective judgment of malfunctioning elements in the system. This occurs mainly because the causes of disappointing outcomes can be far more efficiently monitored. This in itself gives impetus to the feedback circle and ensures a better fit of the process objectives that are formulated by the top management, and the measures that are consequently need to be put in place. This responsibility of top management has often been explicitly described in recent accreditation standards. It was Donabedian himself who concluded that it is impossible to make valid quality assessments by merely examining separate outcome indicators in isolation from one another.

According to DoH of the UK (1999:7-9), indicators are grouped into different categories or areas according to the *NHS Performance Assessment Framework* by making use of the balanced scorecard approach. The *Performance Assessment Framework* was designed to ensure that all areas of NHS performance could be measured in a balanced way so that both the patients who make use of the system and the public themselves cannot claim a more equitable, balanced and nuanced view of just how well their hospitals and health authorities are performing.

DoH of the UK (1999:10) also points out that the *Performance Assessment Framework* enables NHS managers and clinicians to compare different key elements of performance and to arrive at an understanding of how changes in one area may have important implications for other areas. A recent study by Chang (2007:117) demonstrated that *Performance Assessment Framework* could be used to make the

performance of the NHS visible to the public so that the public could at least be aware that the central government had made serious attempts to comply with its mandates and promises to the electorate.

- **The use of performance indicators**

According to CHI (2003), the government is responsible for setting priorities. This, in turn, determines the indicators that will be used to measure key targets of performance. These indicators and ratings provide the employees who work for the NHS and the general public with detailed information about the performance of the health services under their control over time.

Postema (2005:1) states that benchmarking can be used to compare several healthcare institutions with regard to a variety of predetermined performance indicators. This data can be used by institutions who wish to compare themselves against these standards of the best practices in the particular field, to identify significant changes and trends, and to utilise the values in comparative research and performance studies.

Postema (2005:1) has pointed out that performance indicators can be used for each of the following purposes:

- *Benchmarking.* By the consistent use of performance indicators for the purpose of measuring and comparing a variety of values and measurements, an institution will be able to determine whether or not it is achieving its predetermined objectives and standards. Such results can be used as an incentive for improving or redesigning specific elements of a system and the processes of which it is comprised.
- *Steering.* Performance indicators constitute an essential element of any performance that occurs in a management system in four different domains and provides *professional, organisational, satisfaction* and *financial* results.

- *As a means for external accountability.* Performance indicators can be used to construct a solid base from which to improve prove standards, realise objectives and meet targets. This kind of procedure is often referred to as *evidence-based management*.

2.2.2.8   NHS performance ratings system

CHI (2003:1) has developed performance indicators and ratings to enhance their accuracy as a reflection of the **patient experience** and **patient outcomes**. Such ratings incorporate the key targets of government priority areas as well as a set of important indicators.

According to CHI (2003:1), NHS UK places performance ratings into one of the following four categories:

- The highest levels of performance are awarded a performance rating of three stars. A three star rating means that the organisation has performed well in terms of the indicators and, if a review has been undertaken, the organisation is considered to enjoy good clinical governance.
- Organisations are awarded a performance rating of two stars although they are not able to demonstrate consistently high standards in all areas of their operations.
- An organisation will be awarded a performance rating one star if there is some cause for concern with regard to particular areas of performance.
- An organisation will be awarded a performance rating of zero stars – the poorest possible level of performance – if the indicators show that little or no progress has been made in implementing clinical governance. A low rating that is based on poor performance with regard to a number of key targets and indicators, does not necessarily mean that a hospital is unsafe, that it does not contain some very good clinical services or that the nursing personnel are not working hard in circumstances that are frequently extremely difficult. But it does mean that performance needs to be improved in a number of key areas. A zero star rating indicates failure to achieve

certain key targets and an organisation that receives such a rating is considered to demonstrate poor clinical governance.

- **Role of the clinical governance reviews in rating performance**

A CHI (2003:1) clinical governance review assesses health services across the following seven components of performance:

- risk management
- clinical audit
- research and education
- patient involvement
- information management
- nursing personnel involvement
- education, training and development

Each of these components is scored, and, after each review, action plans are devised for addressing areas that had been identified for improvement by the CHI.

According to the University of Washington's human resources (2007:1), most employees *want* to be successful contributors to the welfare and status of their organisation. They want to know what is expected of them and how they can most effectively achieve such expectations. Performance management is the systematic process that a manager applies with a view to involving the institution's employees in accomplishing a unit's mission and goals, in improving the overall effectiveness of the unit, and in helping employees to understand the importance of their contributions.

Effective performance management requires a manager to:

- identify the occupational duties that each employee is expected to accomplish

- communicate the competencies (job knowledge and job skills) are indispensable for achieving success in each particular position in the organisation

- ensure that employees had been trained in the required competencies or that a process and plan had been put in place by means of which an employee can acquire such knowledge and skills

- offer timely feedback to employees on how effectively they are applying the job knowledge and skills that are needed to achieve the goals that have been established for the positions in which they find themselves

- reward effective performance.

In the event that a particular performance does not meet the requirements that are being determined for a specific position, a manager must have a clear understanding of the corrective processes and methods that can be used to help employees to improve their performance. This kind of ameliorative action is at the basis of a professional development.

- **Professional development**

Davies and Nutley (2000:998) point out that each review team assesses performance against certain standards. According to Davies and Nutley (2000:998), NHS embodies the view that the management of the organisational culture in conjunction with improved standards of learning and monitoring, will deliver substantial gains in performance. The avowed aim of such a process is "to create a culture which celebrates and encourages success and innovation . . . , a culture which recognises . . . scope for acknowledging and learning from past mistakes" (Davies & Nutley 2000:998).

Davies and Nutley (2000:998) also confirm although learning is something undertaken and developed by individuals, certain *organisational* arrangements can either foster or inhibit the process. The organisational culture within which individuals work shapes their engagement with the learning process. Thus, although continuing professional

development has long been a part of the NHS, evidence from other sectors suggests that learning needs to play a more central role in the culture and ethos of the organisation. Organisations that position learning as a core characteristic of their system are called "learning organisations". This is a vitally important concept in the context of organisational development.

Davies and Nutley (2000:998-999) define the characteristics of organisational are culture needed to underpin and support learning. Learning organisations play a central role in enhancing personal capabilities and in mobilising these characteristics within organisations. Since so much of healthcare is based on custom and practice rather than evidence, there is also a need for learning strategies that help individuals to focus on "unlearning" previously established ways of doing things. This kind of unlearning on the part of individual practitioners changes their practice and personal investment in current competencies.

Davies and Nutley (2000:1000) emphasise that the national framework for assessing service performance in the national context facilitates single-loop learning by providing clear measures of performance and benchmarks against which these measures can be judged. "Continuing Professional Development programmes need to meet both the learning needs of individual health professionals . . . but importantly they also need to meet the wider service development needs of the NHS" (Davies & Nutley 2000:998).

Davies and Nutley (2000:1001) note that the process of building learning organisations represents, in effect, an attempt to manage the culture of that organisation. Appropriate cultural changes are required to underpin the transformation of healthcare providers into participants in a learning organisation. Within any busy organisation, there is a always a tension between "doing" and "learning about doing". The provision of incentives and rewards in conjunction with the necessary resources to develop learning about doing, can help to ease this tension.

▪ **Use of information**

According to Barham (2004:106), information can be used as feedback to compare actual performance with a desired target (performance assessment). This allows managers to engineer the system so that it conforms with the desired objectives by using incentive manipulation (performance management). Barham infers that all we need is a sufficient amount of data in order to produce a "complete, validated, interpretable, and uncontested" picture.

Key indicators of success in an organisation are internal and external assessment, which provides the necessary information to ensure improvement in an organisation.

According to NHS (2006a:12-13), internal assessments are reflected in the following statements:

- Patient surveys and complaints reflect the users and healthcare providers belief that they are well cared for.
- Because of surveys of nursing personnel, all members of the nursing personnel that they are feel included, are listened to, and are empowered.
- All members of clinical nursing personnel regularly undergo clinical supervision.
- Issues of safety and quality high are on the agenda of every meeting.
- There is an increase in the reporting of incidents and "near misses".
- As nursing personnel begins to share what they learn from incidents, they begin to observe a decrease in the number of incidents that occur.
- The internal benchmarking of clinical data indicates changes in clinical practice.
- There is an improvement in recruitment and retention rates.

According to NHS (2006a-:12-13), external assessments produced the following results:

- a continued compliance with standards

- an increase in indices of patient and nursing personnel satisfaction as it is monitored by means of national surveys

- an indication by 100% of nursing personnel that they have undergone an annual appraisal

- successful clinical governance-related assessments by external auditors

All of these elements provide useful information for the design and implementation of improvements.

- **Key performance indicators**

The Royal Children's Hospital of Melbourne (2008:1) notes that while key performance indicators are similar to clinical indicators, they reflect overall hospital, departmental or group "performance" rather than just clinical problems or outcomes. Key performance indicators often reflect administrative, service or business areas, such as staffing levels, the under- or over-utilisation of services by certain groups of patients, and degrees of efficiency in certain areas. Key performance indicators, like clinical indicators, can reflect the quality of a service – particularly services that relate to quality areas of efficiency (such as waiting times for services and the cost of services) and issues of access (such as the types of patients who are utilising a particular service).

2.2.2.9 Targets

The Oxford English Dictionary (2005:1513) defines *target* as a result that you try to achieve. Targets are usually officially recorded in some way that is quite specific such as a figure or quantity or as that embodies a desired goal or outcome to.

Encarta Dictionary [online] defines a *target* as a goal or objective towards which effort is directed. DoH of the UK (2004:23) states that targets refer to a defined level of performance that is envisaged, often by means of a numerical and/or time dimension.

The purpose of a target is to create an incentive for improvement in the specific area that is covered by the target over a particular timeframe.

DoH of the UK (2004:23) defines *benchmarking* as the "process of defining a level of care set as a goal to be attained". Benchmarking techniques can help employees to avoid setting unnecessarily low or unrealistically high target levels of performance. Targets levels are based on the expected levels of performance that of defined in a policy, and are defined by making use of *thresholds*. A *threshold* distinguishes between achieved, underachieved, and significantly underachieved performances. Each key target is allocated penalty points that indicate the level of its performance. The focus areas which represent the performance for each indicator are categorised into performance bands, and points are awarded for the best performances and the worst. Individual band scores are then combined to produce an overall score for each focus area. All indicators are equally weighted within their focus area in such a way as to ensure that despite differing numbers of indicators, each focus area carries the same weight.

Only the NHS clinical governance model was used to guide this study. The clinical audit protocols were derived from NHS clinical governance procedures. The purpose of the study was derived from the clinical audit that was performed in the hospital that was selected for the purposes of this study.

2.3   CONCLUSION

This chapter introduced and discussed the conceptual framework, and the Donabedian and the NHS clinical governance models that were used in this study. The researcher stated that the models which are interrelated, should be discussed in detail so that the reader gets a comprehensive view of quality of care and clinical governance.

The following chapter (chapter 3) describes the literature review that the researcher conducted for the purposes of this study.

CHAPTER 3

"The secret of success is to know something nobody else knows."
Aristotle Onassis (1906-1975)

Aristotle Socrates Onassis, Greek ship-owner, financier and business man

LITERATURE REVIEW

3.1 INTRODUCTION

The usefulness and applicability of a quantitative research study to the research questions can be significantly enhanced if it is conducted on the basis of a careful review of what is already known about the topic of research. Quantitative researchers therefore strive to understand what is already known about a topic by conducting a thorough literature review before they even begin to collect the necessary data (Polit & Beck 2006:55).

The purpose of the study was to explore, identify, and analyse the management of a patient deterioration as well as the processes and problems that are encountered when patients are transferred to a higher level of care. With a view to acquiring a thorough understanding of this problem, the researcher conducted an intensive literature review of all the following topics and themes as they appeared in the literature: ward patient deterioration, care of ward patients who are at risk, suboptimal care in general wards, early warning signs of deterioration, in-hospital cardiac arrests, antecedents of hospital

deaths, unexpected deaths, procedures before admission to intensive care units, readmissions to intensive care units or high care, and the normal ranges of applicable physiological values. The researcher needed to conduct a detailed review of the literature on these topics so that she would be thoroughly acquainted with all the research that has already been undertaken in this field before the empirical phase of this study commenced.

The purpose of the literature review was to establish a baseline for what is already known about these phenomena and to obtain an in-depth understanding of the processes and problems that are encountered when patients have to be transferred to a higher level of care.

In order to set the study problem within the framework of a strong theoretical approach, the researcher utilised Donabedian's model of quality assessment (which is based on the three pillars of structure, process and outcome) and on the UK's NHS clinical governance model of continuous improvement of health care. While the researcher based the literature review as a whole on these two theoretical models, she focused most intensively on the use of the clinical audit in the NHS clinical governance model in order to obtain the greatest possible clarity on this topic. Both of these conceptual frameworks are set and described in detail out in chapter 2.

The researcher conducted the literature review by using a select number of key words to examine the online OVID, Medline, EBSCO host, Institute for Healthcare Improvement, MEDLINE and PubMed databases. The key words (and phrases) that the researcher used to conduct the search were: "clinical audit", "clinical governance", "transfer to higher level of care", "outreach", "suboptimal care", "physiological deterioration", and "cardio-pulmonary resuscitation (CPR)". References that were cited in various journal articles, reports and other studies were used to obtain additional material. As can be readily seen in the bibliography of this dissertation, the researcher used a wide range of search engines to conduct the necessary Internet and World Wide

Web (www) searches. Web searches were conducted on full-text databases of journal articles. Because of its wide reach and versatility, the meta-search engine that the researcher used most frequently to conduct online searches was Google. The enormous number of results obtained from Google searches produced references that the researcher frequently pursued by means of other lesser known research procedures. The initial date range investigated by the researcher ranged from 1995 to 2008. This was done so that all research references would be both current and up-to-date. But since this cut-off point produced only a limited number of sources, the researcher extended the period of investigation to 15 years (1992 to 2008). While the literature review was limited to the past 15 years, all fairly recent primary research articles of particular relevance to this study were included in the review. The search was restricted only to articles and other references that had been written in English.

Although there was a considerable amount of literature available on physiological deterioration and the suboptimal care of general ward patients, the role of emergency and care teams, as well as in-hospital cardiac arrests prior to admission to ICU, the literature review brought up only a limited amount of literature about the processes and problems that are encountered when patients are transferred to a higher level of care and the outcomes of care teams. Since a few important research projects relevant to this study were carried out in the middle and late 1980s and the early 1990s, these were also included in the literature that was reviewed. The researcher's review revealed that there was a limited amount of literature about the nature and duration of life-threatening antecedents suffered by patients prior to their admission to intensive care. In spite of these limitations, the researcher selected and discussed all literature that she felt would add value and depth of understanding to the particular problem that she had set out to investigate in this study. Table 3.1 sets out the headings in terms of which the researcher conducted the literature study.

Tabel 3.1 Topics and terms utilised for literature review

Literature study topics

Structure (3.2)

Facilities (3.2.1)
Emergency department (3.2.1.1)
Hospital facilities for in-patients (3.2.1.2)

Personnel (3.2.2)
Categories of hospital personnel (3.2.2.1)
- Medical personnel
- Nursing personnel
- Support personnel and structures

Qualifications (3.2.2.2)
Experiences (3.2.2.3)
- Expertise
- Inexperience
- Novice nurses versus experienced nurses
- Confidence
- Decision-making
- Critical thinking
- Lack of competence
- Development of competencies

Competencies (3.2.2.4)
- Technical, cognitive and interpersonal skills
- Decision-making
- Critical thinking
- Lack of competence
- Development of competencies

Training and development (3.2.2.5)
- Education, training and professional development
- Supervision

Equipment and supplies (3.2.3)
Emergency department (3.2.3.1)
Intensive care (3.2.3.2)
High care (3.2.3.3)
General wards (3.2.3.4)

Management and leadership (3.2.4)
Management style (3.2.4.1)
Leadership style (3.2.4.2)
Policies and procedures (3.2.4.3)

Finances (3.2.5)
Budget (3.2.5.1)
Cost control (3.2.5.2)

Process (3.3)

      Process activities (3.3.1)
            Patient flow (3.3.1.1)
            Admission (3.3.1.2)
            Nursing care (3.3.1.3)
            Monitoring (3.3.1.4)
            Clinical audit (3.3.1.5)

      Process coordination (3.3.2)
            Communication (3.3.2.1)

      Control measures (3.3.3)
            Correct monitoring (3.3.3.1)
            Approaches/strategies for management of at-risk patients (3.3.3.2)
            Organisational changes (3.3.3.3)

Outcomes (3.4)

      Expected outcomes (3.4.1)
            Seven pillars of clinical governance (3.4.1.1)

      Problems encountered in hospitals (3.4.2)
            Availability of hospital beds (3.4.2.1)
            Communication (3.4.2.2)

      Patients at risk (3.4.2.3)
            Sub-optimal care (3.4.2.4)
            Physiological deterioration (3.4.2.5)
            Biochemical variables deterioration (3.4.2.6)
            Failure to recognise physiological deterioration (3.4.2.7)
            Premature and night discharges (3.4.2.8)
            Delay in transfer to ICU (3.4.2.9)
            Readmission to ICU (3.4.2.10)
            In-hospital cardio-pulmonary resuscitation (3.4.2.11)
            Unexpected cardiac arrest (3.4.2.12)

Conclusion (3.5)

3.2   STRUCTURE

The Donabedian model is based on the structure of a hospital and it indicates what an organisation such as a hospital needs in order to be able to deliver a range of services with maximum efficiency and cost-effectiveness. This section provides an overview of what the literature says about hospital facilities, personnel, equipment and supplies, management and leadership, and finances.

3.2.1 Facilities

This section describes the facilities that are required in an emergency department in particular and in a hospital for in-patients in general, the definition and description of an intensive care unit, the particular needs and dispositions of a high care unit, the standard equipment and treatments that are offered in a general ward, all the facilities that a hospital needs to operate effectively, and the concept of levels of care.

3.2.1.1   *Emergency department*

According to the *English Dictionary* [online] http://www.babylon.com/definition/ [Accident and Emergency Department/English](http://www.babylon.com/definition/Accident and Emergency Department/English) an emergency department, sometimes called "the emergency room", "an accident and emergency department" or a "casualty department", is a specific department in a hospital that provides initial treatment to patients who are suffering from a broad spectrum of illnesses and injuries, some of which may be life-threatening and which may therefore require immediate attention and treatment. Emergency departments first appeared in response to an increased need for rapid assessment and the management of critical illnesses and injuries.

In the USA, trauma centres are ranked by the American College of Surgeons (2007:1) from level I (a unit that provides comprehensive services) to level III (unit that provides only limited forms of care and treatment). While a unit that is labelled "level II" provides definitive trauma care (regardless of the severity of the injury or illness), it may not be able to provide comprehensive care. Patients who therefore present with more complex kinds of trauma and injuries may have to be transferred from a level II unit to a level I trauma centre. The different levels indicate the different kinds of resources that are available in a trauma centre in conjunction with the number of patients who are admitted annually. Since a level I trauma centre provides the highest level of surgical care to trauma patients, it needs to be staffed by a team of surgeons and

an anaesthetist who all need be on duty during every 24-hour period in the hospital. A level I trauma centre also requires an education programme as well as preventive and outreach programmes, and must admit a minimum annual volume of severely injured patients in order to qualify as a level I unit. The key elements of a level I unit include 24-hour in-house coverage by general surgeons and the prompt availability of care in varying specialties such as orthopaedic surgery, neurosurgery, anaesthesiology, emergency medicine, radiology, internal medicine, oral and maxillofacial surgery, and critical care. The services of all such specialists are required to respond adequately and comprehensively to the various forms of trauma that a patient may suffer.

3.2.1.2 *Hospital facilities for inpatients*

The National Department of Health (2006:6) of South Africa defines in-patients as patients who are admitted to a hospital for at least one night for a diagnosis, investigations and/or treatment. Such a hospital would also contain a specialised unit that would be able to deliver the particular services and treatments required by a specific group of patients. A facility that provides specialist and sub-specialist care (as defined for level 3 services) is depicted in **Annexure J: Specialties classified as level 3 services**. Table 3.1 (above) sets out the facilities that are required for in-hospital patients and the levels of care that can be made available to such patients.

- **Licensing requirements for a hospital**

According to the National Department of Health (2006:1-10) of South Africa, a hospital can only be licensed to operate if it fulfils all the required conditions and is able to offer the specific requirements for facilities that are set out in Table 3.2 (below). Table 3.2 (below) sets out the requirements that are obligatory for a level 3 facility before it can be licensed to operate within the parameters of the statutory law in terms of which the National Department of Health operates.

- **Intensive care unit**

The *Medical Dictionary* [online] http://cancerweb.ncl.ac.uk/cgibin/omd?intensive+care+unit (2000) defines an *intensive care unit* as a hospital facility that can offer intensive nursing to critically ill patients, that is characterised by a high quality and quantity of continuous nursing and medical supervision, that uses sophisticated monitoring and resuscitative equipment, and that may be organised for the care of specific patient groups such as neonatal ICU, neurological ICU and pulmonary ICU.

o **Size and number of beds**

Bryan-Brown and Dracup (2005:178) point out that between 8% and 12% of a hospital's beds in the **USA** are devoted to some form of critical care. Since the equivalent figure outside of the USA is only 3%, hospitals in the USA consume *half* of each institution's direct patient care budget. ICUs are therefore extremely expensive units to operate in the USA. McKinley (2007:309) point out that the number of intensive care beds in **Australia** stands at around 2.8% of all hospital beds or 9.4 beds per 10,0000. The research conducted by Scribante and Bhagwanjee (2007:1311) reveals that the ratio of ICU beds to the total number of hospital beds in **South Africa** is 1.7% in the public sector compared to 8.9% in the private sector. The majority of units and hospital beds (public and private) at the time of the research were located in three provinces, namely Gauteng, KwaZulu-Natal, and the Western Cape. The ratio of public sector beds to the assessed human population in the Free State, Gauteng and Western Cape was less than 1:20,000. In all of the other provinces of South Africa, the ratio ranged from between 1:30,000 and 1:80,000. The majority of these units are in level 3 hospitals.

o **Intensive care**

The *Medical Dictionary* [online] http://cancerweb.ncl.ac.uk/cgibin/omd?intensive+care+unit defines **intensive care** as a kind of advanced and highly specialised care that is offered to patients whose conditions are life-threatening and who require

comprehensive nursing and medical care and constant monitoring. Intensive care is usually provided in the appropriately equipped units of a health care facility. Hillman (1999:1353), however, expands the conventional meaning of "intensive care" to encompass the provision of expertise in critical care medicine to patients who have not yet been admitted to the ICU or who are no longer in an ICU. Damon and William (2002:1) describe **intensive care medicine** as "advanced and highly specialised care provided to patients whose conditions are life-threatening", and they note that is administered within "specially equipped care units".

- **High care unit**

According to the *Data Dictionary*, [online] http://www.datadictionaryadmin.scot.nhs.-uk/isddd/1819.html **high care** is a unit for patients who require more frequent observation, treatment and nursing care than that which can be provided in a general ward. Such a ward would not normally accept patients who require the kind of invasive monitoring that is characteristic of a high care unit. There is thus a distinctive difference in the standard of care that is provided in a general ward and in an intensive care unit.

- **General ward**

According to the *Collins English Dictionary* [online], http://www.thefreedictionary.com/ward the definition of a general ward is a room in a hospital for patients will require similar kinds of care.

Table 3.2   In-patient hospital facilities and level of care

Facilities offered to in-hospital patients	Level of care
Level 1 Hospital: This is a facility in which a range of outpatient and inpatient services are offered that are mostly within the scope of general medical practitioners. It has a functional operating theatre in which operations are regularly performed under general anaesthesia.	Level 1 care: These consist of services that are part of the skill base of a general medical practitioner and that do not require the intervention of a specialist. Basic surgery that requires a general anaesthetic is also conducted in these hospitals.
Level 2 Hospital: This is a facility that provides the kind of care that requires the intervention of specialists as well as general medical practitioner services. A hospital that offers a single specialist service is classified in South Africa as a specialised level 2 hospital. A general level 2 hospital needed to be permanently staffed in the following basic specialties: surgery, medicine, orthopaedics, paediatrics, obstetrics and gynaecology, psychiatry, diagnostic radiology, and anaesthetics.	Level 2 care (secondary): These consist of services which at some point during the intervention would be beyond the normal scope of a generalist and would therefore need input from a registered specialist.
Level 3 Hospital: This is a facility that provides the kind of specialist and sub-specialist care that is required for level 3 services. A *specialised* level 3 hospital will only offer one or two specialties from groups 1, 2 or 3 (such as, for example, cardiology and respiratory medicine together with associated anaesthetics and diagnostic facilities). A *general* level 3 hospital will have sub-specialty representation in at least 50% of the Group 1 specialties listed in Annexure J.	Level 3 care (tertiary): These consist of services which at some time during the intervention are beyond the normal scope of a specialist and would therefore require input of a registered sub-specialist.

Source: South Africa National Department of Health (2006:1-10)

Table 3.3   Requirement for a level 3 facility

Licensing requirement for Level III facilities		
Administration requirements	**1. Administrative Services** 1.1. Personnel 1.2. Accounting 1.3. Budget and Finance 1.4. Medical Records 1.5. Property and Supply 1.6. Housekeeping	1.7. Laundry and Linen 1.8. Maintenance 1.9. Ambulance Service 1.10. Security 1.11. Dietary 1.12. Social Services
Clinical services	**2. Clinical Service** 2.1. Specialty Clinical Care 2.1.1. Department of Medicine 2.1.2. Department of Pediatrics 2.1.3. Department of Obstetrics and Gynecology 2.1.4. Department of Surgery and Anesthesia 2.2. Critical Care 2.2.1. Intensive Care	2.2.3. Pathologic – Premature Nursery 2.2.2. Post-Anesthesia Care 2.3. Emergency Service 2.4. Outpatient Service 2.5. General Dentistry 2.6 Outpatient service
Nursing Service	**3. Nursing Service** 3.1. Intensive Care and Management 3.2. Health Education and Counseling	
Ancillary Service	4. Ancillary Service 4.1. Tertiary Clinical Laboratory	4.2. Radiology 4.3. Pharmacy

Source: South African National Department of Health (2006:1-10)

3.2.2   Personnel

This section contains a brief overview of various categories of hospital personnel and their corresponding qualifications, experience, competencies, training and development.

3.2.2.1   Categories of hospital personnel

In this section, the categories of hospital personnel who are relevant to this study (namely, medical personnel, nursing personnel and support personnel) are discussed below.

- **Medical personnel**

For the purpose of this study, the medical personnel who are discussed in this section consist of the emergency physician, intensive care medical personnel, the intensivist and the hospitalist.

o **Emergency physicians**

Emergency physicians are medical practitioners who are trained in emergency medicine. They are on duty for 24 hours a day in emergency departments. According to the American Board of Medical specialities (2006-2008:1) [online] http://www.abms.org/WhoWeHelp/Consumers/AboutPhysicianSpecialties/emergecy.aspx emergency physicians specialise in immediate decision-making about the action or response that is necessary to prevent the death of a client or any further disability both in the pre-hospital setting. He or she accomplishes this by directing the activities of the emergency medical technicians in the emergency department. The emergency physician provides an immediate response and diagnosis, evaluation, care, stabilisation and the disposition of a generally diversified population of adult and paediatric patients in

response to episodes of acute illness and injury. Emergency physicians are well trained in the methods and techniques of cardio-pulmonary resuscitation and are also well experienced in the care of emergency patients. An emergency physician works closely with a trauma surgeon and with other specialists within the hospital setting.

o **Intensive care medical personnel**

According to the *Encyclopaedia of surgery*, [online] http://www.surgeryencyclopedia.-com/Fi-La/Intensive-Care-Unit-Equipment.html a medical team usually comprises a critical care-attending physician (also called an *intensivist*), an infectious disease team, critical care respiratory therapists, pharmacologists, physical therapists, and dieticians. Physicians trained in other specialties, such as anaesthesiology, cardiology, radiology, surgery, neurology, paediatrics, and orthopaedics, may be consulted and called to the ICU to treat patients who require their expertise. According to the *Encyclopaedia of surgery*, [online] http://www.answers.com/topic/ intensive-care-medicine patients are given 24-hour assessments by the intensivist. Preparatory orders for the ICU generally vary from patient to patient because treatments are individualised. The initial workup should be coordinated by the attending ICU personnel (the intensivist and the ICU nurse specialist), the pharmacists (for medications and IV fluid therapy), and the physiotherapist.

o **Intensivist**

Bright, Walker and Bion (2004:35) point out that intensivists are doctors who have been specifically accredited for the practice of critical care medicine. Bright et al. (2004:35) state that, in the USA, The Leapfrog Group (2000) has recommended that intensivists be appointed to manage ICUs while, in a parallel development, many hospitals are appointing hospitalists to provide in-patient care in the wards. In South Africa, an

intensivist is a physician who specialises in the care of patients who are critically ill or injured, and who have usually already been admitted to an intensive care unit.

A study by Multz, Chalfin, Samson, Dantzker, Fein, Steinberg, Niederman, and Scharf, (1998:1468) have demonstrated that an improvement occurs in outcomes for critically ill patients when dedicated intensivist and nursing personnel, together with direct critical care services, are in charge of organising and caring for all patients. Some studies, such as those cited by Multz et al. (1998:1468), have shown that the availability of qualified intensivists correlates with lower mortality rates and costs (Brown & Sullivan 1989:127-129; Marini, Nathan, Ritter, Rivera, Jurkiewics & Cohen 1995:A235; Lima & Levy 1995: A238; Mallick, Strosberg, Lanbrinos & Groeger 1995:611-624; Pollack, Katz, Ruttimann & Getson 1988:11-16; Manthous, Amoateng-Adjepong, Al-Kharrat, Jacob, Alnuaimat, Chatila & Hall 1997:391-399).

o **Hospitalists**

According to Bright et al. (2004:35), a *hospitalist* in the USA is someone who has been trained in internal medicine and who has also specialised in the kind of acute hospital medicine that is practised by managed care organisations. Hospitalists regard themselves as being able to contribute to a reduction in the costs and duration of hospital stays. Although the training of hospitalists is rooted primarily in internal medicine, there is no national core curriculum for hospitalists. Since they do not appear to be responsible for surgical patients, they cannot be considered to be generalists in the sense of being able to deal with *all* acutely ill patients. Hospitalists occupy a role that is very similar to that undertaken by a general physician in hospitals in the UK, except that general physicians in the UK often specialise in some sub-speciality. The hospitalist programme is also concerned with triage and with caring for the critically ill with the improved resources that are now available for acutely hospitalised patients in general wards

- **Nursing personnel**

This section describes what the literature has to say about staffing, combinations of skills, patient acuity, the nurse-patient ratio, nursing workloads, and the scope of practice laid down by SANC and ICN.

o **Staffing of nursing personnel**

McGillis Hall (2005:2) defines the staffing of nursing personnel as "the appropriate numbers of full-time equivalent nursing personnel by each skill class (Registered Nurse, Enrolled Nurse and Enrolled Nurse Assistance) required to provide patient care to patients". Lake (2003:7), from the University of Pennsylvania, and Lankshear, Sheldon and Maynard (2005: 165) have noted that there is a considerable body of empirical evidence to demonstrate that a link exists between inadequate nurse personnel staffing and a range of adverse patient outcomes including inadequate pain management, cardiac arrest, failure to resuscitate and a trend towards increasing readmissions.

- **International Council of Nurses**

The ICN (2006:7-8) states that **staffing** means more than merely having an adequate number of in personnel a healthcare institution. Adequate staffing also takes account of other variables that exert a profound effect on the quality of care that can be offered. These variables include: workload, work environment, patient complexity, the skill levels of the nursing personnel, the mix of the nursing personnel, cost efficiency, effectiveness, and the correlation and linkages between patient numbers and nurse outcomes. Because staffing levels are related to key indicators (such as mortality rates), staffing levels are also an element in considerations of patient safety. The ICN (2006:7) asserts that safe and

appropriate staffing practices take account of the complexity and intensity of the kind of nursing that is required variations in the levels of nurse preparedness; the competency and experience of the nurses who are employed the professional development of health care personnel; the kind of support that nurses receive from nursing management on an operational and executive level; the technological environment of each facility in a hospital and the ability of nurses to operate advanced forms of medical technology efficiently; the number and quality of support services that are available in a hospital, and the provision of "whistleblower" protection.

Patient satisfaction, on the other hand, has been shown to decrease in proportion to reductions in the number of nurses who are employed. It has also been demonstrated that there is a reduction in the number and severity of accidents and personnel errors when nursing personnel staffing levels are adequate for the number of patients who require care in a particular facility (ICN 2006:11).

- **South Africa**

Netcare Fin24 (2007:1) have estimated that South Africa is currently producing about 4,000 new registered nurses every year. In spite of this, there is still a general shortage of more than 50,000 registered nurses throughout the industry in South Africa. The SANC register of July 2006 indicated that 18,4% of all the country's 190 449 registered nurses no longer practise their profession – at least not within the context of South Africa's formal hospital infrastructure.

o   **Skill mix**

According to Buchan and Dal Poz (2002:575), the term "skill mix" is a relatively broad term that could refer to the distinctive combination of personnel in the workforce or the classification of all the roles and activities that are performed by different categories of personnel. Proctor (2006:1-2) defines "nursing skill mix" and the advantages that may accrue from it in the following way:

> [Nursing skill mix means] the balance between trained and untrained, qualified and unqualified personnel within a service area. […] [The] optimum skill mix is achieved when the desired standard of service is provided, at the minimum cost, which is consistent with the efficient deployment of trained, qualified and supervisory personnel and the maximisation of contributions from all personnel. It will ensure the best possible use of scarce professional skills to maximise the service to clients (Proctor 2006:1-2).

Lankshear et al. (2005:163) reviewed 22 studies that confirmed that the combination of adequate nursing personnel staffing and an optimal **skill mix** was associated with improved patient outcomes.

o   **Patient acuity/Nursing hours per patient-day**

Jennings's (2008:1, 3) patient acuity system classifies patients into care categories and quantifies the nursing effort required for each patient in each of the defined care categories. These patient classification systems are widely used to predict patient requirements for nursing care. Because such requirements can be predicted in advance in terms of numbers of personnel required and patient acuity, it is possible to manage nursing personnel resources, costs and quality with some degree of accuracy. Needleman, Buerhaus, Mattke,

Swart and Zelevinsky (2002:1715-1722) worked out that the mean number of hours of nursing care per patient-day was 11.4, of which 7.8 hours were provided by registered nurses, 1.2 hours were provided by licensed practical nurses (who are equivalent to registered nurses in South Africa), and 2.4 hours were provided by nurses' aides (in South Africa these are the equivalent of Enrolled Nurse and Enrolled Nurse Assistance).

Needleman et al. (2002:1715-1722) produced evidence to show that among **medical and surgical patients**, the higher proportion of hours of care per day provided by registered nurses was associated with a shorter length of stay (P=0.01 and P<0.001) as well as with lower rates of complications.

o   **Nursing personnel to patient ratio**

It is of fundamental importance to determine optimal nurse-patient ratios and skill distributions so that patients can be assured of receiving quality health care.

The South African Society of Anaesthesiologists (2001:1) has drawn up guidelines which indicate the optimal number of nursing personnel that are needed for intensive care units. The highest degree of patient care is required by patients who are suffering from multiple organ failure, by patients who require multidisciplinary interventions, by patients who require ventilation, by patients with a second organ failure, and by hemodynamically unstable patients (such as unstable myocardial infarct patients and patients who are in the immediate aftermath of bypass surgery). All patients in these categories require one registered nurse to be present with each patient at all times. (See Annexure G: South African Society of Anaesthesiologists Nursing Personnel in ICU).

According to South African Society of Anaesthesiologists (2001:1), the level of care and facilities that are required vary according to the *type of patient* who is admitted. The South

African Society of Anaesthesiologists Guidelines for Intensive Care have been formulated so that positions and hospital administrators can assign the correct number of nurses with the correct skill mix to intensive care units (See Annexure F: South African Society of Anaesthesiologists Categories in ICU).

Bryan-Brown and Dracup (2005:178) report that the most effective nurse-to-patient ratio in the **USA** should be maintained at 1:1 or 1:2.

The Intensive Care Society (2003:7) of the **UK** report that critically ill patients have traditionally received a 1:1 ratio of nursing care because of the nature of their illnesses or injuries and the considerable nursing input that their relatives require. A lower ratio is usually provided for those receiving high care. The exact nursing requirement for high dependency care patients is dictated by the patients' needs and the nursing skill-mix. All nursing personnel in a high care unit that is responsible for direct patient care should be registered nurses, and the majority of all senior nurses in high care units should have a post-registration qualification in intensive care or training in high dependency nursing care. A nursing-personnel-to-patient ratio of 1:2 is recommended by the Intensive Care Society of the UK (2003:7) for safe nursing care in high care units.

Among other things, Judith Oulton, the Chief Executive Officer of the International Council of Nurses, made the following statement in a press release issued in the name of the World Health Professions Alliance: "We are concerned with the current global shortage of health professionals, the dilution of skilled workforce with less qualified personnel, and reduction in overall nursing personnel staffing levels" (World Health Professions Alliance 2003:1). According to Delon Human, the Secretary-General and Chief Executive Officer of the World Medical Association, "There is growing evidence that inadequate institutional staffing levels are correlated with increases in adverse events such as patient falls, bed sores, medication errors, nosocomial infections and readmission rates that can lead to

longer hospital stays and increased hospital mortality rates" World Health Professions Alliance (2003:1). In short, inadequate human resources present a serious threat to patient safety and quality of care.

o   **Workload**

A vitally important consideration for the nursing profession in our contemporary climate of economic constraint and adversity is the relationship between adequate staffing and nursing workload.

Sochalski (2004:1167-1168) analysed the results of a survey of more than 8,000 acute care nurses working in hospitals throughout the state of Pennsylvania. Sochalski then compared the number of acute care nurses employed and their workload with nurse assessments of the quality of care that they were able to deliver. Although workload varied according to unit type, the nurses in the studies who worked in general in-patient units cared for an average of 6.4 patients per shift while those who worked in ICUs cared for an average of 2.4 patients per shift. Roughly, one quarter of all these nurses rated the quality of care that was provided by their unit as "excellent", while 20% rated the quality of care rated the quality of care provided by their unit as "poor" to "fair". When they were questioned about their ability to complete all nursing care tasks such as patient teaching, oral and skin care, the documentation of problems, and discharge planning, more than 40% of the nurses who were surveyed reported that they had to leave at least three tasks in an incomplete state after their last shift. When it came to measures of patient safety, 16% of nurses reported that medication errors occurred "occasionally" or "frequently" in their unit and 22% reported patient falls. What became evident was that both the assessments of care became more and more prejudicial to the safety and health of the patients while the number of errors and unfinished tasks reported rose relative to increases in the workloads of nurses. These results show that the structure of care (of which the workload of nurses is

a component) affects the process of care as well as the ability of nurses to monitor patient safety and complete all their necessary nursing tasks.

o   **Scope of practice according to the South African Nursing Council**

"Scope of practice" refers to the activities for which a particular profession is educated, the degree to which its practitioners are considered to be competent to practise what they have been taught, and the extent to which practitioners are authorised to perform certain activities. The scope of practice therefore provides a base from which standards of practice, curricula, and position descriptions can be prepared. The actual scope of individual practice is determined by the varying needs of patients in particular situations, by an individual caregiver's education and competence, by the settings in which they practice, and by the requirements of the employer. The scope of practice assists consumers of nursing and midwifery services to obtain a general understanding of the qualifications of the individual who provide the care and the types of services that they provide (SANC: Scope of practice under the Nursing Act of 1978 (Act 50 of 1978)). A "scope of practice" therefore refers to the knowledge, practices and attitudes that are required by professional practitioners in order to fulfil a professional role. Scopes of practice are therefore used as a guide for those who set standards for educational programmes and those who set out guidelines for workers in particular areas. This enables them to be used as an authoritative source for anyone who wishes to know what can be theoretically expected from a professional practitioner. A scope of practice does not usually include a comprehensive list of what each kind of professional practitioner is authorised to perform (SANC: Scope of practice under the Nursing Act of 1978 (Act 50 of 1978)). (See Annexure E: Scope of Practice).

o   **The scope of practice according to the International Council of Nurses**

The ICN (2004) defines "scope of practice" within a legislative regulatory framework that communicates the roles, competencies (knowledge, skills and attitudes), and the degree of professional accountability that is required of each nurse. In addition to this, the scope of practice for nurses is not limited to specific tasks, functions or responsibilities, but also includes direct care-giving, the evaluation of impacts, the practice of advocacy on behalf of patients, the practice of supervision and delegation to other competent professionals, methods of leading, managing, teaching and undertaking research, and the development of health policies for healthcare systems. Furthermore, because any scope of practice is dynamic and responsive to health needs, to the development of knowledge and to the development technological developments in the equipment used by the profession, periodic reviews are required to ensure that any explicit official definition of "scope of practice" remains consistent with current health needs, health outcomes and overall developments in the profession (ICN: 2004).

o   **South African Nursing Council**

The Republic of South Africa's Minister of Health and Welfare makes regulations for the nursing profession on the recommendation of the SANC in terms of the authority invested in the minister by Section 45(1)(q) of the Nursing Act, 1978 (Act 50 of 1978). A new nursing act, called the Republic of South Africa Nursing Act of 2005 was published in the Government Gazette (No. 492 of 29 May 2006), and the state president proclaimed some sections of the Nursing Act of 2005 (Act 33 of 2005), no. R. 4, 2007, with effect from 15 December 2006. The proclamation of sections 30 and 31 affects every nurse in the Republic of South Africa. The implementation of **Section 30** deals with the scope of the profession and practice of nursing while **Section 31** describes how registration as a nurse as a prerequisite for practice in South Africa takes place in terms of the new regulations that

came into effect in 2006. (See Annexure E: SANC – Scope of practice for registered nurses, enrolled nurses and auxiliary nurses).

- **The Nursing Act of 2005 (Act 33 of 2005)**

Chapter 2 of the act deals with the education, training, research, registration and practice of nurses, the scope of the profession and the practice of nursing as follows:

- A professional nurse is a person who is qualified and competent independently to practise comprehensive nursing in the manner and to the level prescribed, and who is capable of assuming responsibility and accountability for such practice.
- A staff nurse is a person who is educated to practise basic nursing in the manner and to the level prescribed.
- An auxiliary nurse or an auxiliary midwife is a person who is educated to provide elementary nursing care in the manner and to the level prescribed.

- **Support personnel and structures**

Various countries have developed different **support structures** to improve quality care. According to Bright et al. (2004:33), health care providers in many countries have become increasingly aware that quality of care can be improved by measures that function to reduce the incidence of **errors**. Bright et al. (2004:33-36) gathered evidence to suggest that the greatest opportunities for improvement and for the reduction of the errors may occur in the management of the acutely ill patients because, in the nursing of such patients, uncertainty, urgency and the absence of integration substantially increase the risk of errors had result in adverse outcomes. It is widely acknowledged that many critically ill patients are managed outside of designated ICUs.

Bright et al. (2004:33) mentions that *clinical error* is now widely recognised as a systemic problem, and that the detrimental events that create adverse outcomes for individual patients are usually caused by a sequence of events that involve deficiencies in the structure and organisation of the whole healthcare system, and are not simply a consequence of isolated human errors. The improvement of safety and quality requires a system approach in which all participants assume responsibility for patient outcomes. The methods that are adopted to achieve this include the need for better integration of care across disciplines so that patients who are at risk can be more quickly identified. The treatment of such patients is referred to "outreach" care.

The USA, the UK, Australia, Canada and Denmark have all instituted nationwide systems that are designed to improve the safety and standard of care that is offered to all acutely ill hospitalised patients (DoH of the UK 2000). Studies such as those undertaken by Åneman and Parr (2006:1255) and Bright et al. (2004:33, 35) state that the following models are being currently employed:

- hospitalists and **rapid response teams** in the USA.
- m**edical emergency teams** (MET) led by doctors as an alternative to cardiac arrest teams together with an ICU **Liaison Nurse Team** in Australia
- a system of **outreach care** in the UK

ICU Liaison Services (Australia)	The Nepean Liaison Nurses' Team is led by an intensive care liaison clinical nurse consultant [online] Intensive Care Liaison Clinical Nurse Consultant and ICU nursing personnel [online]. http://www.nepeanicu.org/liaison.html
Outreach service (UK)	Multidisciplinary outreach care is provided by a medical critical care consultant, critical care-trained nursing personnel, a physiotherapy team and critical care technicians (Intensive Care Society Standards 2002:2-3). Åneman and Parr (2006:1258) point out that intensive care nurses who are authorised to call upon a consultant intensivist if they need to, constitute the nursing personnel who make up an outreach team.
Rapid Response Team (USA)	A rapid response team consists of an intensivist, an ICU nurse and a respiratory therapist (Offner, Heit & Roberts 2007:1223). It might also include a hospitalist and a resident or physician assistant (Simmonds 2005:58). Åneman and Parr (2006:1258) note that a rapid response team centres around a hospitalist physician who is specifically trained to manage acutely ill ward patients and not around an intensivist.
Medical Emergency Team (Australia)	A medical emergency team consists of a team of doctors (Lee, Bishop, Hillman & Daffurn 1995: 183; O'Dea, Pepperman & Bion 2003, cited in Bright et al. 2004:33). Åneman and Parr (2006:1258) note that a medical emergency team consists of intensive care medical and nursing personnel.

Section 3.3.4.2 (below) describes the calling criteria, the objectives, the advantages and the disadvantages of the care teams that had been established in various countries.

3.2.2.2   *Qualifications*

The SANC is the body that is entrusted to set and maintain standards of nursing education and practice in the Republic of South Africa. It was initially established by the Nursing Act (Act 45 of 1944), which has now been superseded by the Nursing Act of 1978 (Act 50 of 1978), as currently amended. In terms of Section 3 of the Nursing Act of 1978 (as amended), the council controls all matters that deal with nursing education and training. Section 4 of the Nursing Act of 1978 (as amended) makes provision for the approval and monitoring of nursing colleges, the conduct of examinations and the issuing of diplomas and certificates.

Section 45(1) (i) of the Nursing Act allows the SANC to promulgate training regulations. These regulations specify standards for the training that must precede registration as a nurse or midwife, for the registration of additional qualifications, and for enrolment as a nurse or nursing auxiliary. A qualification certifies that the practitioner is able to work according to the specified nursing scope of practice (which is discussed in section 3.2.2.1).

- **General ward and high care qualifications**

In South Africa, nurses are trained in nursing colleges and universities for four years until they qualify for a four-year diploma or degree that enables them to practise as a professional nurse by registering with the SANC as an authorised practitioner.

According to chapter 2 of the Nursing Act of 2005 (Act 33 of 2005:25), a *staff nurse* is a person who is educated and authorised to practise basic nursing while an *auxiliary nurse* is a person who is educated and authorised to provide elementary nursing care in the manner and to the level prescribed. Because of the need for certification, all nursing personnel of all categories are required to be able to present proof of registration before they are entitled to practise as practitioners.

- **Intensive care qualifications**

A registered nurse can obtain a post-basic critical care nursing diploma after completion of a one-year practical and theoretical course in an accredited ICU and after the successful completion of a national examination that has been approved by SANC. Nurses can also extend their qualifications by enrolling for a master's degree in nursing science at a university.

3.2.2.3   Experiences

Encarta dictionary [online] defines *experience* as "active involvement in an activity or exposure to events or people over a period of time that leads to an increase in knowledge or skill".

Effken (2001:246) points out that experienced nurses are quick to detect and respond to an unexpected or adverse patient response to an intervention. This ability on the part of nurses is particularly significant in emergency situations in which rapid information processing and appropriate responses by qualified nurses are crucial to the patient's well-being and survival. In the opinion of Haines (2007:24), it is the *experience* of nurses that enables them to make a professional judgement about whether or not patients should be moved from ICU into a ward. This has been considered to be a potential problem when more junior nursing personnel are on duty because they may not have the necessary experience and knowledge to make a well-informed decision. Experience therefore is crucial for preventing decisions to transfer patients out of ICU into general wards who are, in reality, too ill to be moved from ICU.

- **Expertise**

Lake (2003:7) believes that an exclusive focus on the numbers of nurses that are optimal for any particular nursing situation can obscure the crucial importance of clinical nursing *expertise*. Expertise may indeed be the single, most powerful indicator of the technical quality of nurses' clinical interventions. Expertise is also indispensable in the non-clinical functions of nurses, such as the ability to coordinate a therapeutic team of providers.

Bright et al. (2004:35) note that, as far back as 1987, Tanner, Padrick, Westfall and Putzier (1987:362) carried out research into the diagnostic reasoning processes of nurses and

nursing students and found that the more knowledge and experience nurses had, the more efficiently and systematically were they able to access data and the more accurate were their diagnoses than those of more junior and inexperienced nurses. A study carried out by Benner and Tanner (1987:31) demonstrated that the diagnostic accuracy of senior and experienced nurses could be attributed to the ability of such nurses intuitively to determine the correct region for assessment, to separate relevant from irrelevant data, and to recognise the changing relevance of cues as the situation evolved. Banning (2008:192) points out that as nurses become more experienced, they develop *the ability to recognise whether or not a patient's condition is deteriorating*. Banner (2008:192) also notes that more experienced nurses develop the acuity to consider several hypotheses concurrently and (depending on the level of the nurse's clinical experience) to select patient-specific information and to use pattern recognition either to support or reject the hypotheses that she or he has assembled to explain the patient's condition.

- **Inexperience**

The research undertaken by Coad and Haines (1999:245) in 1999 indicates that some patients are requiring an increased acuity, which means the amount of hands-on nursing hours in every 24-hour period that a patient needs. In tandem with this development, difficulties in recruiting qualified nurses have led to a dilution of the skill mix, to the use of temporary nursing personnel, and to a reduction in the number of nurses who are registering for post-registration courses of various kinds in their professional field. The upshot of this is that more inexperienced nursing personnel are more frequently expected to care for patients who are highly dependent, without any appropriate training and support. The inexperienced junior doctors to whom ward nurses frequently turn for advice and assistance in such situations only exacerbate already-serious situations by their ignorance and inexperience.

Haines (2007:24) points out that more and more highly dependent patients for whom highly complex treatments had been prescribed, are currently being cared for in wards. This means that a number of intricate treatments that were previously only provided within critical care environments are now being seen in some wards, and the dependency levels of patients are rising. Haines (2007:24) points to the fact of how vitally important it is for ordinary registered nurses to develop the necessary skills and knowledge that will enable them to care for this group of patients effectively and safely. "Lifelong learning" of this kind that enhances the continuity and quality of patient care was proposed as far back as 1997 by the Department of Health of the UK.

Franklin and Mathew (1994:246) note that while the ward patient population has become (on average) older and sicker, enormous improvements have been effected in surgical, anaesthetic, and critical care techniques and that this has led to high-risk patients being offered surgical interventions and advanced medical care. Indeed the expectation on the part of the public that individuals will be given access to advanced and intricate treatments and interventions is now much greater than it was in previous decades. But the increasing tendency to specialise in particular services can result in deskilling or in a lack of necessary experience on the part of registered nurses who work in general wards. Because ICU beds are in short supply even in the best hospitals, many patients are now cared for in wards that are inappropriate for their conditions. Medical patients, for example, may be cared for in surgical wards. The obvious effect of this is the nursing personnel in a surgical ward may well be unfamiliar with a patient's condition and the policies or protocols of the department which should be taking care of a misplaced patient's condition. They may also be ignorant about which medical personnel they should contact in cases of necessity.

- **Novice versus experienced nurses**

Huckabay and Jagla (1979:25) note that the deficiencies of nursing personnel staffing might well be attributed, not only to an insufficient number of nurses deployed in the ward, but also to a sub-optimal combination of skills among those who are deployed. All nurses have frequently observed situations in which experienced nursing personnel have been replaced with novices. These situations create a great deal of stress and anxiety for all nursing personnel – the no matter how experienced a well trained they might be. In such situations, the more experienced nurses have to accept the additional burden of teaching, coaching, supervising and supporting inexperienced nurses –particularly in light of Rich and Rich's (1987:65) suggestion that young nurses require more supervision and support than their older counterparts. For novices, the presence of highly skilled personnel, the first performance of tasks, and other stressful situational factors can undermine confidence and increase anxiety (Jenkins 1985:243). All of these factors exert an adverse effect on decision-making and therefore (ultimately) on the quality of service and nursing care that is delivered.

- **Confidence**

The research undertaken by Bright et al. (2004:35) identified the fact that ward nursing personnel often lacked confidence and feel ill-prepared to cope efficiently and correctly with patients who are acutely ill or unstable, and that their deficiencies in this regard only serve to increase their stress, anxiety, uncertainty and lack of confidence. These problems can only be ameliorated if nurses are empowered by means of adequate resources, in-service or on-the-job training, and by coaching in simple methods of clinical monitoring to cope adequately with patients who are acutely ill or unstable.

- **Decision-making**

Hoffman, Donoghue and Duffield (2004:53), Mattingly (1991:979) and Correnti (1992:91) all note that experience and knowledge are two of the major factors that affect *decision-making*. The ability to make the correct decisions within the context of practice disciplines such as nursing requires more than the application of theoretical knowledge. Actual experience of specific situations and conditions is necessary if the treatments that nurses offer are to address the reality of an illness as it is experienced by a particular patient. Such understanding can only evolve from an accumulation of the right kind of knowledge and practical experience on the part the nurse over a period of years. Evans (1990:180) mentions that *experience* increases the cognitive resources that are available for the interpretation of data, and that this results in more accurate decision-making. A study by Corcoran-Perry and Bungert (1992:69) suggests that because the acceptance of intuitive understanding as a valid means for improving decision-making can lead to an increase in nursing expertise, they challenge experts to share their own experiences of making decisions with their younger or less experienced colleagues.

- **Interpretation**

The *Encarta dictionary* online defines "interpretation" as an explanation or establishment of the meaning or significance of something. *The English thesaurus* [online] defines "interpretation" as the ability to perceive and explain the meaning or the nature of something. Kozier, Erb, Berman and Snyder (2004a:245-253) note that at least cognitive and interpersonal skills are indispensable for the interpretation of physiological data (see section 3.2.2.4 below).

- **Intuition**

Rovithis and Parissopoulos (2005:3), and Benner and Tanner (1987:23), extend the research of Dreyfus and Dreyfus (1986) when they offer a definition of intuition as "understanding without a rationale" (which is frequently one of the aspects of the judgment of an expert in his or her field). In 1993, Tanner refined this definition by stating that intuition is "judgment without a rationale". Rovithis and Parissopoulos (2005:9) recognised that *intuition* has in practice been linked to improved clinical judgement and more effective decision-making (McCutcheon & Pincombe, 2001) – as well as to the ability to foresee and avert crises (Cioffi, 1997). It could be argued that in this era of evidence-based practice, nurses also need to recognise the validity of intuition and to utilise it effectively in their nursing practice.

Rovithis and Parissopoulos (2005:2) point out that, in clinical nursing practice, the comprehension of salient information, the understanding of its significance, and a willingness to respond to a patient's issues or concerns on the basis of such understanding, often occurs in the absence of any conscious deliberation at all. This ability of nurses to immediately perceive and understand a situation and to respond independently in the absence of any prior linear reasoning, was first identified by Carper (1978), who referred to the fundamental importance of intuition as a way of *gaining knowledge and guiding decisions* in nursing practice.

The research undertaken by King and Macleod (2002:322-329) demonstrated that *intuitive awareness* appears to become an increasingly important aspect in the decisions made by some experienced nurses. What happens is that certain cues tend to act as a trigger that initiates an analytical process that guides a nurse to undertake a conscious search to acquire data that will confirm their sense that a change has occurred in the status of the patient. Nurses who could be classified as ranging from between competent to expert

increasingly developed these skills. The result of this kind of development was that the nurses who applied it became more and more effective at making intelligent use of their intuitive feelings as they searched for and identified vital clinical signs which they could then use when making judgements about a patient's situation. The difference between expert and non-expert decision-making appeared to lie in the ability of an expert to use intuitive judgment much more skilfully and effectively. And intuition is, of course, much more effective because it can be tested in terms of the depth of knowledge and experience that expert practitioners bring to their judgements.

In spite of research that has indicated the usefulness of intuition in the context of expert judgements (Rew 1990:37), intuition has been dismissed by other researchers as merely a form of irrational guessing (Correnti 1992:92). Because of this dismissive and critical attitude, many nurses are reluctant to follow their "gut feelings". Instead of following the leads of their intuition, they tend to deny that intuition should play any role at all in clinical decision-making. Even know some expert and experienced nurses might *know* that something is wrong before any clinical signs have actually appeared, they will deny their intuitive diagnostic abilities because intuition as a valid nursing technique has been debased and regarded with suspicion in some quarters. This tendency to dismiss intuitive judgement without good reason as a kind of irrational guessing, can undermine the confidence of nurses and inhibit their ability to make rapid and skilful judgements. Arrogant criticisms of this kind (that are not based on any kind of empirical research or reasoned argument) undermine the integrity of nursing judgement as a human ability that is supported by many different human faculties. It can also lead to questions about the competency of nursing personnel and demands for nurses to improve the quality of care so that it corresponds to the model of clinical governance that prevails in the institution.

3.2.2.4   *Competencies*

Encarta Dictionary [online] defines *competency* as an ability to do something, especially something that can be measured against a fixed standard or benchmark. Whelan (2006:199) refers to the Joint Commission on Accreditation of Healthcare Organisations, which defines *competency* as "the knowledge, skills, ability, and behaviours that a person possesses in order to perform tasks correctly and skilfully".

ICN (2004) [online] http://www.icn.ch/psscope.htm states that nurses require a long course of basic training and education, as well as ongoing post-basic education and training throughout their professional lives, before they can be regarded as being competent to practise within their profession. Nursing administrators and educators must therefore ensure that nurse educators and nurses managing nursing services are staffed by experienced nurses with suitable qualifications and a thorough understanding of the competencies and conditions that are required to deliver quality nursing care in the health care environment.

The Canadian Human Resource Systems Group (2008:1) asserts that when competencies are correctly made use of in an organisation, it provides a business with the means to translate the *organisation's vision and goals* into expected employee behaviour, to identify areas for employee development that are directly linked to desired outcomes and *organisational objectives*, to identify training areas that will render the best possible return on investment, to devise more effective (and valid) criteria for developing and evaluating performance, to identify the way in which the sets of skills that are currently possessed by the personnel will not be adequate to meet future requirements, and to ensure the retention of those competencies on which the future success of the organisation depends.

Research carried out by Whelan (2006:199) set out to compare years of competency assessment data with actual performance on the job, and discovered that the ability of

inexperienced nurses to perform their work up to a required standard of effectiveness has been declining year by year. What researchers *have* found out that there is, as yet, no accurate method of predicting the extent to which years of accumulated experience and credentials correspond to competency and ability. What *has* been established is that the better the competencies of the nursing personnel, the lower is the personnel turnover rate. A low turnover rate means that a hospital will only have to employ a minimum (or no) agency nurses, and that their existing nursing personnel tend to demonstrate a high degree of commitment to the ideals and mission of the organisation in which they work.

- **Technical, cognitive and interpersonal skills**

Kozier et al. (2004a:245-253) assert that technical, cognitive and interpersonal skills are necessary for the assessment of patients.

Kozier et al. (2004a:254-253) point out that *technical skills* include the necessary expertise to operate equipment correctly and safely and the ability efficiently to operate and handle various kinds of medical technology that are used for the performance of medical and diagnostic procedures (such as the monitoring of vital signs and the administration of medications). *Cognitive or intellectual skills* **require a nurse to be able to analyse a** problem, to solve a problem, to engage in critical thinking, and to make judgments about a patient's needs. Included in these two skills is the ability to differentiate between actual and potential health problems by means of observation and making the correct decisions and by synthesising the nursing knowledge and experience that they have already acquired. *Interpersonal skills* include therapeutic communication, active listening, conveying knowledge and information, developing trust, building up a rapport with patients, and the use of ethical means to obtain relevant information from a patient – information which is can then be utilised in health problem formulation and analysis.

- **Decision-making**

Kozier Erb, Berman and Snyder (2000:253) note that nurses must make many important *decisions* during the course of a workday, decisions that create vitally important consequences for patients. Since such decisions are often concerned with the well-being (or even the survival) of patients, it is necessary for their decisions be sound and dependable. Nurses use critical-thinking skills to collect and interpret the information that they need to make decisions. In emergency situations, it is critical thinking that enables a nurse to recognise important cues and indicators, and to respond quickly (by making adaptations, where necessary) to meet the specific needs of clients.

Those nurses who are already competent, proficient and expert, have a special responsibility to guide beginners through decision-making processes. According to Jones (1988:185), it is necessary for a nurse to observe all the vital signs of a patient before making an initial nursing assessment because vital signs are one of the most basic forms of clinical information on which nurses base decisions. Clinical decision-making is the ability to sift and synthesize information and to make and implement decisions based on reliable information obtained from the clinical environment. This ability is an essential component of professional nursing practice. The right of nurses to professional recognition is based partly on their ability to correctly observe, makes sense of and solve many different kinds of problems.

The research of O'Reilly (1993:34) also states that clinical decision-making is an essential component of professional nursing practice. Nurses must therefore be encouraged to make important decisions and to assume responsibility for them. All nursing professionals including nurse managers, nurse educators and healthcare administrators, have a responsibility to encourage professional nurses and to provide them with opportunities to practise decision-making under the observant eye of experienced and qualified superiors.

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- **Critical thinking**

According to Khosravani, Manoochehri, and Memarian (2005:1), several definitions of critical thinking in general (and within the nursing profession in particular) have been proposed. Critical thinking is a composite activity that consists of particular attitudes, knowledge, and skills. Attitudes that are used in critical thinking include an ability to recognise the existence of problems and an acceptance that one needs to produce evidence to support what one asserts to be true. The skills that one needs in critical thinking are an ability to apply what one is learned by means of inquiry and from the precedents that are contained in one's own experience and an experience one's colleagues. Stone, Davidson, Evans and Hansen (2001:66) feel that a sound definition of critical thinking within the nursing profession depends upon a disciplined intellectual process that results in sound clinical judgment. Nursing in a clinical setting requires individuals to process complex data as they plan, manage and evaluate patient care.

The Oxford English Dictionary (2005:820) defines *knowledge* as the information, understanding and skills that a person obtained by means of education or experience, or as the state of knowing about a particular fact or situation.

Dickerson (2005:240) believes that the teaching critical thinking in the basic nursing curriculum requires the strengthening of a student's analytical skills in tandem with the knowledge supplied by the core components of nursing practice. Critical thinking is a form of exercising judgment that is based upon the correct analysis of needs and on imagining what the consequences of particular decisions might be. When one exercises critical thinking, one makes a decision or solves a problem by reaching certain conclusions and by reflecting upon the results of certain possible courses of action. Brunt (2005:60) is of the opinion that critical thinking and clinical decision-making are also essential skills for interpreting *physiological data*.

One of the most important cognitive skills they do nurse requires is competence in reflection. Price (2004:46-47) defines *reflection* as the process of reviewing one's repertoire of clinical experience and knowledge so that one will be in a position to evaluate possible consequences if a certain line of action is pursued. Reflection is also an essential ability for nurses who are sufficiently imaginative and skilful to devise new (and better and more efficient) ways of dealing with complex clinical problems. Reflection also enables one to evaluate one's own competencies as a prelude to making judgments about those areas in which one's performance can be improved.

- **Lack of competencies**

Numerous studies (such as those that have been discussed in section 3.4.2.4) have shown that a lack of competencies and deficiencies in the training needs of nursing personnel can result in suboptimal care in general wards, and that such suboptimal care may actively contribute to the physiological deterioration of patients (with important consequences for hospital mortality rates). It is therefore vitally important to assess and address the competencies that are needed by all categories of nursing personnel so that one can give them opportunities for committing themselves to continuous professional improvement.

The early recognition of deteriorating vital signs relies on the correct interpretation of a range of physiological observations. These observations are obtained and interpreted at regular intervals that correspond to the seriousness of the condition that afflicts the patient. The patient who is developing a critical illness in a ward will require careful and regular observations on the part of nursing personnel who appreciate and understand the significance of basic physiological parameters and any deviation from normal values. The correct and objective measurement of a patient's physiological status is a far more reliable and objective indicator of deterioration than most subjective assessments. This indicates how important it is for health professionals to monitor basic physiological parameters

regularly, correctly and accurately. Schein, Hazday, Pena, Bradley, Ruben and Sprung (1990:1388) studied the case of 64 patients who had suffered cardiac arrest events and who had subsequently been hospitalised. They reported that 84% of the vital sign charts of all these patients accurately revealed a process of acute deterioration in the patient's condition *prior* to the cardiac arrest.

- **Development of competencies**

An effective nursing personnel development programme requires a balance of activities that had been designed to meet the unique needs of individuals and of the organisation. Certain key professionals should be involved in the development of nursing competencies. According to a study carried out by Whelan (2006:198), experienced nursing personnel can provide valuable insight into the precise competencies that need to be assessed. Nurse educators should have a thorough knowledge of the most current methods that have been developed to assess and instil competencies. Competency assessment consists of the number of different activities that include the initial development of competence, the maintenance of knowledge and skills, educational consultation, remediation, and redevelopment. Miller, Flynn, and Umadac (1998:1) add that a nurse educator's most important role is to develop competency in nurses by devising and implementing suitable educational programmes. The supervisor's role is to maintain a nurse's competence by overseeing and guiding her or his performance and practice.

3.2.2.5   Training and development

This section discusses nurse education, training, professional development and supervision.

- **Education, training and professional development**

While competent nursing personnel are one of the most basic requirements for the improvement of quality in a healthcare organisation, the state of an organisation's learning culture is of equal importance. Education and training are indispensable components of clinical effectiveness, and the responsibility for the content, style and relevance of clinical education rests with the professions (Royal College of Obstetricians & Gynaecologists 1999:1-3). Healthcare facilities therefore need to develop an organisational culture that fosters and promotes learning and development.

According to *Free Dictionary* [online] www.thefreedictionary.com/training, the term *education* refers to the process of acquiring knowledge and understanding by means of study, by teaching (especially at a school, college, or university), and by applying the theory of teaching and learning. Banning (2008:188) asserts that the education and development of nurses as autonomous clinical decision makers necessitates appropriate pre-registration education and training programmes that train nurses within an educational framework that supports the development of the intellectual and cognitive skills that are needed to manage complex situations, and to make judgements that are appropriate to the problems that appear in the context of clinical work.

The *Free Dictionary* [online] www.thefreedictionary.com/training defines the term *training* as the acquisition of knowledge, skills, and competencies as a result of the teaching of vocational or practical skills and knowledge that relate to specific useful competencies. Training is therefore the process of bringing a person to an agreed standard of proficiency by practice and instruction. Harvey, Loftus-Hills, Rycroft-Malone, Titchen, Kitson, McCormack, and Seers (2002:80) note that "the purpose of facilitation can vary from providing help and support to achieve a specific goal to enabling individuals and teams to analyse, reflect, and change attitudes, behaviour, and ways of working".

Training objectives are the goals for the realisation of which educators, administrators, developers and trainers develop a structured programme of auditing and guidelines, as well as clinical effectiveness programmes by means of which to improve services, to ensure continuous professional development, and to set standards, particularly risk management standards. The International Council of Nurses (ICN: 2004:1) and the attitude of SANC to education and training are described in section 3.2.2.1 of this chapter.

According to the *Encarta Dictionary*: English (UK), *professional development* often refers to those skills that are required for maintaining a specific career path or to general skills that are acquired by means of continuing education, including the more general skills that are an element of personal development. Professional development can be acquired by means of education and training to keep a professional current with changing technology and practices in a profession or by means of engagement with lifelong learning. Developing and implementing a programme of professional development is usually a function of the human resources or organisation development department of a large corporation or institution. DoH of the UK (2000:1) recommended the development of courses which included assessment and monitoring skills, an in-depth knowledge of normal and abnormal physiology, methods of recognising and taking care of seriously ill patients, and inculcation of professional decision-making skills. All these topics need to be addressed in the pre-registration nursing curriculum.

Nichols et al. (2000:178) note that the clinical governance model supports a culture of continuous learning, innovation, and development, and that it requires a change in the professional culture so that education and research can be accorded their rightful place and importance. A culture in which people learn from failure and in which good practice and new approaches are freely shared and willingly received, is the exception rather than the rule.

o   **Training of nursing personnel on ICU equipment**

The manufacturers of more sophisticated ICU equipment such as ventilators and patient monitoring devices, provide clinical training for all personnel who are involved in ICU treatment when such equipment is purchased. In the same way, all ICU personnel need to have undergone specialised training in the care of critically ill patients and must be trained to respond to life-threatening situations because all ICU patients are in a critical condition and may experience sudden respiratory or cardiac emergencies (*Surgery encyclopedia*; intensive care equipment [online] http://www.answers.com/topic/intensive-care-unit-equipment).

o   **Specialised training**

Nursing personnel working in specialised units such as emergency units, ICU and high care units, require specialised training to manage critical patients. According to the UK Resuscitation Council (2005: 29), the role that is played by up-to-date training and education in cardiac arrest prevention is crucially important and may mean the difference between life and death for patients. The recognition that many cardiac arrests may indeed be preventable has led to the development of postgraduate courses that are specifically designed to prevent physiological deterioration, critical illness, and cardiac arrest. These include immediate Life Support and Advanced Life Support courses. The UK Resuscitation Council (2005: 29) has furthermore stated that other courses that focus on the management of sick patients in the first 24 hours of a critical illness when more direct critical care expertise may not be immediately available. It has now been recognised that training in acute and critical care should commence early in a nurse's education, and many countries have therefore established appropriate curricula for inclusion in undergraduate education programmes.

- **Supervision**

According to the cution or performance of (something), to direct the movements of work, or take charge of a person or people in the performance of some other task.

This section discusses clinical supervision and respective roles played by a mentor, an assessor, and a novice. This section has been included in this study to emphasise the importance of the development and guidance of nursing practitioners.

o **Clinical supervision**

According to Saliba (1997:1), the word "clinical" refers to those activities that occur at a sick bed. Grossman (2007:29-30) defines *clinical supervision* as an exchange between practising professionals that enables the development of professional skills. The Royal College of Nursing (2002:3) stated that clinical supervision is "a formal process of professional support and learning which enables individual practitioners to develop knowledge and competence, assume responsibility for their own practice and enhance consumer protection and safety of care in complex clinical situations". Clinical supervision is also used as a tool to support various elements of clinical governance that include quality improvement, risk management, performance management, and systems of accountability and responsibility. It enables a more structured and disciplined approach to deeper reflection on clinical practice. This can lead to improvements in practice and contribute to clinical risk management.

According to the Royal College of Nursing (2002:6), clinical supervision is a vital component in the framework of clinical governance for nurses because it ensures continuous professional development and provides opportunities for continuous improvement.

o **Mentor and preceptor**

Although *clinical supervision* is used as an umbrella term for many things, there is some evidence that many people conflate it with the role of mentor and that of an assessor who provides supervision. Grossman (2007:28) suggests that mentoring in nursing encompasses a guided experience which is formally or informally assigned over a mutually agreed-on period, and that mentoring empowers the mentor and mentee to develop personally and professionally within the context of a caring, collaborative, culturally rich and respectful environment. The goals of supervision are to expand the knowledge of the mentee and to assist him or her to develop clinical proficiency, autonomy and self-esteem as a professional within the safe boundaries of the mentor relationship.

In the opinion of Grossman (2007:29-30; 8), *mentor* refers to the process in which an experienced professional nurtures and guides a novice. A mentor tends to be a person who possesses an advanced degree of experience, knowledge, and power in the organisation in which the mentor and the mentee find themselves. The mentor accepts the responsibility of developing the skills of the mentee so that he or she can extend and enrich the knowledge and experience on which their profession is founded. According to the *Medical Dictionary* [online] http://medicaldictionary.thefreedictionary.-com/preceptor a *preceptor* as an expert or specialist, such as a physician, who gives practical experience and training to a student, especially a student of medicine or nursing.

o **From novice to expert**

Uys, Van Rhyn, Gwele, Mcinerney and Tanga (2004:501) use of the work of Dreyfus and Dreyfus to identify five levels of practice that range from novice to expert. The main characteristics of these different stages or levels of practice are described below.

Novice: The behaviour of the novice nurse is characterised by rule-governed behaviour and is normally extremely circumscribed and inflexible in scope and execution. Because novice nurses often have little or no experience of the situations with which they are expected to cope, they need to be given inflexible rules to guide their performance. Novices are not accorded any latitude to change their behaviour even though it may seem to them that the context requires it. The most they can do to cope with an emergency that is beyond their scope and competence, is to summon a superior. It is obvious from this definition that novice nurses need continuous and close supervision and coaching.

Advanced beginner: Because of their previous experience, advanced beginner nurses have the ability to differentiate between the degrees of seriousness that are present in various emergency situations. They are therefore marginally more skilled in identifying clinical situations and are entitled (within limits) to be more flexible if the situation demands it. They nevertheless always operate under strict professional supervision.

Competent: A competent nurse is someone who is performed nursing duties in the same or similar situations for two or three years can look and therefore anticipate developments make plans with a view to responding effectively to crises and achieving considered long-term objectives. The competent nurse is someone who is able to consider the implications of present and future situations make plans that are based on a conscious, abstract and analytical contemplation of the problems that appear.

Proficient: A proficient nurse is someone who is sufficiently experienced and qualified to perceive situations and their implications holistically, but who still needs to rely on the established procedures, rules and guidelines of the nursing and medical professions. Since the judgments of a proficient nurse are based on many years of experience, education and training, they comprehend the immediate consequences as well as the long-term implications of all the clinical situations that require attention.

***Expert*:** An expert nurse is someone who no longer needs to rely on analytic principles such as the established rules, guidelines and maxims that govern the practice of nursing in order to decide upon an appropriate line of action. The enormous amount of experience that has been accumulated by an expert nurse enables an expert nurse to gain an intuitive grasp of each new situation and to go immediately to the heart of the problem.

The description provided by Uys et al. (2004:500) of an advanced beginner nurses also indicates that a practitioner is required to practise safely because *safe nursing practice* is the legal requirement in South Africa.

3.2.3   Equipment and supplies

This section discusses the equipment that is used in emergency departments, intensive care units, high care and general wards.

3.2.3.1   *Emergency department*

Since resuscitation is a key requirement in an emergency department, there are usually several individual resuscitation bays for adults in an emergency department, as well as one that is especially equipped for paediatric resuscitation. Each bay is equipped with a defibrillator, a ventilator, airway equipment, oxygen, intravenous lines, fluids, and emergency drugs. Resuscitation areas also contain electrocardiogram machines and x-ray facilities.

3.2.3.2   *Intensive care*

According to the *Surgery Encyclopedia:* Intensive care equipment (2008) [online] http://www.enotes.com/surgery-encyclopedia/intensive-care-unit-equipment, *intensive care*

unit equipment includes technology and devices for monitoring patients, for respiratory and cardiac support, for the management of pain, various kinds of emergency resuscitation equipment, and other life support equipment that is designed to care for patients who are seriously injured, who have a critical or life-threatening illness, or who have undergone a major surgical procedure. All such patients require continuous 24-hour care and monitoring. An ICU may be designed and equipped to provide care for patients with a range of conditions and injuries, or it may be designed and equipped only to provide specialised care for patients with specific conditions. Intensive care unit equipment includes provision for patient monitoring, life support and emergency resuscitation equipment, and diagnostic devices. ICU is also furnished with disposable equipment such as catheters, tubes and drains.

- **Operations and diagnostic equipment**

According to the *Surgery Encyclopedia*: Intensive care equipment [online] http://www.answers.com/topic/intensive-care-unit-equipment, **operations equipment** in the ICU connects patients to cardiac monitoring systems that sound an alarm when a patient's vital signs suddenly deteriorate. All patient monitoring devices are connected to a central nurses' station for the purpose of easy supervision. **Diagnostic equipment** such as mobile x-ray units for bedside radiography and portable clinical laboratory devices, are also required in the ICU.

- **Healthcare team roles**

All of the equipment in an ICU is used by team members who are specialised and experienced in their use. Such a team usually consists of a critical care attending physician (also called an intensivist), various critical care nurses, an infectious diseases team, critical care respiratory therapists, pharmacologists, physical therapists, and dieticians. Physicians

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who are trained in other specialties such as anaesthesiology, cardiology, radiology, surgery, neurology, paediatrics, and orthopaedics, may be consulted and called to the ICU to treat patients who require their particular forms of expertise. Radiological technologists who are exposed in carrying out mobile X-ray examinations (i.e. bedside radiography) also form part of an ICU team. Blood analyses are undertaken either by nurses or by clinical laboratory personnel. Equipment in an ICU is maintained and repaired by the hospital's biomedical engineering personnel and/or representatives of the manufacturers of the equipment (*Surgery encyclopedia*; intensive care equipment [online]

http://www.answers.com/topic/intensive-care-unit-equipment.

3.2.3.3 *High care*

According to Australian and New Zealand College of Anaesthetists (2008:1-2), a high care unit is a section that is especially staffed and equipped to provide a level of care that is intermediate between the provided in an intensive care unit and in a general ward. Because patients in HCUs are often suffering from single organ failure, they are at a high risk of developing complications. An HCU should contain resources for the immediate resuscitation and management of the critically ill. Specialised equipment should be immediately available for the management of short-term emergencies such as, for example, situations in which mechanical ventilation is required. In patients who are stable, routine monitoring and support may include electrocardiograph equipment, oximetry, an invasive device for measuring blood pressure, low-level inotropic or pressure support, and non-invasive ventilation.

3.2.3.4 *General wards*

Pelletier (2008:6) has noted that the amount of technological equipment that is routinely needed in the healthcare sector has increased rapidly over the past decade or two. Highly

complex technological equipment is now also found in general wards and not only in traditionally "high tech" environments – equipment such as infusion control devices or suction pumps, computerised patient information systems and other electronic devices that make contributions to treatment and monitoring.

3.2.4   Management and leadership

According to the *Oxford Dictionary* (2005:896), *management* refers to the act of running and controlling a business or organisation while *style* refers to the particular way or manner in which it is done. The *Oxford Dictionary* (2005:838) defines a leader as a person who leads a group of people, and defines *leadership* as the state or position of being a leader.

3.2.4.1   *Management style*

A *management style* refers to the overall idiosyncratic methods of leadership that are used by a manager. McKay (2005:1-2) is of the opinion that *managing* means working with and through other people to accomplish the objectives of both the organisation and its members.

Organisations create management hierarchies as a method for maintaining their control over planning, budgeting, reporting and supervising, and in order to ensure that all these activities take place in an orderly and controlled fashion that is acceptable to the distinctive ethos and mission of the organisation. *Management* therefore consists of the process of understanding all the components and linkages in a complex organisation and the systematic selection of appropriate goals and purposes for that organisation, the systematic design and development of strategies for achieving the goals of the organisation, and the ability to marshal the resources that are necessary for achieving the goals of the organisation. *Management* also incorporates the organisation, direction and control of the

activities, resources and personnel who are indispensable for achieving the predetermined purpose or overall aim of the organisation. In order to accomplish the aims of the organisation, an organisation needs a manager who possesses the distinctive human qualities that are necessary for controlling, inspiring and encouraging the people who have been employed to accomplish the organisation's stated aims and purposes.

McKay (2005:1-2) point out that management focuses on creating and managing structures and controlling complex processes. Management, in other words, is concerned with doing things in accordance with the established protocols of the organisation and in providing solutions to problems whereas *leadership* is concerned with inspiring people to work towards the achievement of stated goals, often by means of the personal example that is set by the leader. All managers of organisations have to be able to perform various major functions which include planning, control, coordination, leadership and motivation. The ways in which managers perform such functions differ (often quite noticeably) from one organisation to another. Such differences in the ways in which managers execute their major functions or referred to as differences in *management style*.

Management styles have been classified in a number of different ways by researchers over the years. A management style may thus be autocratic, charismatic, democratic or participatory, all a management style may conformed to the classical management principles of *bureaucracy*. According to the *Business dictionary* [online] http://www.answers.com/topic/-management-styles, an **autocratic management style** means that the manager makes all major decisions by herself/himself, keeps all strategic information under lock and key, and prohibits decision-making on the part of other members of the senior management. The manager is the only person who sets objectives and tasks, and she/he expects members of the workforce to do exactly what is required without question and without deviations from the protocols that she/he has devised. The

kind of communication that is involved in autocratic management is mainly top-down – from the leader to the subordinate.

Charismatic management style, by contrast, is characterised by a manager's exceptional gift for inspiring workers and colleagues in for describing the mission and purpose of the organisation in inspirational terms. Charismatic managers are able to articulate ideological goals and missions, to communicate their ideas to followers with passion, enthusiasm and inspiration, to set an example by their own behaviour, and, because of their ability to inspire others, they are often able to inspire a great deal of hard work and commitment on the part of their followers, which frequently far exceeds normal expectations. Leaders who affect a *democratic management style* invite employees to become part of the overall decision-making process by which the institution is run. Rules and policies of therefore the result of intensive discussion and debate, and the agreement of the majority. The direction of communication in a democratic management style organisation moves extensively in both directions (from subordinates to leaders and vice-versa). Managers operate with a *participatory management style* base their working methods on the belief that workers are able to contribute to the design of their own responsibilities and contributions to the organisation.

3.2.4.2   *Leadership style*

McKay (2005:1-2) writes: *"Nor is leadership necessarily better than management or a replacement for it. Both are necessary for success in a complex and volatile business environment."* Leadership means a willingness to challenge existing ways of doing things and old established routines, and a desire to chart new directions for an organisation that will improve the viability and efficiency of the organisation. Leaders focus on inspiring people to work towards the achievement of a new direction and improve methods for delivering the same results, and they often works through the personal example that is set by the leader.

Leadership is concerned with motivating and enabling others to work towards new goals and to become more efficient and creative in the accomplishment of their tasks.

3.2.4.3 *Policies and procedures*

According to the *Business Dictionary* [online] http://www.businessdictionary.com/, policies and procedures are sets of documents that describe an organisation's policies and the procedures that they have devised for the fulfilment of such policies. **Policies** are principles, rules and guidelines that have been formulated and adopted by an organisation in order to actualise its long-term goals. They are designed to provide guidance about all important matters that affect the organisation, to shape the form and content of all major decisions and actions, and to ensure that all activities take place within the boundaries that are set by such policies. **Procedures** are the specific methods that organisations use to put policies into action in the day-to-day operations of the organisation. When policies and procedures work together in a harmonious way, they ensure that the intentions of the management and founders of an organisation are translated into practical actions and outcomes that are compatible with the foundational intentions of the organisation.

3.2.5 Finances

This section provides a brief overview of a hospital budget and how much it costs to deliver a healthcare service.

3.2.5.1 *Budget*

The World Health Organization (2004:3) points out that the overriding concern of a budget is to place a limit on the total amount of money that is spent on healthcare. A budget is an annual plan that is designed to promote the effective use of human and material resources

and services, and a means for managing the environment in order to improve productivity and for achieving the financial objectives expressed in the budget. A budget reflects the ongoing activities implied in revenues and expenses in the way in which funds are managed in order to maintain fiscal objectives and to translate them into financial terms.

3.2.5.2   Cost

Revenue and costs both contribute to an organisation's profitability. One of the ways in which an organisation can improve its financial performance is by controlling its costs. The World Health Organization (2000: xvii) notes that, in many countries, two-thirds or more of annual recurrent expenditures reflect labour costs.

The literature is unanimous about the fact that the provision of care for critically ill patients represents a costly endeavour. Halpern, Pastores and Greenstein (2004:1254) point out that the establishment and maintenance of ICUs and HCUs is an extremely expensive undertaking. Their research showed that ICU costs in the USA consume 4.2% of National Healthcare costs, which represents between 0.56% and 1% of the gross domestic products – a figure amounting to between $55 and $67 billion per year. Brilli, Spevetz, Branson, Campbell, Cohen, Dasta, Harvey, Kelley, Kelly, Rudis, St. Andre, Stone, Teres, Wele and Peruzzi (2001:2007) note that 80% of hospitals in the USA have ICUs and that the patients who receive medical care in intensive care units account for nearly 30% of any hospital's acute care costs – in spite of the fact that these patients occupy only 10% of inpatient hospital beds. Research conducted by Manimala and Suhasini (2004:238) revealed the fact that an ICU bed in an Indian hospital costs three times more per day than a bed in an acute ward. In addition to it, an ICU consumes 8% of the total hospital budget in India, while the corresponding figure for the USA is between 14% and 20% of a hospital's budget. The cost of maintaining ICUs and HCUs in South Africa is estimated to consume 30% of the funds disbursed by medical aid associations every year.

Bhagwanjee and Scribante (2007:4-6) note that there is an enormous difference between the estimated annual expenditure on health care in the USA (where healthcare receives 16% of gross domestic products) in healthcare in developing countries (which devote approximately 3% of their gross domestic products to healthcare expenditure). The amount of money that South Africa spends on healthcare expenditure is relatively high for a developing country (it is estimated to account for between 8% and 10% of the country's annual budget). The Hospital Association of South Africa (2008:20) has observed that the expenditure of hospitals has changed in line with changes in admission figures. Hospital Association of South Africa attributes this change to increased acuity, increased levels of care, increased lengths of stay, greater drug usage per bed-day and the purchase of new forms of technology. Hospital Association of South Africa (2008:20) has noted that as the severity of cases increases, so will the proportion of the budget being consumed by more expensive ICU and high care costs increase, and that ward days will also increase relative to general ward days.

3.3   PROCESS

"Process" in this context refers to the methods that are adopted by an organisation so that it will be in a position to provide services such as the procedures and practices that are implemented by nursing personnel, the delivery and evaluation of care, monitoring, general evaluation, and other actions that modify the provision of care. This section describes the hospital activities, coordination and control measures that are subsumed under the heading of *process*.

3.3.1   Process activities

This section discusses the process is inherent in patient flow, admission, nursing care, monitoring and clinical audit.

3.3.1.1 Patient flow

Côté (2000:8) points out that *patient flow* is characterised by certain recurrent features that include an entrance, an exit, a path connecting the entrance to the exit, and the random nature of healthcare elements. Patient flow begins at a point when a patient is first diagnosed with a particular medical condition or at that point where a patient first enters or is admitted to a healthcare facility. After a medical condition has run its course, the patient leaves a hospital or is discharged from a healthcare facility. Between these two points (the patient's entry into a hospital and the patients discharge from a hospital) there exist a number of conditions, activities, services and locations that the patient will usually encounter. Between these two points, a patient will come into contact with a variety of healthcare resources and personnel (such as beds, examining rooms, physicians, nurses and medical procedures). This implies that the concept of *patient flow* can be depicted as a network.

According to the Institute for Healthcare Improvement in the USA (2003:3-4), optimal care can only be delivered when "the right patient is in the right place with the right provider and the right information at the right time". Efforts to effect improvements in patient flow demonstrate that it is possible to reduce waiting times and delays in hospital care and to achieve better outcomes at lower costs.

3.3.1.2 Admissions

This section discusses the number of hospital admissions and admission criteria.

- **Number of hospital admissions**

The Hospital Association of South Africa (2008:22) states that there has been an increase in the total number of hospital admissions amounting to approximately 13% (or just over 3% per annum between 2002 and 2006 in the private sector). Hospital Association of South Africa (2008:22) has also noted that the prevalence of disease and its progression in South Africa affect the number of hospital admissions as well as the severity of the cases that are admitted. This in turn impacts on the number of bed-days and the level of care that is required for each of these bed-days (when one compares the requirements of high care to the requirements of general wards).

- **Admission criteria**

The severity of a patient's condition will dictate the level of care that will be needed, whether such care is delivered in general wards, high care or in intensive care units.

Cuthbertson and Webster (1999:294) have observed that patients who become physiologically unstable require intensive nursing and medical care. They also require frequent observation and treatment changes, and are usually suffering from *multi-organ dysfunction* with an unpredictable 24-hour prognosis. Such patients normally need to be attended by two critical care nurses in an intensive care unit.

Cutherbertson and Webster (1999:296) also point out that intensive care is appropriate for patients who require or who are likely to require advanced respiratory support and the support of *two of more organ systems.* They also note that patients suffering from a chronic impairment of one or more organ systems to an extent that restricts their daily activities (co-morbidity), and who require support for an acute reversible failure of another system,

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are all in need of intensive care nursing. Such patients need a 1: 1 patient-nurse ratio to support and sustain them.

Cuthbertson and Webster (1999:294) have found that although high care patients are usually physiologically stable, they need more intense and frequent monitoring than do ordinary ward patients. Among such patients one would find those who need support because of a single failing organ system but who do not need advanced respiratory support. These patients would benefit from a more detailed and frequent observation schedule than can be provided in a general ward. While they no longer need to remain in an intensive care unit, they are not yet well enough to be returned to a general ward. Such patients include post-operative patients and those who need close monitoring for more than a few hours.

3.3.1.3   Nursing care

A detailed description of the concepts of a nurse, a nursing care plan, a nursing assessment, a nursing process, problem solving, healthcare and healthcare systems enable the researcher to define the concept of nursing care by means of examining the various components of which it is composed. The *English Dictionary* [online] http://www.babylon.-com/definition/nursing_care/English defines all of these concepts in the following way:

- **Nursing care**

Nursing care means care of patients. This kind of care is part of what a nurse does when she or he implements a nurse's role in the implementation of a care plan.

- **Nurse**

Nurses are responsible (together with other healthcare professionals) for the treatment, safety and ultimate recovery of acutely or chronically ill or injured people, the maintenance of health in the healthy, and the treatment of life-threatening emergencies in a wide range of healthcare settings. Nurses may also be involved in medical and nursing research and perform a wide range of non-clinical functions that are necessary to maintain the delivery of healthcare.

- **Nursing care plan**

A nursing care plan details the nursing care that will be provided for a patient. A nursing care plan describes a set of actions that the nurse will implement to resolve the nursing problems that are identified by an assessment. The drawing up of such a plan represents an intermediate stage in the nursing process. It guides the ongoing provision of nursing care and assists in the evaluation of that care.

- **Nursing assessment**

Nursing assessment means the gathering of information about a patient's current physiological, psychological, sociological, and spiritual status.

- **Nursing process**

The nursing process is the process that nurses use to deliver care to patients. Such processes often supported by specific nursing models and philosophies of nursing and the delivery of care. The nursing process was originally an adapted form of problem

solving and was classified as a process of deductive reasoning (which means reasoning that leads to a conclusion after a methodical analysis of the pertinent facts).

- **Problem solving**

Problem solving represents a mode of thinking or reasoning. Problem solving is considered to be one of the most complex of all intellectual functions. It has been defined as a higher-order cognitive process that requires the ordered manipulation of more routine and fundamental skills. Problem solving is one part of the problem-solving *process* that includes problem finding and problem shaping.

Kozier et al. (2004b:261) are of the opinion that the interpretation of vital signs is a vital and integral component of the nursing process. They regard the interpretation of vital signs as a manifestation of a nurse's problem-solving ability. Uys, et al. (2004:500) note that, in the context of healthcare, problem-solving refers to a process of selectively attending to information in a patient-care setting while formulating hypotheses about the origins and progress of a patient's specific problems. Nurses therefore utilise critical thinking to identify rational solutions to problems that relate directly to client care. Kozier et al. (2000:260) define *problem solving* as "the process used when a gap is perceived between an existing state (what is occurring) and a desired state (what should be occurring)". Kozier et al. (2000:254) stated that nurses make decisions in the course of solving problems as a prelude to each step of the nursing process.

- **Healthcare**

Healthcare implies the prevention, treatment, and management of illness and the preservation of mental and physical well-being by means of the services that are offered by professional caregivers in the medical, nursing and allied health professions. World Health

Organization defines *healthcare* as a totality of all those goods and services that are designed to promote health, including "preventive, curative and palliative interventions, whether directed to individuals or to populations". The organised provision of such services on a national and local level constitutes a healthcare system.

- **Health care systems**

A *health care system* is the organisation and the methods by means of which health care is provided. In practice, these systems vary enormously from one country to another, and not all health care is delivered by means of a health care system. Although the comparison of various systems is the focus of a great deal of current research into health care provision, systems are usually compared in this research in terms of how they are financed and how they are managed.

3.3.1.4   Monitoring

Encarta Dictionary: English (UK) defines *monitoring* as checking something at regular intervals so as to find out how it may be progressing or developing.

Goldberg (2008) [online] http://meded.ucsd.edu/clinicalmed/vital.htm asserts that *vital signs* include the measurement of temperature, the respiratory rate, pulse, blood pressure and, where appropriate, blood-oxygen saturation. The term *vital signs* in this context refers to the measurement of vital or critical physiological functions whereas the term *observations* implies a broader and more encompassing range of measures. This suggests that patient observations need not be limited to the traditional four parameters that are mentioned above, but that these observations may be supplemented by additional measurements such as those that are crucial to a patient's clinical status. Gorgas (2004:3) notes that vital signs are measurements that provide a unique and objective assessment of a patient's clinical

condition and that they indicate the severity of the illness and the urgency in terms of which a patient requires interventions. *Deteriorating* vital signs are an important indicator of the deteriorating physiological status of a patient whereas *improving* values offer some reassurance that an unstable patient is responding to whatever therapy and treatments have been provided. The UK Resuscitation Council (2005:28) asserts that the monitoring of a patient's respiratory rate is essential because it may predict the imminence of a cardio-respiratory arrest.

Gorgas (2004:24) points out that pulse oximetry has made a significant contribution to monitoring techniques because it provides a non-invasive method of monitoring oxygenation in a wide variety of clinical situations. Pulse oximetry is a non-invasive and inexpensive monitoring procedure that gives continuous real-time estimates of arterial saturation in the range between 80% and 100%. It provides an early warning of a diminished perfusion rate while avoiding the discomfort and risks that are associated with arterial puncture. As a result, pulse oximetry has become a standard technique among other clinical procedures. The *Medical English Dictionary* [online] http://www.babylon.com/defi-nition/Non-invasive_(medical)/English defines the term *non-invasive* in medicine usage as follows: "A medical procedure which does not penetrate or break the skin or a body cavity, i.e. it doesn't require an invasive incision into the body to introduce a catheter to obtain a blood sample."

3.3.1.5   *Clinical audit*

A *clinical audit* is a standard process that is used to identify patterns and trends in nursing practice. Section 2.2.2.2 in chapter 2 describes and discusses the meaning of *clinical audit*.

3.3.2 Process coordination

In order to deliver a service effectively, all the components, phases, processes and sequences of a service need to be coordinated. Process coordination is discussed below.

3.3.2.1 *Communication*

The *Oxford English Dictionary* (2005:291) defines communication as the activity or process of exchanging information by several methods such as the writing of reports and documents, auditory means such as speaking, and other communication systems such as telephones and call-systems.

A discussion of the need for a conceptualising process for successful reporting is discussed below.

- **Reporting**

According to the *Oxford English Dictionary* (2005:1238), *reporting* is a form of communication that gives people information about something that a person has heard, seen or done, and its purpose is to inform. A spoken or written description of something will contain information that somebody needs to have if it is intended to be a method of reporting.

o **Conceptualising processes for successful reporting**

Andrews and Waterman (2005:473) utilised a grounded theory approach for conducting research into how physiological deterioration can be effectively reported. They

investigated how ward-based nursing personnel used vital signs and the Early Warning Score to detect or "package" physiological deterioration effectively so that doctors could be presented with coherent reports that were easily accessible to interpretation. In the way, nurses were able to maximise the efficiency of their referral of patients to doctors by providing credible evidence about this of a patient's physiological deterioration. This core category has been conceptualised in three processes of *intuitive knowing, contextualising,* and *grabbing attention*. Nurses were able to identify patients whose status had changed and who urgently needed medical attention by means of *intuitive knowing*. The physiological deterioration of the patient concerned was explained in the context of his/her medical diagnosis, the rates of progression, and changes in vital signs through a process that is called *contextualising*. This process enabled nurses to present credible information about deterioration in a persuasive way— by *grabbing attention*—so that doctors would be more likely to review the condition of a patient whose condition urgently needed reviewing.

Whatever quantifiable evidence of deterioration was available was presented to doctors by means of *packaging deterioration*. Doctors then used this quantifiable evidence to make a judgment about how ill the patient and what needed to be prioritised in terms of assessment and treatment. Vital signs provide a *convincing referral language* for nurses because they are presented by means of unambiguous and concise medical terms that are immediately understood by all hospital nursing personnel. It was also observed that when nurses used subjective, non-medical language to communicate information about deterioration, they often came across as inarticulate and incoherent, and this would prompt further clarification from the doctors. The Early Warning Score quantified and packaged the physiological deterioration indicated by the five vital signs (temperature, systolic blood pressure, heart rate, respiratory rate, and central nervous system status) in a precise and concise manner. Since this empowered nurses to be far more effective in their presentation of clinical evidence to doctors, it also enabled doctors to respond more quickly and decisively to their requests for referrals. The Early Warning Score also made it

much easier for doctors to *contextualise* the information they received in terms of the relative importance of symptoms and the severity of deterioration, to make informed judgments about the condition of patients, to prioritise the need for care and treatment, and therefore to facilitate a more rapid diagnosis and provision of treatment where needed.

Smith, Prytherch, Schmidt, Featherstone, Knight, Clements and Mohammed (2006:19) note that the literature tends to emphasise the importance of identifying premonitory signs (which refer to the signs such as tachypnoea that emerge in the stage before technological monitoring begins in ICU with the aid of monitoring equipment) as a method for augmenting the prediction of physiological deterioration. Although deterioration is sometimes well documented, there might be little discernible evidence of intervention. In many cases, the monitoring and recording of vital signs that are presented to a doctor are infrequent and/or incomplete. Coiffi (2000:112) followed up on the research conducted by Daffurn, Lee, Hillman, Bishop and Bauman (1994) when they undertook a descriptive study that described and investigated the experiences of nurses who had been involved in calling the Medical Emergency Team (MET). They used this research to establish that nurses often recognised patients who were in need of urgent help on the basis of "a gut feeling, a sixth sense" that they had with regard to particular patients, and that they often linked such intuitive feelings to past experiences in which their intuitive feelings had been vindicated by the subsequent course of events. Cioffi (2000:114) concludes that although the criteria for calling the MET should be standardised by means of an objective consideration of the physiological variables of a patient, a nurse's *subjective* and *intuitive* feelings about patient deterioration should also be valued and recognised by other healthcare professionals.

3.3.3 Control measures

This section discusses the correct procedures for monitoring clinical markers.

3.3.3.1 *Correct monitoring*

The correct monitoring of vital signs depends on the skilful use of the equipment that is used to obtain accurate information about physiological indicators. After these observations have been correctly interpreted, the medical and nursing care that a patient might need can be considered. Specific techniques such as techniques to measure heart rate, blood pressure or mean arterial pressure are used to measure physiological variables – either directly or indirectly (Burns & Grove 2005:746). Competencies in three domains (cognitive, interpersonal and technical – as described in section 3.2.2.4 of chapter 2) are all necessary for the correct monitoring of physiological data.

The UK Resuscitation Council (2005:28) have confirmed that *regular monitoring* and the implementation of the *early and effective treatment* of seriously ill patients appears to lower the rate of cardiac arrests that occur in hospital contexts. When patients deteriorate, they tend to display the same clinical signs, all of which indicate failing respiratory, cardiovascular, and neurological systems. This is the common basis on which the monitoring of the vital signs of patients is predicated. Abnormal physiological signs are common in general wards. Harrison, Jacques, Kilborn and McLaws (2005:149), as cited by the UK Resuscitation Council (2005:28), note that the important physiological indicators of sick patients are measured and recorded less frequently than is desirable under the circumstances. While the monitoring of the respiratory rate is essential in any event, it may also offer a clear indication of an imminent cardio-respiratory arrest.

- **Clinical marker indicators**

Clinical marker indicators are the international physiological arithmetic mean values of vital physiological data. The *Encarta Dictionary*: English (UK) [online] defines *clinical* as scientific, medicine-based or involving medical treatment, practice, observation, or diagnosis, and they define a *marker* as an indicator, object or sign that indicates the position or presence of something. The *Collins Essential English Dictionary* [online] defines an *indicator* as a number or ratio (a value on a scale of measurement) derived from a series of observed facts. According to Subbe, Kruger, Rutherford and Gemmel (2001:521), five routine physiological parameters, namely systolic blood pressure, pulse rate, respiratory rate, temperature, and neurological status, are essential information for recognising and identifying patients who are at risk of an imminent and catastrophic deterioration. Goldhill, White and Sumner (1999a:529) suggest that it would be it would be useful to add *oxygen saturation* and *urinary output* as vital and highly informative physiological parameters.

- **Quick response parameter indicators**

According to the *Medical Dictionary* [online] http://medicaldictionary.thefreedictionary.-com/parameter, a *parameter* is defined as an objective, definable, and measurable characteristic of a patient or of the process or outcome of care. Donabedian (1981:411) points out that each parameter has a scale of possible values. The *Medical dictionary* [online] notes that the universe value of any summarising measure of the distribution of one or more characteristics is called a *parameter*.

McGloin, Adam and Singer (1999:256) indicate that the physiological abnormalities of blood pressure, pulse rate, respiratory rate, oxygen saturation, temperature, urine output, and levels of consciousness involve grading that is sometimes located beyond normal

physiological parameters. The Track and Trigger System is a method of using the scoring of physiological indicators to trigger action from the ward itself or from clinical experts. Cullinane et al. (2005:4) note how the early warning score is based on the allocation of "points" to manifestations of physiological deterioration, and that this, in turn, allows a clinician to calculate a total "score" and to designate commonly agreed-upon "trigger" levels.

- **Indicators of pain management**

According to the *English Dictionary* [online] http://www.babylon.com/definition/acutepain-/English, *pain* is a sensation transmitted from sensory nerves through the spinal cord to the sensory area of the cerebrum where the sensation is perceived and interpreted as pain. The International Association for the Study of Pain defines *pain* as "an unpleasant sensory and emotional experience associated with actual or potential tissue damage, or described in terms of such damage".

The pain assessment tool devised by Whaley and Wong (1987:1070) assists patients to describe the intensity of their pain. Their *pain faces scale* uses six faces with different expressions on each face. Each face is that of a person who feels happy and contented because he or she feels no pain at all or only limited pain, or is that of a person who feels unhappy, anxious and depressed because he or she is experiencing a great deal of pain. Patients are asked to choose the face that best describes the degree of pain that they are feeling. It is possible for children of 3 years or older to use this rating scale. (See figure 5.3 for the pain faces scale.) Middleton (2003:28) notes that pain produces a physiological stress response that includes increased heart and breathing rates to facilitate the increased demands of oxygen and other nutrients for vital organs. The failure to relieve pain produces a prolonged state of stress that can produce harmful effects in many of the body's

systems. The meticulous management of acute pain is an essential component of holistic nursing care.

- **Biochemical indicators**

According to the *Medical Dictionary* [online], the *biochemical profile* is an array of biochemical tests which are performed on individuals who are admitted to a hospital or clinic. These tests usually involve the use of automated instrumentation. The *Collins Essential English Dictionary* [online] defines an *indicator* as a number or ratio (a value on a scale of measurement) derived from a series of observed facts.

3.3.3.2 *Approaches/strategies for the management of at-risk patients*

This section describes what the literature has to say about the approaches and strategies that need to be instituted in order to manage patients-at-risk in general wards. This survey will also look at the kind of care teams that are used in various countries, at their advantages and disadvantages, and at the scoring systems that are used to support nursing decisions.

- **Care teams**

The different approaches and strategies that have evolved in various countries have led to a global trend to establish a care team that is responsible for preventing suboptimal care, for managing patients at risk and the deterioration of ward patients. According to a cohort study undertaken by Åneman and Parr (2006:1261), the rationale for implementing a designated team is that the early recognition and rapid institution of adequate therapy for a deteriorating patient can lead to an improvement in the condition of the patient. The

concept of bringing the necessary expertise to any patient who is acutely ill (irrespective of his or her location within the hospital) has been described as "critical care without walls".

Daffurn, Lee, Hillman, Bishop and Bauman (1994:115), cited by Bright et al. (2004:37); Lee et al. (1995:184) and Morgan, Williams and Wright, (1997) call for various strategies to reduce for the incidence of suboptimal care, all of which focus on the identification of patients at risk of critical illness and the provision of some form of critical care outreach service that offers expert advice about the management of these patients. One strategy that has been adopted in Australia and the UK to assess and manage risks in such patients is called the **ICU Liaison service** and the **Outreach service** respectively. These names imply that such services which are being used in ICU offer management advice, education and support for general wards with regard to patient care – and not only with regard to the fulfilment of variously defined calling criteria.

Simmonds (2005:42) has pointed out that three fundamental problems contributed to the mortality of the American patients. These problems related to failures in *planning* (including assessments, treatments and goals), to failure in *communication* (communication between patients and nursing personnel, communication between nursing personnel and nursing personnel, and communication between nursing personnel and the physician), and to an inability or failure to *recognise* a patient's deteriorating condition. These problems were addressed by organisations across the USA which began to organise *rapid response teams*, which, in Australia, are also known as *medical emergency teams*. Åneman and Parr (2006:1258) note that an *medical emergency team* is alerted to a patient's condition on the basis of various defined criteria that facilitate further management.

Table 3.3 sets out a concise portrayal of the intensive care liaison service, the outreach service, the rapid response team, and the medical emergency team. Table 3.4 summarises

the advantages and disadvantages of teams that are utilised for assisting high-risk patients in general wards.

- **Calling criteria**

According to Bright et al. (2004:38-39), the process of identifying critically ill and deteriorating patients has traditionally relied on the clinical intuition of personnel. While the value of experienced clinical judgement is well recognised, there has been a trend towards shorter training times and reduced hours of work in the clinical environment, and objective systems of clinical measurement are becoming increasingly important because inexperienced practitioners frequently fail to recognise impending critical illnesses and the need for assistance.

Several such systems utilise combinations of physiological variables as indicators of risk. According to Bright et al. (2004:36), variables with predictive capacity include chest pain, personnel concern, and deviant vital signs. The choice of vital signs such as systolic blood pressure, oximetry, pulse rate, respiratory rate, and temperature, is fundamentally important in the ward environment. More finesse could be achieved with the inclusion of laboratory tests such as serum electrolytes, blood sugar, and acid-base analysis, but these are often omitted or inaccurate. The more complex the scoring system, the more likely it is that it will contain errors or omissions. McArthur-Rouse (2001:696) noted in 2001 that the early warning score or "calling-criteria have been adopted by many hospitals to assist in the early detection of critical illness". Table 3.5 sets out the physiological calling criteria of various care teams.

○ **Rapid response team**

Simmonds (2005:58) that the nursery be justified in calling a rapid response team if the physiological criteria she or he observes are consistent with clinical deterioration. Offner el al (2007:1223) point out that because nurses rely heavily on experience when making complex decisions, it is important that the system of care in which they work should support their abilities to develop clinical skills while at the same time providing safe and timely care. McQuillan, Pilkington, Allan, Taylor, Short, Morgan, Nielsen, Barrett and Smith (1998:1858) recommend the introduction of a medical emergency team to *pre-empt* cardiac arrest rather than to rely on the cardiac arrest team once the cardiac event has occurred. They suggest that the use of minimum criteria for calling such a team be adapted from the study of Lee et al. (1995). (See the detailed discussion about decision-making in section 3.2.2.4 of this chapter.)

○ **Medical emergency team (MET)**

The Resuscitation Council of the UK (2005:28-29) stated in some hospitals in the UK, the role of the cardiac arrest team has been subsumed in that of the MET. This team responds not only to cardiac arrests, but also to patients who are displaying signs of acute physiological deterioration. The MET responds to specific calling criteria and their interventions often involve simple tasks such as initiating oxygen therapy and intravenous fluids. (See Table 3.5 for a summary of the MET calling criteria.) The MET system, which is similar to that of a resuscitation team, acts in response to calling criteria and a specific protocol, and the Critical Care Liaison service, which is similar to the outreach system, takes action in response to a critical Early Warning Score. (See sections 3.2.2.1 and 3.3.4.2 of this chapter for brief discussions of these topics.)

A summary of care team physiological calling criteria is displayed in Table 3.5 (below).

Table 3.5   Care teams in various countries

	ICU Liaison Service	Outreach Service	Rapid Response Team	Medical Emergency Team
Country	**Australia**	**UK**	**USA**	**Australia**
Main Objectives	To follow-up on patients in general wards after discharge from the ICU. To decrease the rates of readmission rate to ICU. To offer clinical support to ward nursing personnel (Nepean ICU Liaison Team [online] (http://www.nepean-icu.org/index.html).	To bring expert assistance to the bedside. To identify deteriorating patients and patients at risk. To reduce the rate of admission or readmission to ICU. To institute timely and appropriate interventions at ward level. To ensure early admission to ICU where it is indicated (Bright et al. (2004:36); Intensive care society standards (2002:2-3, 6).	To replace the cardiac arrest team by bringing experts to the bedside (Simmonds 2005:41). To assist with patient evaluation and treatment before clinical deterioration progresses to the point of cardiac arrest (Simmonds 2005:42). To diminish the incidence of cardiac arrests outside the ICU (Simmonds 2005:58).	To provide a viable alternative to the cardiac arrest team (Lee et al. 1995: 183; O'Dea et al. (2003), cited by Bright et al. 2004:33). To bring experts to the bedside in good time (Bright et al. 2004:36). To identify patient deterioration and patients-at-risk. To provide early interventions. To reduce acute incidence of physiological deterioration and cardiac arrests (UK Resuscitation Council 2005:28-29).
Methods of contacting patients at risk and the methods used for alerting the team	Visiting patients who have been discharged from ICU in their wards. Using a calling system that is based upon calling criteria (Intensive care society standards 2002:8).	Visiting wards regularly (Bright et al. 2004:46). Using a calling system (Bright et al. 2004:36) and the calling criteria of an early warning score (Intensive care society standards 2002:4, 8, 9: Stenhouse, Coates, Tivey, Allsop, Parker 2000:663).	Using a calling system and the calling criteria of the Patient at Risk Team Protocol (Goldhill el al. 1999:855).	Using a calling system and the calling criteria of the early warning scoring system (Morgan et al. 1997:100).
Other objectives *Education*	Providing bedside education for ward nurses in pain management, tracheostomy care and central line management (Nepean ICU Liaison Team [online] (http://www.nepeanicu.org/liaison.html#cnc#cnc).	Providing education for ward nursing personnel in the management of deteriorating patients (Garcea, Thomasset, Mcclelland, Leslie, and Berry 2004:1096). Sharing ICU skills and expertise with ward nursing personnel. Learning from and supporting other clinicians	Enhancing the critical-thinking abilities of non-ICU nurses. Using education opportunities for teaching ward nursing personnel in the clinical situation (Simmonds 2005:58).	Assuming an educational role in order to prevent the de-skilling of ward-based junior medical nursing personnel. Propagating the idea that ICUs should adopt a hospital-wide educational role by insisting that they can no longer function as isolated island of expertise (Garrard & Young

		(Bright el al. 2004:39).		1998:1853).
Admissions and readmissions	To avert unnecessary readmissions to ICU. To facilitate early and appropriate admission or readmission to ICU [online] (http://www.nepeanicu.org/index.html).	To avert unnecessary admissions to ICU. To facilitate timely admissions to ICU and the discharge of patients to wards (Bright el al. 2004:39). To reduce readmission rates to ICU (Garcea et al. 2004:1096).	None	To reduce the rate of unplanned admissions to ICU (Åneman & Parr 2006:1255)
Communication	To improve communication between ICU and the wards. To consult patients and their families about their issues and problems [online] (http://www.nepeanicu.org/index.html).	To improve communication. To make the traditional boundaries between wards and ICUs more permeable and less rigid (Bright el al. 2004:39).	To assist nursing personnel by facilitating constructive communication with the treating physician. To provide constructive, non-judgmental and non-punitive feedback to the person calling (Simmonds 2005:58).	To ensure that ICUs adopt a hospital-wide educational role. To share expertise throughout the hospital and not keep it in the state of artificial isolation (Garrard & Young 1998:1853)
Discharge/ transfers	To follow-up on patients who have been discharged from ICU (Intensive care society standards 2002:8).	To facilitate discharges from ICU (Bright el al. 2004:39). To facilitate transfers to ICU (Garcea et al. 2004:1096).	To assist nursing personnel with stabilizing and transferring a patient to a higher level of care (Simmonds 2005:42).	To reduce the rate of unplanned admissions to ICU (Edelson & Abella 2006:18). To reduce the rate of readmissions to ICU (Åneman & Parr 2006: 1258).
Availability	24 hours per day, and seven days per week	24 hours per day, and seven days per week	24 hours per day, and seven days per week	24 hours per day, and seven days per week
Other responsibilities	To arrange and organise outpatient appointments so that various issues can be addressed with a social worker or a counsellor. To provide clinical support.	To empower ward nurses to manage patients at risk. To promote continuity of care. To audit and evaluate outreach service. The conduct research into the performance of outreach (Intensive care society standards 2002:2-3).	To provide feedback to nurses about a patient's condition. To promote better outcomes. To drive cultural change and raise awareness about the potential benefits of activating the team (Simmonds 2005:59).	None

Table 3.6   Care team advantages and disadvantages

Country	Advantages	Disadvantages
ICU Liaison Service Australia	Early patient interventions. Support for ward nursing personnel. Liaison between ward and ICU nurses. A beneficial influence on hospital policy. A systematic evaluation that impact on outcomes (Endacott & Chaboyer 2006:94). Educative and empathic support for ward nursing personnel. Specialist roles such as that of the ICU liaison nurse who effects improvements in patient and family care (Green & Williams 2006:118-127). Improved patient outcomes and readmission rates (Chaboyer, Gillespie, Foster & Kendall 2005:775; ICU Liaison Service of the Nepean hospital in Australia, [online] http://www.nepeanicu.org/liaison.html).	A lack of role clarity, an absence of role models and peer support, a need to establish professional boundaries and re-define professional relationships. A lowering of expectations in Australia that the roles would lead to nursing personnel development (Endacott & Chaboyer 2006:94).
Outreach Service (PART) UK	Patient intervention. Support for ward nursing personnel and liaison between wards and ICU nursing. The development of formal education for ward nursing personnel. The influence on hospital policy. Systematic evaluations that impact on outcomes (Endacott & Chaboyer 2006:94). Incidence of CPR prior to ICU admission was 3.6% in patients seen by Patient at Risk Team in comparison with 45% in patients who were not attended to by Patient at Risk Team (Goldhill, Worthington, Mulcahy, Tarling and Sumner 1999b:853). Any increase in medical attention would be likely to improve outcomes (Åneman & Parr 2006:1256). Critical care mortality, in-hospital mortality and 30-day mortality were all reduced in the post-outreach period among readmissions to critical care (Garcea et al. 2004:1096). Better integration, coordination, collaboration and continuity of multidisciplinary care (Garcea et al. 2004:1096).	The deskilling of ward nursing personnel does occur and this risks an increase in the number of calls to medical emergency teams and a greater need for high dependency unit facilities (McArthur-Rouse 2001:701). Patient care may become fragmented. The disenfranchisement of ward nurses with regard to critical care issues (Gibson 1997:163-4). Encouraging the use of monitoring techniques and therapies that have traditionally been the remit of ICUs and HC. Ward nursing personnel may feel unsupported if outreach services are not provided on a 24-hour basis (McArthur-Rouse 2002:702).
Rapid Response Team USA	The reduction of cardiac arrest incidents outside the ICU by 50% and prior to ICU transfer by 25% to 30%. A decrease in overall hospital mortality by 26% (Simmonds 2005:58). A 50% reduction in cardiac arrest. Activation resulted in early patient transfer to a higher level of care and progression to cardiac arrest was	No cost data available (DeVita, Bellomo, Hillman, Kellum, RotondiTeres, Auerbach, Chen, Duncan, Kenward, Bell, Buist, Chen, Bion, Kirby, Lighthall, Ovreveit, Braithwaite, Gosbee, Milbrandt, Peberdy, Savitz, Young, Harvey & Galhotra 2006:2463-78).

Country	Advantages	Disadvantages
	thereby averted. Medical personnel feedback regarding the RRT was uniformly positive (Offner et al. 2007:1223).	Professional resistance from doctors, nurses and management because of the norms that they have accepted from their training. Deskilling of nurses and a reduction in training opportunities for junior physicians. Territorialism and turf control ("the my patient syndrome") on the part of professionals. Physicians may discredit efforts to ensure patient safety because they have poor evidence. Hospitals and physicians financial and reputational risks from liability claims that result from failing to implement an intervention that is considered to be a standard, even if the value of that intervention remains unproven (Winters, Pham & Pronovost 2006:1645). Winters, Cuong, Hunt, Guallar, Berenholtz and Pronovost (2007:1238) found weak evidence that rapid response systems are associated with a reduction in hospital morality and cardiac arrest rates.
Medical Emergency Team Australia	The reduction of the incidence of unexpected cardiac arrests in hospital by 50%. Subsequent mortality rates were reduced from 77% to 55% (Buist, Moore, Bernard, Waxman, Anderson & Nguyen 2002:387). The reduction of the cardiac arrest rate to 65%. Twenty-six percent reductions in the overall hospital mortality rate (Bellomo, Gold-smith, Uchino, Buckmaster, Hart, Opdam, Silvester, Doolan & Gutteridge 2003:283; Jones, Bellomo, Bates, Warrillow, Godsmith, Hart, Opdam & Gutteridge 2005:814-15). The reduction in the rates of cardiac arrests, deaths, and unanticipated ICU admissions; improvements in detecting of medical errors, treatment-limitation decisions, and reduced post-operative ward deaths (UK Resuscitation Council 2005:29). A decreased incidence of cardiopulmonary arrests (DeVita, M.A. Braighwaite, R.S. Mahidhara, R. Stuart, S. Foraida, M. Simmons, R.L. and members of the Medical Emergency Response Improvement Team 2004:251-253).	No strong evidence of effectiveness (Winters et al. 2006, 1645-46). Buist et al. (2002:390) find poor use of the MET and a failure to identify patients who would benefit most from such early intervention. Kenward, Castle, Hodgetts and Shaikh (2004:257) detected *no significant differences in outcomes* between the MET and the control hospitals. The results can be explained by the lack of effectiveness of the MET system (which is a complex process), insufficient periods provided for implementation and evaluation, and poor compliance with procedures for activating the MET. Complex interventions such as the introduction of trauma team systems need up to 10 years to prove a consistently positive effect on mortality rates. According to UK Resuscitation Council (2005:29), the MET system demonstrated that the introduction of a MET increased the calling rates of the team, but did not reduce the incidence

Country	Advantages	Disadvantages
	The incidence of cardiac arrest, mortality and unplanned admissions to intensive care was found to be significantly lower in a hospital with MET compared with two other hospitals that had no such system (Buist et al. 2002:388-389). Early intervention based on well-defined criteria of clinical instability together with a system of support, ongoing education, and performance feedback to the primary caregivers can significantly reduce the incidence of cardiac arrest and morality from cardiac arrest in hospitals (Buist et al. 2002:388-389). According to the UK Resuscitation Council (2005:29), research results showed a reduction in cardiac arrests, deaths, and unanticipated ICU admissions, an improvement in the detection of medical errors, treatment-limitation decisions, and reduced postoperative ward deaths.	of cardiac arrest, unexpected deaths, or unplanned ICU admissions. Decreased post-operative adverse outcomes (respiratory failure, stroke, severe sepsis, acute renal failure), emergency ICU admissions, post-operative mortality and post-operative lengths of stay (Åneman & Parr 2006:1259).

Table 3.7   Care teams' calling criteria

	Intensive Care Liaison Service[1]	Outreach[2]	Rapid Response Team[3]	MET[4]
Airway				Threatened airway
Breathing Respiratory rate: breaths/minute Blood saturation	<8 or >30 < 90% on 24% oxygen	<10 or >25 > 90%	<6 or >24	All respiratory arrest <5-6 or > 30-36 Difficulty speaking <90% on oxygen
Circulation Pulse: beats/minute Systolic blood pressure	<45 or >125 >90mmHg	<55 or >110 >90mmHg	<40 or >130 >90mmHg	All cardiac arrest <40 or >140 < 90mmHg
Neurology	Glasgow coma score < 8 or decrease > 2 points. Alert, Reactive, unresponsive to voice/pain (AVPU)	Not fully alert and orientated and respiratory rate >35 or heart rate > 140	Seizure, an acute change in mental status	Sudden fall in level of consciousness. Fall in Glasgow coma scale of > 2 points. Repeated or prolonged seizures. Agitation or delirium
Clinical concerns	√	√	√	√
Other	Blood gas PaO2 < 9.0 kPa, Pa CO2 > 6.5 kPa on 24% oxygen, pH <7.25	Urine output < 100 ml over last 24 hours	Temperature <35º>38.5ºC	Failure to respond to treatment. Uncontrolled pain. Any patient who does not fit the criteria above, but about whom the nursing personnel are seriously worried.

Source: Offner et al. (2007:1223)   ; McArthur-Rouse (2001:698)-; Damon et al. (2002:4) ; Intensive care society standards (2002:8-9)

3.3.3.3   Organisational changes

This section discusses organisational changes such as "open" and "closed" intensive care units and the consequences of night and premature discharges.

- **"Open" and "close" units**

In order to supplement the research undertaken by McQuillan et al. (1998) to study recommendations for organisational and structure improvements, Carson, Stocking, Podsadecki, Christenson, Pohlman, MacRae, Jordan, Humphrey, Siegler and Hall (1996:322) studied the effects of organisational change and made comparisons between *"open"* and *"closed"* ICU formats that produced evidence that changing from an open to a closed ICU format improved clinical outcomes. According to Multz et al. (1998:1468), patients are often admitted to "open" ICUs, often without triage, and are then cared for by their primary care physician. In open units, the level of critical care input is variable. "Closed" units adopt much stricter administrative and triage controls, and patients are transferred to the care of an intensivist. Patients also generally only accepted to the unit after an intensivist has evaluated them.

Multz et al. (1998:1468) conducted a prospective cohort analysis as well as a retrospective analysis on the basis of the hypothesis that a "closed" ICU was more efficient than an "open" ICU. Admissions to the ICU were retrospectively analysed before and after ICU closure at one hospital, and a prospective analysis was performed in that ICU with an open ICU close at hand.

The study demonstrated that the organisation, resource utilisation, and outcome of a closed ICU were more efficient when measured by a decrease in the rate of ICU lengths of

stay. There was a slight improvement in the mortality rate in the closed ICU organisation. Shorter ICU and hospital lengths of stay demonstrated the increased efficiency of closed ICUs. The study also found that the continued presence of an intensivist could have enhanced the likelihood that care decisions were being carried out in a more timely fashion. Finally, this study also demonstrated the advantages to a closed ICU organisation. Patients are likely to be treated more efficiently in a closed ICU system while the ICU system demonstrates either the same or a reduced mortality rate and a lower rate of lengths of stay.

3.4 OUTCOMES

Hospital processes and structures influence patient outcomes to a significant degree. This section discusses these anticipated outcomes and the problems that give rise to them, and then presents a considered conclusion.

3.4.1 Expected outcomes

An *expected outcome* means the effect or effects that a particular healthcare intervention will produce in patients.

3.4.1.1 *Seven pillars of clinical governance*

The seven pillars of the clinical governance model represent the expected outcomes of healthcare interventions as envisaged by the model. These seven pillars are clinical effectiveness, risk management effectiveness, patient experience, communication, resource, strategic and learning effectiveness. (For a detailed discussion of the seven pillars, see section 2.2.2.1 of chapter 2.)

3.4.2 Problems encountered in hospitals

This section describes what the literature says about the problems that are encountered in hospitals. These problems include the obstacles, hindrances and difficulties that are experienced by the hospital with regard to the availability of hospital beds, communication, patients at risk, suboptimal care in general wards, physiological deterioration, biochemical variable deterioration, the inability of healthcare personnel to recognise the signs of physiological deterioration, premature discharges and discharges that take place at night, delays that occur when patients need to be transferred to ICU, the rate of readmissions to ICU, in-hospital cardiopulmonary resuscitation and the treatment of unexpected cardiac arrests.

3.4.2.1 *Availability of hospital beds*

It is generally believed by researchers and hospital administrators that the past few years have seen an enormous increase in the demand for *beds* in ICU. Goldfrad and Rowan (2000:1138) suggests that the increase in the number of reports and the amount of correspondence that relate to this topic indicate that the demand for beds in ICUs is now far greater than it ever was before.

One of the indicators of this ever-expanding demand for ICU beds is reflected in increasing number of discharges that take place at night. It is the view of the clinicians who work in ICUs that *night discharges* are far more likely to be "premature" and therefore (obviously) not in the best interests of these patients who are being prematurely discharged to make way for other patients who need acute care. It is also obvious from these facts that many hospitals have an insufficient number of intensive care beds to meet the demand for intensive care services. While it is important for hospitals to meet the needs of their clients,

it is also important for them to make the best use of scarce facilities such as ICU units. Table 3.7 (below) mentions several studies that have studied the problem of the availability of hospital beds all over the world.

Table 3.8   Availability of hospital beds

Source	Purpose and Concept	Sample	Design	Result
Tobin and Santamaria (2006:334)	To determine the impact of discharge time on subsequent hospital mortality rates. Concept: There is a direct relationship between a number of discharges from ICU that take place at night and an overall increase in hospital mortality rates.	10 902 patients who were discharged alive from ICU between 1992 and 2002	Retrospective cohort study	It has been observed over a 22-year period that more and more patients are being discharged from ICUs in the afternoon and at night. This seems to indicate an increasing demand for ICU beds, and a corresponding amount of pressure on ICU personnel.
Bhagwanjee and Scribante (2007:1323)	To determine in South Africa: (1) the profile and number of nurses who work in ICUs and HCUs, (2) the number of beds available in ICUs and HCUs, and (2) the ratio of nurses to ICU/HC beds. Concept: An examination of the state of critical care health resources in South Africa	All the ICUs and HCUs (448) that exist in South Africa, both the public and private sector	A descriptive, non-interventative, observational study design. A national audit of all public and private sector ICUs and HCUs.	There is a dire shortage of ICU and HCU beds in the public healthcare sector in comparison to the number that are available in the private sector. The number of ICU and HCU beds available in the private sector is comparable to the availability of such beds in the European Community. Even though this may be the case, there is still a shortage of ICU and HCU beds in many of the bigger cities of South Africa centres.
Mutakaitis (2005:90)	To determine the appropriateness of admissions to various hospital units. Concept: Some admissions are appropriate while others are not. This study also looked at the amount of average time had elapsed between requests for admission and the admissions themselves.	Two acute care hospitals with a combined Total of 800 beds and 94 high care beds.	Not mentioned.	The study identified the prolonged waiting times and inappropriate admissions are not caused by the extreme demand for high care beds.
Giannini and Consonni (2006:57)	To identify the perceptions of physicians with regard to ICU resource allocation and the problems of inappropriate admissions. Concept: The difficulties that are caused by the extreme demand for ICU beds.	20 ICUs in Milan, Italy	Questionnaire	67% of ICU the physicians in the study turned down requests for appropriate admissions because of the unavailability of ICU beds.

Goldfrad and Rowan (2000:1138-1141)	To examine the consequences of premature and night discharges from ICU. Concept: The demand for beds in ICUs is a direct cause of premature discharges and discharges that take place at night.	21 295 admissions of adults to 62 ICUs during the period between 1995 and 1998	Prospective data collection	The incidence of premature and night discharges increase hospital mortality rates.
Damon and Williams (2002:3)	To examine methods for identifying patients at risk: the use of technology and the ICU outreach service. Concept: ICUs account for approximately 10% of acute-care patient beds.	Not mentioned	Not mentioned	The early identification of patients at risk contributes to optimal care, cost-savings, reduced rates of complications and medical errors, decreased lengths of stays in hospital, improved patient outcomes and a decrease in hospital mortality rates.

3.4.2.2   Communication

The following section discusses the various problems that are encountered in hospital-related communications.

- **Reporting experts**

A study that was undertaken by Franklin and Mathew (1994:244) examined the case records of 150 patients who had consecutively succumbed to cardiac arrest over a period of time in a general ward, and found documented notes that indicated prior clinical deterioration in 99 (66%) of the cases. Many signs of patient deterioration therefore go unnoticed (or ignored) by nurses and/or doctors in the wards. A common feature of the fatal cardiac events was the failure of the nurse (for whatever reason) to notify a physician immediately about the deterioration in the patient's condition. This pattern or trend of detected deterioration followed by a failure to summon help and by poor reporting of the various signs of deterioration that *had* been observed has been occurring since 1994, and is totally consistent with the trends identified by the researcher in the hospital that she selected as a locus for her research.

The study by McArthur-Rouse's (2001:696) relied on data that was obtained from personal communication with nurses in practice and in the classroom. What it showed was that even when nurses were deeply concerned about the condition of patients, they often experienced enormous difficulties when trying to convince an attending physician to take appropriate action. The reasons for the failure of nurses to persuade physicians to take action could hypothetically be attributed to their personal inability to articulate their anxiety and concerns about their patients, and possibly also to the reluctance of a junior doctors to seek help from senior colleagues. The researcher also identified this

phenomenon in the hospital in which she conducted her study. She collected evidence that showed that auxiliary nurses and staff nurses felt inhibited and at a disadvantage when they attempted to communicate their genuine concerns about particular patients to specialists and to senior nursing personnel.

- **Analyses of physicians and nurses responses hours before event**

The case series study undertaken by Franklin and Mathew (1994:244-7) in Chicago, Illinois, was designed to determine the frequency and severity of signs, vital indicators and symptoms before the occurrence of cardiac arrest in patients in general medical wards. The study also set out to determine whether any characteristic patterns in nurse and physician responses to these signs and symptoms could be identified, and whether cardiac arrests in the ward occur more frequently in patients who have been discharged from ICU than occur in other patients. They examined the total of 21 505 admissions over a period of 20 months, and identified 150 cardiac arrests in the medical wards (which translates into a cardiac arrest rate of 7.0/1000 patients, and a hospital mortality rate of 91%). In 99 of the 150 cases of cardiac arrest, they showed that either a nurse or a physician had already documented deterioration in the patients' condition within the six-hour period before the cardiac arrest event occurred.

The findings in the research undertaken by Franklin and Mathew (1994:246-7) indicated the frequent failure of the nurse on duty to notify a physician of a sudden deterioration in the mental status of patients; the number of times physicians neglected to obtain or interpret an arterial blood gas measurement when signs of respiratory distress were clearly evident, and the failure of the attending ICU triage physician to stabilise the patient's condition before transferring the patient to the ICU. The conclusion of the study was that although premonitory signs and symptoms nearly always precede cardiac arrests in the

general wards of hospitals, such signs and symptoms are frequently ignored or are treated with a casualness that seems to indicate neglect or indifference. Strategies for the prevention of cardiac arrest should include training for nurses and physicians that concentrates on cardiopulmonary stabilisation and on methods of responding effectively to signs of sudden neurological and respiratory deterioration.

- **The time periods that elapse between notification and response**

A study by Young, Gooder, McBride, James and Fisher (2003:82), tracked the processes-of-care by recording the time that elapsed (as documented by the nurse) from the moment when the patient's physician was first notified of the patient's deterioration and the time when the physician responded by attending to the patient. They also classified the transferral of patients as either '"slow transfers" or "rapid transfers", and determined whether a transfer was slow or rapid by noting the amount of time that elapsed between the first observation of patient deterioration in the ward and the time when the patient was transferred to the ICU. Patients who were transferred to the ICU more than four hours after the first signs of physiological threshold criteria had been identified, were labelled as "slow transfers" while patients who were transferred within four hours (or less) were classified as "rapid transfers". According to Young et al. (2003:82), the most likely explanation is that the delay in responding to signs of physiological deterioration was itself responsible for the increased morality and costs. An analysis by Young et al. (2003:83) of the process of care records indicates that physicians of slow-transfer patients were less likely to receive prompt notification of a patient's deterioration by nursing personnel.

- **Possible reasons of under reporting**

A study by Goldhill et al. (1999b:853) that took place over a six-month period involved an assessment of "whether the physiological criteria used to call the Patient at Risk Team were appropriate and useful in determining the necessity for admission to ICU". This was done in order to determine whether the **Patient at Risk Team** system had played a useful role in attending to patients at risk and in facilitating necessary transfers to ICUs. Many of the patients included in the study had already been monitored more frequently and treated more intensively than they would been treated in a normal ward environment. This indicated that although the nurses in the ward were aware of the patient's health status, they had not called the Patient at Risk Team and asked for their assistance. Over the six-month period of a study, 422 patients were admitted to the ICU, of which 99 had previously been located in hospital wards. Twenty-eight of the patients who had been directly admitted from the wards to the ICU had been assessed by the Patient at Risk Team within 48 hours of their admission, while 69 patients who were not assessed by the Patient at Risk Team before admission were assessed by the Patient at Risk Team prior to their admission.

Goldhill et al. (1999b:854) argued that the high rate of under-reporting may be due either to the fact that many nurses and doctors seem to be *unaware of the existence of the Patient at Risk Team*, or to the fact that the treating doctor may have decided not to call the team. A close reading the study might also enable one to argue that the *criteria for calling the Patient at Risk Team were too prescriptive* because, in order for the Patient at Risk Team to be summoned, a patient had to manifest three criteria. The absence of one or other of these three criteria may have inhibited the nursing personnel from summoning the team. Goldhill et al. (1999a:584) acknowledged in their study that the physiological criteria that

were being used to notify the Patient at Risk Team were probably unsatisfactory and inadequate for identifying those patients in wards who were already critically ill.

- **Patient record documentation**

The studies discussed below indicate the problems that the researcher had to deal with because of inadequate or otherwise problematic documentation. In the study undertaken by Goldhill et al. (1999a:533-534), for example, the researcher's task was enormously complicated because despite the severity of the illnesses that were being dealt with, routine observations were seldom found in notes, and data was often improperly or imprecisely recorded. This once again emphasises how poor documentation can create problems for researchers, for the hospital itself, and for the whole health service of the country concerned. In this particular instance, routine observations were available in 81-89% of the cases, basic haematology and biochemistry results were available in 91% of the cases, and blood gases were available for 51% of patients who had been admitted to ICU during the preceding 24-hour period.

In a study undertaken by Cullinane et al. (2005:4), the research analysed the medical notes that were made in those cases where the patient had died during the study period. Unfortunately, the quality of the medical records was so poor that the necessary information was difficult to obtain.

In the case of the research by McGloin et al. (1999:255), there was a serious defect in the study that prevented the researcher from identifying whether any kind of abnormalities had been detected and whether any plan of treatment had been envisaged for patients who subsequently died. The limitation being referred to here was the extremely poor quality of the notes that were made by the nursing and medical personnel. In some these cases, the

absence of any therapeutic intervention recorded in the drug or bedside charts enabled the researcher to reach the conclusion that the nursing and medical personnel had either not recognised the existence of any problem or (worse) they had recognised it and had simply ignored it for reasons that are unknown. In those cases where a problem had been recognised but had not been recorded in the notes (as well as in those cases in which there were no indications of any kind of proposed treatment for the severely ill patient), one may still designate the treatment received by these deceased patients as severely suboptimal. In these cases, the severity of the patient's condition had been observed, but no contingent plans had been made for arranging the kind of care that the patient urgently needed.

3.4.2.3   Patients at risk

The research performed by Goldhill et al. (1999b:853) identifies patients as being at risk when their physiological parameters reach an extreme value that is outside of the normal range. Both McArthur-Rouse (2001:696) and McQuillan et al. (1998) indicate that the identification of acute illness in ward patients inevitably increases the demand for ICU beds and (as McQuillan et al. (1998) note) this inevitably increases the costs for which the hospital will be liable if the patient is transferred to a higher level of care. This appreciation of the increasing the number of patients who require admission to ICU and the corresponding expenses that have to be borne by the hospital, has resulted in an upsurge of interest in strategies for detecting at-risk patients so that experts can be summoned and so that appropriate interventions can be made to stabilise at-risk patients.

In subsequent developments, the Intensive Care Society (2002:6) of the UK Lee et al. (1995:183) and Morgan, Williams and Wright (1997:100) all suggested strategies for reducing the need for suboptimal care that focuses on the identification of patients at risk

of critical illness, and the timely provision of some form of critical care outreach that will offer expert advice for the management of these patients.

Garrard and Young (1998:1841) are convinced that a strong argument can be made for developing strategies which identify patients who are at risk of deterioration. If one does this, one can design pre-emptive interventions that will avert admission to the ICU, or, if that is not possible, one can make arrangements for the patient to be admitted to ICU in an appropriate and timely manner. The UK has already implemented systems that identify these patients. Such systems include the *classification* of patients in terms of the levels of care that they might need so that one can move patients up and down according to the developing status of their condition. In the UK general wards are also supported by systems such as **MET** and the Critical Care Liaison service. Because these systems have refined a list of specific conditions or disease processes that may cause a patient to become critically ill, they encourage nursing personnel to develop their clinical judgment (Intensive Care Society 2002:6-9).

Table 3.8 (below) mentions two studies that conducted research into the phenomenon of patients at risk.

Table 3.9   Patients at risk of deterioration

Source	Purpose and Concept	Sample and design	Result
Damon and Williams (2002:3)	To identify patients at risk as well as the technology and modus operandi of ICU outreach services Concept: This study examines methods of augmenting the conventional model of ICU care because it focuses on providing expert care for all patients who have not yet been admitted to ICU.	Not mentioned	Hospitals are able to deliver optimal care, save on costs, reduce the incidence of complications and medical error, decrease the lengths of hospital stay, improve patient outcomes and decrease hospital mortality rates.
Goldhill et al. (1999b:855)	The researchers describe how it is possible to establish a "patient-at-risk team" for the early identification and management of seriously ill patients in hospital wards. Concept: The researchers in this study were not able reliably to predict which patients would be admitted to the ICU by using the physiological criteria that they used in the study.	Sixty-nine assessments were performed on a sample of 63 patients over a period of six months.	While the requirement for CPR before admission to ICU was 3.6% for patients who had been assessed by the team, it was 30.4% for those who had not been seen (p<0.005). While 25% of patients who had not been assessed died, 45% of patients who had been assessed survived (not significant, p=0.07). Among those who are not seen by the team, the mortality was 40% for those who did not require resuscitation and 57% for those who did (not significant). Many critically ill ward patients had abnormal physiological values before they were admitted to ICU. This suggests that being able to identify critically ill patients in wards in combination with early advice from experts and active management to arrest the process of deterioration, are likely to prevent the need for cardiopulmonary resuscitation and will therefore improve outcomes.

3.4.2.4   Suboptimal care

According to the *Encarta Dictionary English (UK)* online, one of the meanings of the prefix "sub" is an indication of inferiority or of lower quality or value, while "optimal" means something that is best, most desirable or favourable. "Suboptimal" therefore means something that is of a lower quality, less desirable or less favourable. There is a growing body of evidence to suggest that many seriously ill patients are receiving suboptimal care in wards prior to their admission to an ICU. Two important studies in this regard are those by McQuillan (1998) and Garrard and Young (1998), and they are discussed in what follows.

Garrard and Young (1998:1855) note that *deficiencies in care* or *suboptimal care* can best be understood in terms of failures in an organisation, a lack of knowledge, a failure to appreciate the clinical urgency of a condition, the absence of proper supervision and the failure to seek advice when it is needed. Suboptimal care means that whatever care was provided was not up to standard in the sense that it did not conform to the required standards, policies and operating procedures of the hospital in which it was observed. Young et al. (2003:80, 83) observe that numerous studies have demonstrated how suboptimal care in general wards frequently contributes to the physiological deterioration of patients, and this exerts a decisive effect on morbidity and mortality rates and the need for subsequent intensive care treatments.

Table 3.8 (below) describes three additional studies of the effects of suboptimal care on patients prior to their admission to ICU.

Table 3.10   Suboptimal care and its effects

Source	Purpose and Concept	Sample and Design	Result
McGloin et al. (1999:255)	(1) To determine the incidence of sudden and unexpected deaths in general wards and an inquiry into whether or not these deaths were avoidable. (2) To assess whether the quality of care in general wards prior to admission to the ICU affected subsequent outcomes. Concept: To understand the extent to which unexpected ward deaths and the need for sudden admission to the ICU were affected by the poor quality of care being offered in wards.	Ward patients who died unexpectedly who or required admission to the ICU. Audit	The audit shows that although a gradual deterioration was observed in physiological and/or biochemical variables in a sample of patients, no appropriate action was taken. In 26.66% of these cases, the patients concerned were deemed to have received suboptimal care prior to admission to the ICU – either because their problems had not been recognised or because the treatments they were being given were inappropriate to their condition. The audit showed that the mortality rate was significantly higher among such patients in comparison to patients who had been "well managed" (p=0.0001).
McQuillan et al. (1998:1856)	To examine the prevalence, nature, causes, and consequences of the suboptimal care that patients were receiving before they were admitted to the ICU, and suggestions for possible solutions. Concept: This study monitored and investigated the management of abnormalities of airway, breathing, circulation, and oxygen therapy.	Cohort of 100 consecutive adult emergency admissions A prospective and confidential inquiry	The researchers found that 69% of the patients were admitted too late to the ICU and that they had been receiving suboptimal care. 41% of these admissions to ICU were considered to be avoidable. Suboptimal care contributed to further morbidity or mortality in most instances. The main causes of suboptimal care were failures in the organisation, a lack of necessary knowledge, the failure to recognise the clinical urgency of certain conditions, a lack of proper supervision, and a failure to seek advice when it was necessary. The study of service observed that the management of airway, breathing and circulation was inadequate, and that the oxygen therapy and monitoring of severely ill patients before they were admitted to ICUs was frequently be suboptimal. Possible solutions included an improvement in the quality of care and monitoring before admission to ICU. Most of the other solutions focused on the need to improve training.
Lee et al. (1995:183)	Utilisation and outcome of Medical Emergency Team interventions	522 calls for a MET in a teaching hospital in Australia.	Cardiopulmonary resuscitation was required in 28% of the cases for which the team was called out. In 48% of the calls, the team was alerted because of the specific conditions of the patients, and in 23% of the cases for which the team was called out, the ward

Source	Purpose and Concept	Sample and Design	Result
		Prospective design.	personnel had observed various physiological or pathological abnormality criteria. The survival rate of patients subsequent to their cardiopulmonary arrest and discharge from the hospital was low (29%) in comparison to the survival rate for other medical emergencies (76%).

3.4.2.5   *Physiological deterioration*

Studies have emphasised the important relationship that exists between vital data, applicable knowledge, the ability to communicate, the ability to recognise the signs of clinical deterioration and the incidence of in-hospital cardiac arrest. As far back as 1990, a study conducted by Schein et al. (1990:1388) found 64 patients suffered cardiac arrest approximately 26 hours after being admitted to hospital. For 84% of these 64 patients, documented evidence was available to indicate that *clinical deterioration and/or new conditions had developed* within eight hours of arrest. Seventy percent of *all* patients observed in the study developed a deterioration of *respiratory and/or mental functions* during this eight-hour period.

There are numerous contributory factors that cause the physiological deterioration of patients in general wards. The literature has a great deal to say about this phenomenon which occurs throughout the world and which has been observed in studies conducted in hospitals in the USA, Canada, Australia, and UK in recent years. Harrison et al. (2005:149) have pointed out that when patients deteriorate, they all display the same signs – namely, the progressive failure of their respiratory, cardiovascular and neurological systems. It is for this reason that the monitoring of patients focuses on these physiological systems. While abnormalities in physiological indicators are common in general wards, the observation of these indicators takes place far less frequently than is desirable.

Bright et al. (2004:33-36) have observed that up to 80% of patients who suffered cardiac arrest show signs of significant physiological deterioration in hours preceding the arrest. McGloin et al. (1999:255) and Subbe et al. (2001:521) all believe that increased rates of morbidity and mortality are the result of a failure on the part of the nursing and medical personnel to react promptly to deterioration in patients when signs of deterioration in

patients are clear and unambiguous. Buist, Jarmolowski, Burton, Bernard, Waxman and Anderson (1999:22) observed that the physiological deterioration of the patients in their study prior to cardio-respiratory arrest were either not recognised or were inadequately treated. Åneman and Parr (2006:1255) make it clear that some of the reasons for this kind of failure and/or neglect on the part of healthcare professionals can be attributed to an inability or failure to recognise abnormal clinical and vital signs, a lack of necessary clinical knowledge, a lack of development in the critical thinking skills on the part of the hospital personnel, and a failure to act with due urgency to deviant and abnormal physiological indicators in patients. Åneman and Parr (2006:1255) also mention that studies undertaken in the USA, Canada, Australia and the UK estimate that sudden adverse events occur in 10% of hospitalised patients (which result in a mortality rate of 5-8%), and that at least half of these deaths should be preventable.

Table 3.10 (adapted from McKay 2007:3) describes various background studies from 1990 until the present that deal with the problem of patient deterioration in hospital wards. Table 3.11 depicts two additional studies of the physiological deterioration of patients prior to their admission to the ICU.

Table 3.11   Background studies that deal with the problem of the physiological deterioration of patients in hospital

Reviews	Population	Findings
Schein et al. Clinical antecedents to in-hospital cardiopulmonary arrest. *Chest* (1990; 98:1388 – 1392).	64 patients suffered cardiac arrest ± 26 hours after hospital admission.	Deterioration or the development of new conditions and illnesses were observed in 84% of the sample within eight hours of the arrest.
Franklin and Mathew. Developing strategies to prevent in-hospital cardiac arrest: analysing responses of physicians and nurses in the hours before the event. *Critical Care Medicine* (1994; 22(2):244-7).	150 cardiac arrests in the medical unit.	In 66% of cases, a nurse or physician had documented deterioration in the patient's condition within six hours prior to the arrest. The failure to take preventative action was attributed to an inability to communicate and deficiencies in assessment. It was noted that patients had been admitted to ICU on a previous occasion, were at higher risk than were the other patients.
McQuillan et al. Confidential inquiry into quality of care before admission to intensive care. *British Medical Journal* (1998; 316:1853-1858).	100 patients (50 from each of two hospitals in the study) were admitted from a ward to the ICU. Their need for pre-ICU care had been evaluated by independents assessors.	20% of the samples were well managed; 54% received suboptimal care; in 26% of the cases, the assessors disagreed among themselves. Since only suboptimal care had been provided, ICU admissions might have been avoided. The suboptimal care provided by these hospitals was attributed to failures, inadequacies and deficiencies in communication, knowledge, organisation structure and supervision, and the failure of nursing and medical personnel to seek prompt advice wherever it was necessary. Recommendations included the performance of audits, the reorganisation of care in the hospital, and calling on the MET wherever necessary.
McGloin et al. Unexpected deaths and referrals to ICU of patients on general wards. Are some cases potentially avoidable? *Journal of Royal College of Physicians.* London (1999: 33(3):255-9).	A six-month audit of (1) unexpected ward deaths (477 deaths) and (2) ward-to-ICU admissions (86 hospital in-patients were admitted on 98 occasions)	The number of deaths occurred on general wards were 317 of the 477. It was concluded that 13 of the unexpected deaths could have been avoided.\nIt was concluded that 31 ward-to-ICU admission patients had received suboptimal care because of the severity of their condition or because of inappropriate treatment.

Source: Ontario's Critical Care Strategy (2007)

Table 3.12 Physiological deterioration

Source	Purpose and concept	Sample	Design	Result
Goldhill, White and Sumner (1999a:530)	To identify the physiological derangements and interventions that occurred prior to the admission of ward patients to the ICU. To investigate the physiological values and procedures in the 24 hours before these patients were admitted to ICU from the ward. Concept: To investigate the significance of physiological derangement inpatients prior to ICU admission. The ward patients were seriously ill prior to their admission to ICU, and this contributed to the high rate of mortality in the hospital.	All patients admitted to the ICU from a ward during a 13-month period	Prospective design	Cardiopulmonary resuscitation preceded 34% of the admissions to ICU in this study, and the overall hospital mortality was 58%. Routine observations were available for between 81% and 89% of the patients, while basic haematology and biochemistry results were available for 92% of the cases. 80% of the patients suffered from abnormalities in heart rate, respiratory rate and oxygenation values. However, only the respiratory rate showed a statistically significant rise. 75% of the patients had received oxygen within six hours of being admitted to ICU. Pulse oxymetry was used for 61% of the patients during this period, and this revealed that 62.5% of patients had recordings < 90% within six hours of admission to the ICU. An increasing respiratory rate seemed therefore to be the best prognostic indicator that ICU admission was required. A significant worsening of the respiratory rate was observed during the 24-hour period prior to admission.
Cullinane et al. (2005:4)	To investigate the quality of care prior to admission to the ICU	All patients who had been admitted to a general ICU during a one-month period.	A clinical questionnaire	During the pre-ICU care period, 42% of the cases in the study had received inappropriate or delayed therapy. The reasons for this may include delays in putting treatment plans into operation, a tendency to rely on doctors who were still being trained to initiate the correct therapies and treatments. It is also noted that the delay between the time of the patient's admission and the first consultant physician review was unacceptably long. Considerable time delays were observed between the appearance of gross physiological instability and the subsequent referral to ICU of 162 cases in the general wards. This happened to patients who had been in the hospital for longer than 24 hours prior to admission to ICU. Of these patients, 66% had presented with clearly identifiable *gross physiological abnormalities* for

Source	Purpose and concept	Sample	Design	Result
				periods of longer than 12 hours prior to their referral to ICU. Deteriorations in those patients who had been in hospital for 24 hours or less prior to their admission to ICU appear to have been more rapidly recognised because only 6% of this group had revealed clearly identifiable gross physiological abnormalities for longer than 12 hours prior to referral to ICU.

3.4.2.6   Biochemical variables deterioration

In a study conducted by McGloin et al. (1999:255-256), the researchers observed a gradual deterioration in physiological and/or biochemical variables of patients in general wards prior to their admission to ICU. The researchers conducted a review of the nursing notes, the bedside charts and the laboratory data of ward patients who had either died unexpectedly or who had required admission to ICU because appropriate action had not been taken in time. Eighty-six hospital in-patients were admitted on 98 occasions to the ICU. Of these, 31 had received suboptimal care prior to the admission to ICU either because of a failure to recognise their condition, a failure to recognise the severity of their condition, or because there had been receiving inappropriate treatments. The mortality rate was significantly higher in these patients compared to patients whose cases had been well managed ($p < 0.0001$). When patients who are displaying obvious clinical indicators of acute deterioration are overlooked, ignored or poorly managed in a ward, the outlook for such patients is bleak indeed. Such factors result in avoidable deaths or in poor outcomes following admission to ICU. It follows that the prompt recognition of abnormalities and the application of measures to counteract such abnormalities, will result in improved outcomes and benefits for hospital patients.

3.4.2.7   A failure to recognise physiological deterioration

Encarta dictionary [online] defines *deterioration* as becoming or making something or someone worse in quality, value or strength. *Thesaurus: English (U.K.)* [online] defines *deterioration* as a worsening, a decline or a weakening of some state, condition or person.

- **Seriousness of deterioration**

The study by Goldhill et al. (1999a:533-534) revealed that since ward patients who were admitted to ICU were already seriously ill, the hospital mortality rate was correspondingly high. It is evident from the records that the ward medical personnel were already aware that certain patients were already extremely ill. This may be deduced from the increased number of interventions, procedures and additional monitoring measures that were received by these patients in the wards. Despite this, one third of the patients in the study required CPR prior to their admission to ICU – perhaps because the seriousness of their deterioration had not been adequately recognised or responded to.

- **Antecedent factors prior to admission to ICU**

Hillman, Bristow, Chey, Daffurn, Jacques, Norman, Bishop and Simmons (2002:1629) conducted a prospective, exploratory, descriptive study that focused on an identification of the characteristics and incidence of serious abnormalities in patients prior to their admission to ICUs. In their study, the total population of 551 patients were admitted to intensive care: 90 of these came from general wards, 239 from operating rooms, and 222 from the emergency department. The researchers collected as much data as they could about the incidence of serious abnormalities in these patients *before* they were admitted to ICU. The Acute Physiology and Chronic Health Evaluation II score instrument was used to measure the severity of their illnesses and the degree of their physiological impairment before they were admitted to ICU. It was noted by the researchers at the patients from the general wards were more severely ill (Physiology and Chronic Health Evaluation II median 21) than those from the operating room (15) or emergency department (19). A greater percentage of patients from the general wards died (47%) than patients admitted from operating rooms (19.3%) and the emergency department (31.5%). The patients from

the general wards displayed a greater number of serious antecedents before they were admitted to ICU (43 or 72%) than those from operating rooms (150 or 64.4%) or the emergency department (126 or 61.8%). Of the 551 patients who were admitted to ICU, 62 had manifested with serious abnormalities during the 8-to-48-hour period before admission to ICU, while 53 had revealed serious abnormalities both within the eight hours as well as within the 48 hours prior to their admission to ICU. The most common antecedents during the 8 hours before admission were hypotension (n=199), tachycardia (n=73), tachypnoea (n=64), and sudden changes in degrees of consciousness and awareness (n=42). Concern was expressed in the clinical notes by attending nursing personnel in the case of 70% of the patients who were admitted from the general wards.

The conclusion of this study is that over 60% of the patients who were admitted to ICU with potentially life-threatening abnormalities had been documented as displaying such abnormalities in the 8 hours prior to their admission. Patient populations such as these could benefit from improved resuscitation and care at an earlier stage in the stages at which they received it.

Knause, Draper, Wagner and Zimmerman (1985:818) note that the Physiology and Chronic Health Evaluation II instrument indicates the severity of illness scores because it measures the degree of acute physiological impairment and also takes the age and chronic health problems of patients into account. Knause et al. (1985); and Teres et al. (1987:208) point out that the Physiology and Chronic Health Evaluation II and other scoring systems are widely used to determine the probability of patient survival rates among patients who are admitted to ICU.

Krause, Smith, Prytherch, Parr, Flabouris, and Hillman (2004:275) investigated the antecedent factors prior to cardiac arrest, death, or emergency admission to ICU in a

sample of hospitalised patients in a comparative study between hospital populations in the UK, Australia and New Zealand. The study showed that a high proportion of patients manifested clear and recognisable indicators of *physiological derangement* prior to adverse health crises and mortality. Sixty percent of the patients who were investigated in this study presented with antecedent factors prior to cardiac arrest, death and emergency treatments.

- **Unrecognised physiological and/or biochemical variables**

A study by McGloin et al. (1999:255) examined the care that was received by 86 patients prior to their admission to ICU on 98 occasions (a study which is similar to that conducted by McQuillan et al. 1998). The study by McGloin et al. was conducted over a six-month period in the University College of London Hospital which had 43 intensive care and high dependency beds, 64 paediatric and neonatal beds, and 151 beds designated for general medicine and surgery. Twenty-four hour medical resident coverage was provided in the hospital, and the nursing coverage in the general wards revealed an approximate nursing personnel to patient ratio of between 1:6 and 1:7. During the six-month audit that formed the basis of the study, the researchers reviewed all relevant medical, nursing and physiotherapy notes, bedside charts and laboratory data in the wards of patients who had either died unexpectedly or who had subsequently required admission to ICU.

The results of the study revealed that 317 of the 477 hospital deaths had occurred in general wards, of which 6% had followed failed attempts at resuscitation. Thirteen of these unexpected deaths were considered by the researchers to have been avoidable deaths because although gradual deterioration had been observed in physiological and/or *biochemical variables*, appropriate action had not been taken. In the same period, 86 hospital inpatients were admitted on 98 occasions to the ICU. Of these, 31 received suboptimal care

prior to admission to ICU because either the personnel had failed to recognise the severity of their problems or because they had applied inappropriate treatments. It is also noticeable that the mortality was significantly higher in these patients then it was in well-managed patients (p<0.0001). Although the assessors were unaware of the eventual outcomes for the patients whom they were investigating, they nevertheless found that suboptimal care was clearly defined and was identified in 31 patients. It was also noticeable that 20 of these patients had died with a mortality rate that was significantly higher mortality rate that is observed for well-managed patients.

This study concluded that patients who display obvious clinical indicators of acute deterioration can regularly be overlooked and/or poorly managed in the general wards of hospitals. This may cause of avoidable deaths and result in poorer outcomes for patients who had been admitted to ICU. Although an early recognition and response to physiological abnormalities may result in improved outcomes, this hypothesis requires further in-depth investigation. Unexpected ward deaths and unplanned admissions to ICU were low valid markers for assessing the quality of care that had been received by acutely ill patients when they were in the general wards

The recommendations of McGloin et al. were that medical and nursing personnel should be adequately trained to recognise and deal appropriately with signs of clinical deterioration. A MET that consists of nursing personnel who are experienced in managing acutely unwell patients may be an invaluable aid for the support of ward-based doctors and nurses.

Another important study by Hillman et al. (2002:1629) identified a high incidence of *serious abnormalities in vital signs* within eight hours of patient admission, and many more such abnormalities in the 48-hour period prior to admission to ICU. The most common

antecedents during the eight hours prior to admission were hypotension, tachycardia, tachypnoea and sudden changes in levels of consciousness and awareness. In over 60% of the ward patients who were admitted to ICU, potentially life-threatening abnormalities had been documented during the eight hours before their admission to ICU. Since McQuillan et al. (1998:1856) as well as McGloin et al. (1999:256) have all identified clear and unambiguous signs of deterioration in patients prior to their admission to ICU, the early recognition, treatment and response to these signs may obviate the necessity for admitting a fair number of these patients to ICU.

All of the studies discussed above have emphasised the importance of the requisite clinical knowledge, the need to report continuous deterioration in patients, and the value of early interventions in general wards. This emphasises the importance of continuous monitoring, audits, the re-assessment of all relevant structures and processes, and the necessity for gathering and recording information that reflects the progress and influence of whatever interventions may have been applied. These studies also reiterate the responsibility of healthcare providers and healthcare settings to effect continuous improvements in their service delivery to communities. Above all, these studies have demonstrated that determined leadership in a hospital is crucial for ensuring the implementation and management of whatever structures and processes could produce more desirable effects.

3.4.2.8 Premature and night discharge

Clear evidence has been gathered in studies by Tobin and Santamaria (2006:334), Moreno, Miranda, Matos and Fevereiro (2001), Goldfrad and Rowan (2000), and Daly, Beale and Chang (2001) to demonstrate that patients who are discharged after hours (at night) from ICU reveal mortality rates that are in excess of those patients who are discharged during the day. The studies undertaken by Goldfrad and Rowan (2000) and by Tobin and

Santamaria (2006:334) will now be discussed below because they also deal with this phenomenon.

The general belief that the current pressure for making ICU beds available has increased inspired Goldfrad and Rowan in the UK (2000:1138) to investigate the consequences of *discharges from intensive care at night as well as premature discharges.* The phrase "at night" was defined for the purpose of this study in the two different ways. Firstly, it was defined as meaning out of office hours (i.e. between 22:00 and 06:59 daily), and, secondly, it was defined as meaning in the early hours of the morning (i.e. from between 00:00 and 04:59). The study examined a sample of 21 295 adult admissions in 62 ICUs during the period between 1995 and 1998. It is notable that night discharges from ICUs have doubled in the UK during the past decade. This represents a worrying trend because it has been established that patients who are discharged at night *fare significantly worse than those who are discharged during the day*. Night discharges are far more likely to be premature in the view of the clinicians because they are regarded as being motivated by an intense pressure for making additional ICU beds available for incoming patients rather than by the best interests of the patients who are discharged. The first obvious implication of these results is that many hospitals have an acutely insufficient number of ICU beds for the clientele whom they serve.

The proportion of admissions of patients who were discharged at night and then who were subsequently readmitted to ICU was similar to the proportion of patients who were discharged during the day (7.9% as opposed to 6.4%). It was found that the eventual ICU mortality was 2.5-fold greater for patients were discharged at night (p=0.00), and that the ultimate hospital mortality of these patients was 1.4-fold greater (p=0.00). The mortality rate of patients who were discharged at night was 2.7% compared to 1.1% for patients who were discharged during the day. Only 44.1% of patients who were discharged discharges

at night were judged by clinicians to be fully ready for discharge compared with 86.3% of patients who were discharged during the day. The incidence of premature discharges was much higher during the night (42.6%) than premature discharges during the day (5.0%). In contrast, only a small proportion of discharges at night were judged to be delayed because of a shortage of ward beds. The rising proportion of night discharges among ICU patients reflected an increased pressure for the availability of ICU beds. The view of clinicians is that the main reason why patients discharged at night eventually fare worse than patients discharged during the day is that patients who are discharged at night are far more likely to be *prematurely* discharged.

Other factors that might account for a worse outcome for patients who are discharged at night might include the poorer quantity and quality of care available at night, both during the transfer and at the destination, because of the extra unplanned workload. From the point of view of a clinical audit, it seems as though the incidence of premature discharges might be a useful measure of unmet needs.

The conclusion of this study is that patients who are discharged from ICU to general wards at night are at increased risk of in-hospital death in comparison to patients who are discharged during the day and those who are discharged to high dependency units. The premature discharge from ICU of patients who are recovering from critical illnesses because the ICU is struggling to accommodate urgent new admissions to the unit, is associated with a marked increase in normal hospital mortality rates (Goldfrad & Rowan 2000:1142, cited by Åneman & Parr 2006:1261).

A retrospective cohort study performed by Tobin and Santamaria (2006:334) investigated the changing discharge patterns among patients who were moved from an ICU to hospital wards, and they set out to determine the impact of discharge time on subsequent hospital

mortality rates. A sample of 10 902 patients who were discharged alive from ICU between 1992 and 2002 were used as subjects for this study. During the study period at the institution, the researchers noticed that as the severity of the of patients who were being admitted to ICU increased, the incidence of afternoon and evening *and* night discharges became more frequent, and that these discharges were associated with a statistically significant *increase in mortality rates*. Tobin and Santamaria (2006:336) estimated that the mortality risk for patients discharged during night is very similar to that observed by Goldfrad and Rowan (2000:1140) and by Beck, McQuillan and Smith (2002:1293). A quarter of these deaths occurred within the first three days after discharge from the ICU. These findings confirm the findings of studies conducted in the UK (those by Goldfrat and Rowan 2000 and by Beck et al. 2002), as well as earlier Australian studies (those by Bristow Hillman, Chey, Daffurn, Jaques and Norman 2000:236, cited in Buist et al. 2002:387, and the study undertaken by Tobin and Santamaria (2006:336), although these studies extend the period of risk to include the afternoon shift.

In conclusion, it may be noted that the incidence of the discharge of patients during the afternoon and at night from the ICU have increased over the past few decades, and are associated with an increase in in-hospital mortality. It is assumed that these figures reflect a systemic problem that is caused by the enormously increased demand for ICU beds during this period, and by the less intense after-hours supervision of patients in wards.

3.4.2.9 *Delay in transfers to ICU*

The purpose of the study by Young et al. (2003:78) was to determine whether or not delays in transfers to the ICU after clear signs of physiological deterioration can be associated with increased rates of morbidity and mortality.

This study was conducted over a 16-month period in a 460-bed hospital in Utah. The ICU consisted of a 14-bed "open" medical-surgical unit to which most physicians had ICU admittance privileges. Since this study by Young et al. (2003:78) demonstrated that the in-hospital mortality rate was 41% for slowly transferred patients compared to 11% for rapidly transferred patients, the timing of transfer to the ICU appeared to be an important determinant of patient outcomes. The timing of several acute care interventions such as thrombolytic agents for myocardial infarction and emergency resuscitation was also shown to exert a substantial impact on mortality. Young et al. (2003:78) have suggested that the earlier transfer of patients could prevent up to 59% of cardiopulmonary arrests in general medical and surgical wards to the ICU. It should be noted, however, that these studies relied on *expert opinion rather than explicit criteria* to retrospectively judge exactly which patients may have avoided respiratory or cardiac arrest. According to Young et al. (2003:82), the slow transfer patients were far more ill than the rapid-transfer patients. The study by Young et al. (2003:83) indicated that the slow transfer to the ICU of physiologically defined high-risk hospitalised patients was associated with an increased risk of death. A slow response to signs of physiological deterioration may explain the significance of these findings.

3.4.2.10 *Readmission to ICU*

This section discusses and draws conclusions from the following three studies: (1) Boudesteijn, Arbous and Van den Berg (2007:475), who describe predictors of readmission to ICU within 24 hours after discharge; (2) Campbell, Cook, Adey and Cuthbertson (2008:1-7), who discuss predictors of imminent death and the likelihood of readmission to ICU after discharge, and (3) Rosenberg and Watts (2000:492-502), who consider various reasons why patients are readmitted ICU after they have been discharged.

- **Predictors of readmission**

Rosenberg and Watts (2000:494) state that patients who are readmitted to ICU have significantly higher illness scores when are admitted to ICU for the first time and when they are discharged after their first stay in ICU, in comparison to those patients who are not admitted to ICU for a second time after they had been discharged. Rosenberg and Watts (2000:494-495) also note the variables that are most commonly associated with ICU readmission: these include fever, hypoxia, an elevated respiratory rate and/or heart rate, a diagnosis of upper gastro-intestinal bleeding at the time of admission, and the age of the patient when that age is significantly higher than the average rate of other patients who have been admitted to ICU over an measurable period. Other variables that were also associated with readmission were a positive fluid balance, elevated pCO_2 and positive blood cultures. The researchers also noted that medical patients were 10% to 40% more likely to be readmitted than surgical patients.

Because readmission to the ICU during the same hospitalisation period is associated with significant morbidity and mortality rates, and because it also results in longer stays in ICU and higher overall costs per patient, there here is a significant and growing interest in identifying reliable predictors of readmission in patients. The aim of a recent retrospective case–control study by Boudesteijn et al. (2007:475) of the Netherlands was to assess the incidence of ICU readmission, to identify predictors of ICU readmission within 48 hours after discharge, and to determine ultimate patient outcomes. The study population consisted of patients who had been discharged alive from a 28-bed surgical, thoracic–surgical and medical ICU in a university teaching hospital during a one-year period in Leiden in Belgium. A relevant case in this study was defined as a patient who had been readmitted to the ICU within 48 hours after discharge. During the period covered by the study, 1,393 patients (out of a total of 1,635 patients who were admitted to the ICU) were

identified as being at risk for readmission to an ICU after having they were discharged to general wards. Out of a sample of 25 patients (1.8%), 23 were readmitted to the ICU. Nine of the 23 (39%) who were readmitted died during their hospitalisation even though the overall ICU mortality was only 10.6%. The most important reason for readmission in 68% of these cases was *respiratory deterioration*.

Boudesteijn et al. (2007:475) concluded from the findings of the research that patients who are readmitted to the ICU need significantly longer overall ventilator times and longer stays in the ICU – even though their ICU mortality rate is ultimately higher than the overall average mortality rate of the ICU. Boudesteijn et al. note that the ventilator time during a patient's first admission to the ICU (especially when it exceeds 300 hours) is an important and reliable predictor of readmission. The amounts of time that it took time to prepare patients for discharge from ICU after extubation also differed significantly from the amounts of time that it took to discharge those patients who were not readmitted. This data suggests that elderly patients who have been ventilated for long periods are at particular risk of readmission and should receive additional care before they are discharged from the ICU. The study by Boudesteijn et al. emphasised the importance of *the continuous monitoring patients who have been discharged from ICU*. The hospital in which this research took place subsequently undertook a programme of monitoring patients who had been discharged from the ICU and subsequently readmitted. The results of this programme are described in section 5.4.3 (phase 3) of chapter 5.

Despite an initial recovery from a critical illness, many patients deteriorate once again after they have been discharged from the ICU. Campbell et al. (2008:1-7) examined the results of a clinical audit of a hospital in an attempt to identify which patients were at risk of readmission or death after they had been discharged from the ICU. Campbell et al. (2008:7) identified risk factors associated with death and readmission to ICU. They took various

risk factors such as the age of the patient and the time that they had spent in the hospital before admission to the ICU, into account in their review. They found that researchers who wanted to identify predictors of readmission needed to be taking all these factors into consideration – especially in patients who have been discharged from the ICU to general wards. They concluded that all patients who are identified as being at risk in terms of these indicators need frequent observation and continuous care by experts after they have been discharged from the ICU.

- **Reasons for readmission to the ICU**

A systematic review by Rosenberg and Watts (2000:492-502) focused on ICU readmission in eight multi-institutional ICU outcome studies that they considered in their review. When they pooled the data from the multi-institutional studies of ICU outcomes, they obtained a mean ICU readmission rate of 7%. The study found that readmission rates were higher in teaching hospitals than in non-teaching hospitals.

They also found that the reasons why patients were readmitted to the ICU related to their initial diagnosis or to problems that were either similar or identical to the problems for which they were first admitted to the ICU in between 19% and 52% of all the cases that they reviewed. Rosenberg and Watts (2000:493) conducted their study in medical and surgical ICUs, and found that readmission to the ICU was most frequently associated with conditions that included hypoxic respiratory failure, inadequate ventilatory or pulmonary toilet, upper-gastro-intestinal bleeding, neurological impairment, and sepsis. Rosenburg and Watts (2000:394) ascertained that the most common reasons for ICU readmission were *pulmonary problems*, including hypoxia and inadequate pulmonary toilet. The second most common reasons for readmission to ICU were a variety of *cardiac conditions* (arrhythmia,

congestive heart failure, and cardiac arrest), and the remaining reasons were mostly associated with upper-GI bleeding and neurological impairments.

Although the reasons for the initial admission to the ICU and for readmission varied according to the type of ICU that was being examined, three important facts emerged from this study. Firstly, the leading (or second most frequent) cause of readmission to the ICU consistently related to *pulmonary disorders*. The *recurrence of GI bleeding* was the most common cause of readmission in cases in which GI bleeding had been the initial cause of admission.

Rosenberg and Watts (2000:494) point out that *early* readmission is of particular interest to researchers because it may indicate that the patients concerned were *prematurely discharged*. Early readmission occurred among 22-30% of these patients. The researchers estimated that *premature discharge* was a feature in the history of 22-42% of the cases of all the readmitted patients they investigated. Although there was only one primary study that evaluated early readmission, it produced no significant evidence of differences in the causes of readmission or in the quality of care offered to the patients whom they examined.

A study conducted by Turkistani (2004) [online] http://www.ispub.com/-journal/the_internet_journal_of_anesthesiology/volume_18_number_2/article/incidence_of_readmissions_and_outcome_in_a_surgical_intensive_care_unit.html in a surgical ICU at the King Saud University Hospital in Riyadh in Saudi Arabia found the readmission rate to a Surgical intensive care unit was 2.6%. *Respiratory* complications were the leading cause of readmission in 41% of the sample. Other causes were redo-surgery, complications after surgery, cardiac dysfunctions, thromboembolic complications, and infections. Premature discharge was not used as a identifying factor in this study.

According to Rosenberg and Watts (2000:502), cited by Turkistani (2004), the *medical ICU* readmission rate was 7% (with a range of 4 to 14%). This figure can be compared to that which emerged from the study by Turkistani (2004), in which the incidence of readmission in the SICU, as noted above, was 2.6%.

- **Outcomes associated with ICU readmission**

Rosenberg and Watts (2000:496-7) point out that, for many patients, readmission may be a function of their failure to respond to treatment rather than a reflection of poor quality care or premature discharge.

Rosenberg and Watts (2000:499-500) note that there is no agreed standard for what might be a "normal" or appropriate readmission rate to an ICU. While it may be reasonable to assume that when a significant number of patients are readmitted within 48 hours, the quality of care may be suboptimal, there is no current evidence to indicate that a longer stay in the ICU would have prevented readmission or that poor care outside the ICU should be ruled out as a cause for readmission. A prompt return to the ICU might paradoxically indicate a higher quality of care since many of the patients who are readmitted are among the sickest who enter the ICU. The acuity of their illnesses and conditions might well make their subsequent readmissions both necessary and probable. According the conclusions reached by Rosenberg and Watts (2000:494-500), any decision to discharge a patient from ICU is based on complex and changing considerations. These include issues about resources (such as bed capacity), the possibility of other safe care alternatives (such as are found in high care units), and clinical guidelines that advocate new approaches to care. But the review undertaken by Rosenberg and Watts (2000: 500) does indeed confirm that ICU readmission is associated with higher hospital mortality rates. Among the many observations made by Rosenberg and Watts (2000:495-6) was the

fact that the *length of stay* for readmitted patients was at least twice as long than that for patients who had been discharged from the ICU – but not readmitted. The average hospital length of stay ranged from between 35 and 47 days for readmitted patients, in comparison to the stay of between 16 and 21 days for patients who were not readmitted. In the study conducted by Turkistani (2004) [online]

http://www.ispub.com/ostia/index.php?xmlFilePath=journals/ija/vol8n1/icu.xml the readmission rate was 2.6% and the corresponding mortality rate was 37%.

- **The effect of outreach teams on rates of readmission to ICU**

The research undertaken by Leary and Ridley (2003:328) was designed to elucidate whether the number, causes and sequence of readmissions to ICUs changed when an outreach team was involved in the care and treatment of a patient. During the two-year period of their study, 256 patients were admitted to ICU. Of these, 100 were readmitted (49 *before* being attended to by an outreach team, and *51 after* being attended to by outreach). It therefore seems apparent that the readmission rate did not vary because of the introduction of outreach teams into the patient-care process. The study also found that there were no differences between the duration of stays in the general ward and in the ICU admissions before or after the introduction of an outreach team. The study *detected no change at all in patterns of readmissions* because of the introduction of an outreach team. These researchers suggest that although the use of outreach teams is an important development for ICU, their utility in the patient care process should be measured by other parameters.

In a non-randomised study carried out by Ball et al. (2003:327) in a tertiary referral teaching hospital with 1200 beds, the researchers examined the prognosis for patients who were discharged from the ICU after their first or only admission during two distinct study

periods (namely, 26 February 2000 to 25 February 2001 and 26 February 2001 to 25 February 2002). The findings of this research was that the use of critical care outreach teams *seemed to reduce the number of readmissions* to a significant extent. Since patients are at an increased risk of deterioration during the recovery period after their discharge from critical care, this often leads to readmission, which, in turn, is associated with higher in-hospital mortality rates. Ball et al. found that the *readmission rate was reduced from 12.4% to 6.0%* after the introduction of the outreach team during the period covered by the research. A readmission rate of 4.0% is in fact below the national average of 6.3% that is reported by the Intensive Care National Audit Research Centre in the UK. The results of the study by Ball et al. showed the introduction of a critical care outreach team improved the survival to discharge from hospital rate after the discharge of these patients from critical care by 6.8% (risk ratio 1.08). Readmission to critical care therefore decreased by 6.4% (0.48).

3.4.2.11   *In-hospital cardiac-pulmonary resuscitation (CPR)*

The UK Resuscitation Council (2005:27) has determined that the rates for survival and for complete physiological recovery in the aftermath of an in-hospital cardiac arrest are poor in all age groups. According to Perberdy, Kaye and Ornato (2003:297), as cited by UK Resuscitation Council (2005:27), only 20% of adult patients who suffer an in-hospital cardiac arrest will survive to go home. Most survivors of in-hospital CPR are admitted to an ICU. The UK Resuscitation Council (2005:27) states that cardiac arrest in patients in unmonitored ward areas is usually a *predictable event* because arrest often follows a period of slow and progressive physiological deterioration that is the result of unrecognised or inadequately treated hypoxemia and hypotension. But the UK Resuscitation Council (2005:27) has also mentioned *deficiencies in acute care* as a precursor of cardiac arrest. Such deficiencies include *the incorrect use of oxygen therapy* and *neglect in the monitoring of patients* as well as a failure to involve *experienced* senior nursing personnel in the immediate care of

sick patients. Additional factors mentioned by the council include a failure to use a systematic approach to the *assessment* of critically ill patients, the adverse effects of various kinds of inadequate *communication*, an absence of *teamwork* and an insufficient use of *treatment limitation plans*.

An observational study performed by Damon and William (2002:1-2) identified the fact that as many as 5.8% of patients who were admitted to the ICU from the hospital ward had received CPR *prior* to ICU admission, and that this group accounted for 30% of all the deaths that had occurred.

Franklin and Mathew (1994:244), Schein et al. (1990:1388, 1391) and Rich (1999:147) have all pointed out that it has been well demonstrated that patients who have been admitted to the ICU following CPR have often displayed premonitory abnormalities in vital signs such as difficulty in breathing, tachypnoea and a deterioration in mental function *prior to their acute deterioration*. Even though these premonitory signs of cardiac arrest are observed by nursing and medical personnel, they are frequently ignored and not acted upon. Hillman et al. (2001:343) observed a high incidence of *serious vital sign abnormalities* in the period before arrest in patients with potentially preventable hospital deaths, and have noted that these antecedents could have identified patients who might have benefited from earlier interventions. Another study by Krause et al. (2004:275) point out that any analysis of the critical events that precede adult cardiac arrests reveal a significant number of easily identifiable *antecedents* that are usually related to abnormalities of the airway, of breathing and of circulation. Smith and Poplet (2002:335) have reason to believe that medical and nursing personnel are not always in possession of the necessary acute-care knowledge and skills for identifying such abnormalities, and may indeed lack the necessary clinical confidence and resources to deal with acute-care problems.

The UK Resuscitation Council (2005: 28) has confirmed that regular monitoring and the early and effective treatment of seriously ill patients appear to improve clinical outcomes and survival rates after cardiac arrest. The use of the Early Warning Score or "calling-criteria" at the bedside of patients in recent years has been used to alert ward nursing personnel to recognise those patients who are at risk so that they can summon professional personnel who have the necessary expertise and equipment to attend to patients who show clear signs of deterioration (UK Resuscitation Council 2005:28). Section 3.3.3.2 of this chapter provides a discussion of the value and use of care teams and the early warning score.

- **Recommended strategies from the UK Resuscitation Council**

The UK Resuscitation Council (2005:29) has recommended the following strategies to prevent avoidable incidents of in-hospital cardiac arrest:

- Place patients who are critically ill or at risk of sudden clinical deterioration in areas where the level of care offered is matched by the acuity of the patient's sickness.
- Regularly monitor such patients by observing and recording simple vital signs such as pulse, blood pressure and respiratory rate on a regular basis. Match the frequency and type of the observations conducted to the severity of the illness of the patient.
- Use an Early Warning Score system to identify those patients who are critically ill or at risk of clinical deterioration or cardiopulmonary arrest (or both).
- Adopt an appropriate patient vital sign chart that clearly indicates and facilitates the regular measurement and recording of early warning score.
- Ensure that the hospital has a clear and unambiguous policy about the need to make a rapid clinical response to any observed deterioration in a patient's clinical condition. Provide advice about whatever further clinical management of a patient might be

required, and the specific responsibilities of medical and nursing personnel in such situations.

- Introduce a set of clearly described responses to any manifestations of critical illness. These responses will vary between the various outreach services and METs that have the capability of responding to acute clinical crises. The emergency team should be called once the personnel have been alerted by the Early Warning Score system, and this service should be available 24 hours a day

- Train nursing personnel in the recognition, monitoring and management of the critically ill patients.

- Make sure that the hospital has a clear, rational and ethically sound Do Not Resuscitate policy that is based on best-practice guidelines, and ensure that all clinical nursing personnel understand what the policy means and what it requires them to do. Clearly identify all those patients who do not wish to receive CPR and those for whom a cardiopulmonary arrest is an anticipated terminal event for which CPR would be an inappropriate response.

The UK Resuscitation Council (2005: 29-30) points out that CPR was originally devised as a technique to save the lives of patients who had suffered a sudden and unexpected cardiac arrest in hospitals. All in-hospital deaths now invariably involve an attempted CPR, even when the underlying condition and general condition of the patient make a successful resuscitation a highly unlikely outcome. In spite of this, there is clear evidence to show that when cardiac arrest or deaths are almost inevitable, ward nursing personnel rarely make decisions about a patient's resuscitation status. Nursing personnel should therefore be educated with the appropriate knowledge, insight and training (and should also be well informed about the hospital's Do Not Resuscitate policy) so that they do not rush to undertake futile and frequently undesired CPR attempts that have little hope of success or any beneficial outcome.

3.4.2.12   *Unexpected cardiac arrest*

The purpose of the research conducted by Buist et al. (2002: 387) was to determine whether earlier clinical intervention on the part of a MET (which had been prompted by signs of clinical instability in a patient) could reduce the incidence of unexpected cardiac arrests in hospital and the mortality rate that resulted from these arrests. The researchers undertook a non-randomised population-based study *before* 1996, and *after* the introduction of a MET in 1999, in a 300-bed tertiary referral teaching hospital. The results of their study demonstrated that early interventions by the MET significantly reduced the incidence of cardiac arrests and mortality from unexpected cardiac arrests in clinically unstable inpatients in the hospital (by 77% and by 55% respectively).

3.5   SUMMARY OF ASPECTS IN THE LITERATURE STUDY APPLICABLE TO THIS STUDY

From the literature reviewed in this chapter, the most outstanding aspects concerning the objectives of the research are given below. It is evident that most studies regarded the deterioration of patients as a critical issue which may, in many cases, could have been prevented by providing optimal patient care and acting immediately when signs of deterioration are noted.

The answer the research question of the following objective *to determine the interventions that are required to decrease the number of in-hospital patients who are currently being transferred to a higher level of care and the details of the deterioration that made such transfers necessary,* numerous studies have demonstrated how suboptimal care in general wards frequently contributes to the physiological deterioration of patients. There are numerous contributory factors that cause the physiological deterioration of patients in general wards, such as

gradual deterioration in physiological and/or biochemical variables of patients in general wards prior to their admission to ICU, lack of knowledge and urgency and failure to recognise physiological deterioration. Franklin and Mathew (1994:244), Schein et al. (1990:1388, 1391) and Rich (1999:147) have all pointed out that it has been well demonstrated that patients who have been admitted to the ICU following CPR have often displayed premonitory abnormalities in vital signs such as difficulty in breathing.

The answer the research question of the following objective *to conduct a retrospective situational analysis of actual problems in order to identify risk times and rates of patient deterioration*, researchers observed a gradual deterioration in physiological and/or biochemical variables of patients in general wards prior to their admission to ICU. The conclusion of a study of premature and night discharges showed that patients who are discharged from ICU to general wards at night are at increased risk of in-hospital death in comparison to patients who are discharged during the day and those who are discharged to high dependency units. The premature discharge from ICU of patients who are recovering from critical illnesses because the ICU is struggling to accommodate urgent new admissions to the unit, is associated with a marked increase in normal hospital mortality rates.

A study by Young et al. (2003:78) determined that a slow response to signs of physiological deterioration which led to a delay in transfer to ICU was associated with an increased mortality rate.

A study by Boudesteijn et al. (2007:475) showed that the most important reason for readmission in 68% of these cases was *respiratory deterioration* with significant morbidity and mortality rates. Rosenburg and Watts (2000:394) ascertained that the most common reasons for ICU readmission were *pulmonary problems*, including hypoxia and inadequate

pulmonary toilet. Many of the patients who are readmitted are among the sickest who enter the ICU and therefore *the continuous monitoring patients who have been discharged from ICU* become a significant quality care decision.

The answer the research question of the following objective, *to determine whether or not any interventions were applied,* studies have emphasised the important relationship that exists between vital data, applicable knowledge, the ability to communicate, the ability to recognise the signs of clinical deterioration and the incidence of in-hospital cardiac arrest.

The answer the research question of the following objective *to develop a management strategy for early interventions in the treatment of deteriorating in-hospital patients* a study demonstrated that early interventions by the MET significantly reduced the incidence of cardiac arrests and mortality from unexpected cardiac arrests in clinically unstable inpatients in the hospital.

3.6   CONCLUSION

This chapter was devoted to an examination of what the literature has to say about the structure of a hospital in terms of its facilities, personnel, equipment and supplies, management and leadership, and finances. The literature review included brief descriptions of the activities, the coordination of care, the control measures, and the processes that are used in hospital settings. This chapter also included descriptions from the literature of expected outcomes and some of the problems that are encountered.

Chapter 4 discusses and describes the research methodology used in this study.

CHAPTER 4

"Blessed is the man, who having nothing to say, abstains from giving wordy evidence of the fact."
George Eliot (1819-1880)

George Eliot, English author and novelist

RESEARCH METHODOLOGY

4.1   INTRODUCTION

While chapter 3 presented the literature review on which this study is based, this chapter describes the methodology that the researcher used in the study. In this chapter, the research design and various methods that were used to fulfil the aims of the study are discussed in detail.

According to Burns and Grove (2001:26), a *research methodology* consists of a master plan that lists all the steps, strategies and procedures that a researcher uses for gathering and analysing the data in a logical and systematic manner. The selection of a research methodology or strategy lies at the very heart of any research design, and the adoption of an appropriate research methodology probably constitutes the single most important decision that an investigator has to make.

Cohen et al. (2000:44) refer to methodology in research as the assemblage of systematic methods that are used for gathering and interpreting data from a given population so that all the phenomena that are of interest to a researcher can be clearly elucidated, analysed and understood. Once a sufficient amount of relevant data has been gathered from a research population, a researcher should be in a strong position to draw conclusions or discern repetitive patterns and themes in the data, and to make generalisations on the basis of the commonalities that he or she discerns. Depending on the kind of methodology that is being used in the research, it might be possible to confirm empirical facts about the phenomena under investigation or to generalise to other similar populations operating under equivalent conditions. Although there are many possible kinds of methodology that a researcher can use (and many different emphases in each kind of methodology), the most widely used ones can be roughly divided into qualitative and quantitative methodologies. Du Plessis, Appelbaum and Pretorius (2001:23) assert that a methodology describes the "logic of method" in terms of which the whole research project is conducted.

Methodology therefore embraces the research design, the population, the instruments that are used to collect data, the ethical principles in terms of which the research is conducted, the process of data analysis and the specific methods that the researcher uses to interpret the information and emergence from the data. Since all research is framed in terms of the specific methodology, it is essential for both the researcher and those who study the results of the research, to be appraised of the exact methods by means of which the researcher proposes to carry out the study. Without a logically valid and carefully thought-out methodology, no research can claim to be scientifically sound.

4.2   RESEARCH DESIGN

A *research design* represents a blueprint for the conduct of the study because it maximizes control over all those factors that might interfere with the validity of the findings (Burns & Grove 2005:211). The research design guides the researcher to plan and implement the study in a particular way so that the envisaged goals will be accomplished once the study is complete. The setting of goals is referred to by Polit and Beck (2006:509) as a "general plan for addressing research questions, including specifications for enhancing the studies' integrity". Green and Thorogood (2004:34) refer to the research design as "the what, how and why of data production" – all of which are factors that are required to answer the research question.

Burns and Grove (2005:40) describe a research design as "a blueprint for conducting the study that maximises control over factors that could interfere with the validity of the findings. The design guides the researcher to plan and implement the study to achieve the set goals."

The design that was used in this research is quantitative, non-experimental, retrospective, descriptive, interventative and of an applied nature. According to Stommel and Wills (2004:23), the essence of all quantitative research is that it relies on an essentially numerical approach and data that can be expressed in terms of numbers or numerical expressions. Quantitative research also analyses data in terms of the general principles of evidence and logic, and does not attempt to introduce any kind of disciplined subjectivity or subjective judgments into the analysis of the data. All quantitative data and analysis is empirical. This is generally taken to mean that it is devoid of subjective judgments and considerations, and can be exactly replicated by other researchers who examine the same data under the same conditions.

4.2.1 *Quantitative*

Burns and Grove (2005:27), define *quantitative research* as "a formal, objective, systematic process in which numerical data is utilised to obtain information and describe variables and their relationships". The questions that are asked by the researcher generate specific numerical information that illuminates the research phenomena and answers the research question. The phenomenon that the researcher set out to investigate in this research pertained to the exact number of in-hospital patients who were transferred to a higher level of care during the specific time period covered by the study.

In quantitative research, a researcher gathers evidence according to a predetermined plan by making use of formal instruments to collect the information that is needed (Somekh & Lewin 2005:215).

According to Burns and Grove (2005:26), quantitative studies of this kind are the method of choice for quantifiable empirical investigations into health care practices, and they require rigorous control to identify and limit the effects of the extraneous variables that contribute nothing to answering the research questions or solving the research problems. The researcher also controls the study by imposing conditions on the research situation that will minimise biases.

For the purpose of this study, the researcher collected quantitative data by means of a formal, objective and systematic process that is typically used in many quantitative research designs.

4.2.2 *Non-experimental*

Stommel and Wills (2004:144,358) point out that in the case of a non-experimental quantitative research design, a researcher cannot manipulate the research question to accommodate either the feasibility or the ethical acceptability of the data that is

gathered. In this research, the researcher only *observed* and *collected* retrospective data that had already been established and stored prior to the commencement of the research. Because of this, the researcher at no stage attempted to intervene in the state of the data or to alter the parameters that circumscribed the phenomena of interest.

4.2.3 Retrospective

Burns and Grove (2005:235) note that, in retrospective studies, both the proposed cause and the effect have already occurred.

For the purpose of this study, both the cause and effect occurred before the commencement of this study since the study consisted of a retrospective analysis of a predetermined number of in-hospital patient's health records that had accumulated over a specific period of time. The purpose of this retrospective analysis was to ascertain various deficiencies that will be described later in this text.

4.2.4 Descriptive

Burns and Grove (2005:232) note that a researcher who uses a *descriptive design* describes situations and events as they occur in their natural contexts without any attempt to manipulate the variables.

Salks and Allsop (2007:6) observe that a descriptive study provides "current information or intelligence on a problem". A researcher's intention in a descriptive study is to "portray an accurate picture of reality" (Stommel & Wills 2004:437). McMillan and Schumacher (2001:283) point out that descriptive research is "concerned with the current status of something and 'asks' what is and reports things as they are".

The purpose of descriptive research is "to observe, explore, describe, and document aspects of a situation as it naturally occurs" (Polit & Beck 2006:192). Descriptive studies

are characterised by little or no researcher control. When the research subjects are human beings, they are examined exactly as they work and perform in their natural settings such as, for example, their homes, in hospitals or in other situations (Burns & Grove 2005:28). Burns and Grove (2005:24) observe that descriptive research is "the exploration and description of a phenomenon in real-life situations", and they add that descriptive research strives to compile "an accurate account of characteristics about particular individuals, situations or groups". The outcome of descriptive research includes the compilation of concepts or generalisations, the identification of relationships and causal connections, and the development of hypotheses that could provide a basis for future quantitative research (Burns & Grove 2005:25).

This present research is descriptive in nature because it describes the care that is provided in a natural environment such as a general ward setting as well as in various higher-level care environments that are reflected in the records.

4.2.5   Intervention research

According to Burns and Grove (2005:28), intervention research (in a nursing environment) would concern itself with investigating how effective particular nursing interventions would be in achieving expected outcomes in a natural setting.

The problems that the researcher investigated in this study involved in the extent of patient deterioration in health care facilities, increases in the number of transfers to higher levels of care, problems inherent in the process of transferring patients, a lack of necessary knowledge on the part of those who were responsible for these activities, and the high incidence of in-hospital cardiac arrests. The purpose of the study was therefore to identify the dynamics and protocols involved in all these situations and to use this knowledge as a basis for suggesting interventions that would serve to improve clinical practice in general but particularly in the hospital that was the subject of this study.

4.2.6   *Applied or practical research*

When Burns and Grove (2005:33) talk about "applied research", they are referring to what might equally well be called "practical research", and practical research means undertaking scientific investigations that generate the kind of knowledge that is needed to improve clinical practice.

One of the most important activities in this research was to review the effects of the implementation of the clinical markers training and the outreach programme. The researcher analysed these two interventions by means of a retrospective chart review and the subsequent comparison of her findings.

4.3   RESEARCH METHOD

Bowling (2007:143) refers to the *research method* as the practices and techniques that are used to in the data collection processes and in the analysis of the data. The research method therefore includes the ***phases of the research*** (which will be discussed in detail below), the research population, the sample itself, the methods that are used for sampling, the size of the sample, the processes that are utilised in data collection, the choice of an instrument of measurement, and an explanation of how the data will be processed and analysed.

4.3.1   Research phases

The present research consisted of the three phases that are described below.

Phase 1: Analytic phase

During this phase, researcher undertook a situational analysis to identify the latest trends in current practice.

The clinical audits that the researcher performed in general wards included monitoring the number of in-hospital patient transfers to higher levels of care. After she had completed the necessary clinical audit, the researcher undertook a survey and assessment of the extent of the nursing personnel's knowledge of clinical markers. She then investigated the extent to which the nurses were technically competent to gather and interpret the vital signs on which all their subsequent decisions were based.

During the analytic phase, the researcher conducted a retrospective examination of patient records in order to determine which patients had been transferred to a higher level of care. She also investigated the reporting structure and the processes that the nursing personnel had used to report abnormal values to the shift leader and the particular actions that were then taken by the shift leaders in the light of the information they received.

Phase 2: Intervention phase

Phase 2 included interventions designed to improve current practice. Both a clinical markers training programme and an Outreach programme were introduced in the hospital in which this study was undertaken.

Phase 3: Re-assessment phase

During the third phase, the situation was re-assessed. The monthly clinical audits were used in this phase to identify whether any improvements had taken place. An improvement was identified as the total number of call outs of the local resuscitation team in relation to the total number of cardiopulmonary arrests and the number of in-hospital patient transfers to a higher level of care that had been made.

The researcher reviewed each patient's health record so that she would be in a position to compare the data contained therein to a retrospective study of those patients who

had been transferred to a higher level of care. At the same time, the researcher took account of improvements in the nursing personnel's knowledge of clinical markers and of the monthly clinical audit that contained information about what had happened when patients were transferred to a higher level of care.

A general overview of these three phases of the research is briefly described in three separate sections in chapter 5 of this study. The first phase (contained in sections 5.1 to 5.3 of chapter 5) presents the situational analysis. The second phase is described in section 5.4. The third and final phase of the research is briefly described in chapter 6.

4.3.2   Population

Somekh and Lewin (2006:347) refer to *a research population* as *all* the people or phenomena that are relevant to the study, from which a circumscribed sample will be selected for research. According to Polit and Beck 2006:56), a *population* refers to all the individuals or objects that display common, defining characteristics. In this study, the population consisted of the records of the in-hospital patients who had been transferred to a higher level of care between May 2005 and October 2005.

Polit and Beck (2006:259) note that the *target population* is the entire population in which a researcher is interested. The *accessible population* consists of cases from the target population that are accessible to the researcher as potential subjects. The target population for this study consists of in-hospital patients in the selected private hospital who had to be transferred to a higher level of care because of physiological deterioration.

In this study, the accessible population of interest consisted of all the patients who were admitted and transferred to the wards.

4.3.3   Sampling frame

Once the study population has been identified, the accessible population is listed, and a final sample is drawn from it. This is referred to as a ***sampling frame*** (Trochim 2006:32).

4.3.3.1   *Sample*

Polit and Beck (2006:260) identify a *sample* as a subset of the population that has been selected to participate in a study. Somekh and Lewin (2005:218) point out that a sample is subjected to intensive scrutiny so that the total population from which it is drawn can be adequately understood. Burns and Grove (2005:350) refer to a *sample* as a subset of the total population that has been selected for a particular study, and they note that the members of a sample are referred to as the subjects of a study. Burns and Grove (2005:350) note that probability and non-probability as well as various sampling methods are used in nursing science research. In this study, the researcher used purposive sampling. Burns and Grove (2005:352) refer to purposive sampling as the kind of selective sampling that requires a researcher to make a conscious selection of the subjects, elements, events or incidents that are relevant to the purposes of the study.

For the purpose of this study, the phenomena of interest were all the unplanned transfers of patients to a higher level of care – transfers that had been precipitated by their prior physiological deterioration in the circumstances of the general wards which they had been admitted. All the information that enabled the researcher to identify these particular patients was available in the patients' records and in the hospital's routine monthly clinical audit.

4.3.3.2   *Sampling*

Sampling is the process of selecting a portion of the population that accurately represents the entire population (Polit & Beck 2006:260). Saks and Allsop (2007:156) note that a member of the target population is known as *a sampling unit* or *element*. The

logic and procedures inherent in the concept of sampling indicate what is central in the methodological process of drawing inferences about human populations. Polit and Beck (2006:259) regard sampling as the process of selecting a portion of the population to represent the entire population. Terre Blanche and Durrheim (2004:44) state that sampling requires a researcher to make decisions about "which people, events, behaviour or social processes are selected and/or observed". The purpose of sampling is to select subjects that will be representative of the population about which the researcher hopes to draw valid and coherent conclusions about the topic that has been selected for study (Terre Blanche & Durrheim 2004:44).

The researcher engaged in the sampling of the participants by following the procedure outlined below:

- Four ICU and or trauma-trained clinical facilitators, a unit manager and a nursing manager identified those patients who had been transferred to a higher level of care on their daily morning rounds in the HCU and the ICUs, the Multi Intensive Care Unit, the Trauma Intensive Care Unit, and the Coronary Care Unit.
- The pro formas were all filled in as each patient was identified (see Annexure D: Pro forma).
- The researcher compiled a list of all the patients who had been identified.
- The pro forma was used as a means for systematically collecting data from each patient's health record.

4.3.3.3 Sample size

Sample size refers to the number of elements that are included in the sample. The more representative a sample in a study, the more generalisable will be the research results. Polit and Beck (2006:267) point out that the sample size is equivalent to the number of subjects in a sample. As a general principle, the extent of sampling error is likely to decrease in proportion to the population size. The larger the sample, the more

representative it is likely to be (Polit & Beck 2004:268). The smaller the sampling error, the more likely it is that the sample will be representative of the population. Representativeness can be enhanced by undertaking probability (random) sampling, by assembling an adequate sample, and by taking into account the total size of the population. If a sample is strongly representative of the population, it may be possible to generalize the research findings to the population as a whole (Burns & Grove 2005:344; Polit & Beck 2006:299). In this research, the sample size was small but well defined. The details that are relevant to the sample size are summarized in table 4.1.

Table 4.1   Sample size

Date	n= Patients	n= Transfers	n= Patients excluded	n= Total patients used	Patients transferred more than once	n= Total transfers used
28/4/2005 – 27/5/2005	35	42	1 Deemed not to be a transfer 1 Missing file 2 Refused	31	7	38
25/9/2005 – 26/10/2005	32	39	2 Refused 1 DNR 5 Records incomplete	24	7	30

Thirty-five patients were transferred to a higher level of care for the period 28/04/2005 to 27/05/2005, representing admissions from 14/04/2005 to 20/05/2005. After record review, one of the cases transferred was deemed an elective post-operative high care admission rather than an unplanned transfer. Of the remaining, 31 were included in this study, the three exclusions being one missing file, and one patient and one patients' family having refused consent for the data to be used.

Of the 31 patients included, seven patients were transferred more than once to a higher level, therefore 31 patients (88.57% of patients) and 38 transfers (92.68% of transfers) were included in this study.

The comparative study period was from 1/10/2005 to 28/10/2005, representing admissions from 25/09/2005 to 26/10/2005, and here 32 patients were transferred. Of these 32 patients, three were excluded for the following reasons:

- Two patients denied request for their data to be analysed (one patient and one patient's family).
- In one case, a pro forma was completed but the patient was not transferred due to a "Do not resuscitate" order.

Of the remaining 29 patients, five further patients could not be used due to inability to recover the records from the hospital record storage system. However, these patients were included in the demographic and time of day of transfer analysis. Therefore 90.63% of patients were analysed for the demographic data and time of day of transfer analysis and 75% for the subsequent analysis. Of the remaining 24 patients, six were transferred more than once to a higher level of care; therefore in the final analysis 30 transfers were used (75% of transfers).

4.3.3.4   Eligibility criteria

Polit and Beck (2006:259) point out that quantitative researchers (and even sometimes qualitative researchers) specify the characteristics that delimit the study population by using eligibility criteria.

In this study, what made a patient eligible to be a member of the target population was that they had to be in-hospital patients who had undergone an unplanned transfer from a general ward to either a HCU or ICU because of their physiological deterioration. Other eligibility criteria included the following:

- Only patients who were older than 18 years were considered for inclusion.

- All patients who had been transferred from the HCU or ICU to the wards and then back to the ICU or HCU (referred to as a higher level of care) were considered for inclusion.

- All patients who were transferred more than once was also included in the study.

4.4 DATA COLLECTION

The following discussion describes the development of the clinical audit instrument, the pro forma that was devised for the collection of data, and the electronic spreadsheet that was used to to capture the data.

4.4.1 Clinical audit instrument

A hospital clinical audit programme is an indispensable requirement for the Health Quality Service international accreditation programme. A well-developed **clinical audit instrument** systematically collects data on selected topics for the purpose of measuring current practices in the organisation.

Topics for the clinical audit programme were chosen in terms of the Health Quality Service international accreditation programme guidelines by the nursing and hospital manager, the ward unit managers, the HC and ICU unit managers, the education department unit manager, the chairperson of the clinical audit committee and specialists with practising privileges in the hospital under study. The selected topic for the clinical audit programme at the time of implementation of the Health Quality Service programme 2004 was "Transfer to higher level of care". Because the clinical audit instrument indicated only trends, it remained necessary to accumulate additional data.

After a topic for the clinical audit programme had been selected, a clinical audit instrument was developed. The chairperson of the clinical audit committee, the nursing

managers and the project leader of the Health Quality Service international programme together developed a clinical audit instrument which was used for daily data collection in the wards. Prior to this, the instrument was presented to and approved by quality committee of the hospital that was the site of the present study. The quality committee consist of specialists, the hospital manager, the nursing managers, the unit managers, the clinical audit committee chairperson, the clinical governance chairperson, the infection control coordinator, the wound care coordinator, the education department unit manager and the clinical facilitators.

A data collection form was needed in order to collect additional data from the health records of patients for research purposes. According to Burns and Grove (2005:424), a data collection form can be used to record biographical data, information from the patient record, observations, values from physiological measures, and other data such as the times when events took place and the incidence of complications. Burns and Grove (2005:424) emphasise the need of designing data collection forms in such a way that the required data can be captured with relative ease and in such a format that it will be relatively easy to be enter it into the computer record.

4.4.2   Pro forma

In order to address the research questions, a nursing team, a trauma specialist and a qualified intensivist work together to develop and produce a pro forma. The pro forma guided the process of data collection from patient health records in a systematic and orderly manner. The pro forma contributed to a data collection method that was quantifiable and objective and that served as a suitable data collection plan. The pro forma used in this study consisted mainly of information that was obtainable from patient records and it recorded biographical data, observations, physiological measures, the duration and times of events, interactions among health professionals, and the patient outcome. The researcher was able to use the pro forma as a source of

information in conjunction with case note reviews in order to reconstruct the course of the patients' hospitalisation and treatment.

The researcher and intensivist developed an Excel spreadsheet on which to capture the data for the computer program that ordered and manipulated the quantitative data. The case note reviews of the researcher and the intensivist were entered directly into the data spreadsheet.

4.5 VALIDITY AND RELIABILITY

The reliability and validity of the instrument was indicated by the quality and sufficiency of the pro forma and was used to measure the consistency and accuracy of the instrument that the researcher developed.

4.5.1   Validity

In the opinion of Saks and Allsop (2007:180), *validity* involves the extent to which the operationalised indicator is really (actually) measuring the concept it is intended to be measuring and the extent to which it is a valid empirical indicator of the theoretical concept. Stommel and Wills (2004:222) note that there are different approaches to assessing the validity of an instrument: these different approaches involve content criterion and construct validity. Polit and Beck (2004:423) contribute yet another dimension – face validity – by measuring the appropriateness of the instrument. The validity of any instrument is supported by a greater or lesser amount of evidence. There are therefore four types of validity, namely, content validity, face validity, criterion-related validity, and construct validity. These are the forms of validity that are most commonly utilised in research of this kind.

For the purpose of this study, the researcher used three of the methods of judging validity that are mentioned here. These are content validity, criterion-related validity and face validity.

- According to Polit and Beck (2006:329), **content validity** is concerned with how adequately the content area that is being measured is sampled. The areas that are covered by the tool should be representative of the topic under study. This is considered to be a subjective exercise because it was the researcher or the people who designed the tests were determined the content that would be included in the study. Polit and Beck (2004:423) also note that content validity is directly related to how accurately the content was originally conceptualised and therefore also to the degree to which an instrument measures an appropriate sample of items. This procedure enables experts in the clinical field and medical experts to assess the appropriateness and accuracy of the instrument (Grove & Burns 2005:378).

- Stommel and Wills (2004:222) point out that **criterion-related validity** is the process of assessing a measurement instrument by making use of external criteria. This approach requires the availability of a reliable and valid criterion against which the measures on the instrument can be compared. In this study, the measurement criteria of the instrument were biographical information, the patient history, the diagnosis, the type of admission, the admission date, the date and time of transfer, the type, route and circumstances of the transfer, the deterioration times recorded by the nursing personnel as against the actual deterioration predicted by the chart review, the first mention of deterioration in the patient's health record and the circumstances of the patient's actual deterioration, the actions that were taken, records of whether these actions were taken by a specialist or by the attendant nursing personnel, the occurrence of further deterioration prior to the patient's transfer to a higher level of care, the actual times when the doctor was notified, the request for permission to transfer, the appropriateness and effectiveness of the action taken, the time when stabilisation first became evident, any other additional

signs of morbidity, and the moment of mortality. All of these criteria that are included on the data collection pro forma and research instrument synchronise with the researcher's intentions and the research objectives. This comparison enabled the researcher to establish and confirm the criterion-related validity of the pro forma.

- **Face validity** verifies the apparent validity of the instrument since it gives every sign and appearance of measuring the content that the researcher needs for her analysis (Burns & Grove 2005:379). Saks and Allsop (2007:180) are of the opinion that face validity refers to how a measure appears on the surface and whether all the required questions have been framed in appropriate language.

For the purposes of this study, it was important that all the members of the team who were involved in the development of the pro forma should be in agreement about both its structure and content. Even though Burns and Grove (2005:379) are of the opinion that this does not constitute important evidence for validity, for the purposes of this study, the researcher felt that it was of the utmost importance that the whole team should be in agreement that the instrument would indeed measure what it was supposed to measure.

The first step in the development of the pro forma was to identify what it was necessary to measure: this is referred to as the *universe* or *domain* of the construct. According to Burns and Grove (2005:378), the domain is determined by means of a concept analysis produced from a literature review that results in a clear indication of exactly what it is necessary to measure in order to resolve the research problem in a satisfactory way. Stommel and Wills (2004:222) mention that an instrument is considered to be valid if it measures the characteristics or attributes that it is intended to measure. If one wishes to add value to the content and to establish content validity as certainly as one can, other resources and inputs can also be incorporated. These consist of literature reviews as well as a review of the instrument by individuals and panels of experts in the field (nursing managers and unit managers of ICU, ward and HCU manager, experts from

nursing education departments, qualified trauma surgeon, intensivist, physicians, peer reviewers and the supervisors of the study concerned).

4.5.2   Reliability

Polit and Beck (2006:324) portray an instrument's reliability as the *consistency* with which it measures target attributes. Polit and Beck (2004:416) also point out that an instrument is reliable to the extent that its measures and reflects true scores for the phenomena under investigation. In addition, Burns and Grove (2005:374) note that reliability is demonstrated by three factors, namely stability, equivalence and homogeneity.

The reliability of this data collection pro forma was tested and confirmed by the researcher during the data collection process as she adhered to the following protocols during her examination of the patient health records:

- The researcher used precisely the same system and procedure to examine each individual patient health record.
- The researcher repeatedly measured the same attributes in each individual health record by means of the same instrument. (According to Burns and Grove (2005:374), this might be characterised as a test-retest process – a procedure that confirms reliability.)
- The researcher selected the data for coding in a simple and straightforward way in strict accordance with the preconceived data collection plan and instrument (Burns & Grove 2005:375).

Constant collaboration and consultation with a qualified statistician further established the reliability of the data during these processes.

- **Reliability of medical records**

Stommel and Wills (2004:272) caution that questions about the reliability of data recorded in medical records cannot be ignored. Medical records may include errors, incorrect observations, bias, and the kind of different emphases that arise from being schooled in different disciplines. Examples of incorrect information are mistakes that are found in recording the dates of various procedures.

After the researcher had discussed a number of discrepancies with the intensivist with whom she closely collaborated during the study, she deleted information that they both agreed was unreliable. This information was therefore not used in the final analyses. The researcher also investigated and rectified a number of incomplete data collection pro formas by comparing them with the patient's health record.

4.6 DATA COLLECTION

Data collection in a quantitative study forms a part of the empirical phase of the study (Polit & Beck 2006:57).

Polit and Beck (2006:57) are insistent that data should be processed and analysed in an orderly fashion so that patterns and relationships can more easily be discerned and validated. Quantitative data is analysed by means of statistical analyses which include both simple and well-known procedures as well as more complex and sophisticated methods.

A team who conducted daily morning rounds in HC and the ICUs identified those patients who had been transferred in the previous 24 hours. The team, consisting of a critical care trained professional nurse, a trauma trained unit manager, a critical care trained unit manager, and a critical care trained nursing manager, collected data retrospectively on these morning rounds at each patient's bedside while they were in

the hospital. The units involved were Multi Intensive Care Unit, Trauma Intensive Care Unit, and Coronary Care Unit. The team completed a data collection pro forma for each of the patients who were identified. The number of transfers correlated with the monthly clinical audit reports from the wards, from HC, and from the ICUs.

The relevant patient's health records were obtained from the hospital's administration department after the completion and closure of the billing department's responsibilities. Although the patient's health records are systematically and safely archived on the premises of the hospital, they are nevertheless easily accessible for research purposes by accredited bona fide researchers.

It was found that the patients' health records, the nurses' assessments, the vital data documents, the nursing care plan statements and the physicians' order sheets, all contributed the necessary data during this data collection phase.

The researcher used the data on the pro forma which had been completed by a team of four senior nurses at the time of transfer in conjunction with the data obtained from the retrospective chart review undertaken by the researcher and by the intensivist to compare the reliability and quality of the information that was being assembled. In those cases where the details on the pro formas did not match (as, for example, with regard to the date or time of transfer), it was possible to use the patient's health record to obtain the correct information. Once this had been done, any fields that contained questionable or dubious data that could not be validated were removed.

4.7 DATA ANALYSIS

The quantitative data that was gathered in the empirical phase was in a raw form that required analysis and interpretation, and this analysis and interpretation constituted the fourth major phase of the project (Polit & Beck 2006:57).

Causality is the assumption that one event or situation has been caused or precipitated by another prior event or situation. Statistical procedures that elucidate causality are of critical importance in understanding and assessing the effects of interventions (Burns & Grove 2005:517). In this study, the extent of knowledge possessed by nurses, the differential rates at which patients deteriorated, the circumstances of patient transfer, and the actions undertaken by the managers of all these processes were all examined as possible causes for transfers to a higher level of care. The research also measured the effects of the systems that were being implemented and the interventions that were being used to improve the circumstances of patient care.

A detailed description of how the data was analysed is presented in chapter 6.

4.8 ETHICAL CONSIDERATIONS

This section describes how the ethical considerations recommended by Stommel and Wills (2004:382) and by Burns and Grove (2005:193), as well as by the guidelines provided by the Academic Advisory Board of the institution in which this research was conducted, were all adhered to. The following ethical considerations were applied during the course of this research.

4.8.1 Gaining entry into the setting

The researcher followed the guidelines for conducting research provided by the hospital in which the study took place, and these are described in this section. The researcher complied with the following ethical considerations during the process of gaining entry into the research setting:

4.8.1.1 Consent

- The researchers submitted a written request to conduct research. In this application to the head office management of the hospital group and the hospital manager of the hospital in which the research took place; she submitted a detailed explanation of the research itself, the reasons for the research, and the probable financial implications of the research for the hospital group.

- In her application, the researcher described in detail the kind of research that would be conducted in the facility where the research was contemplated. She also confirmed that, should permission for the research be granted, she would undertake to ensure that:

  o all information would be treated as strictly confidential

  o the name of the company would not be mentioned in the research without the prior written consent of the Academic Board of the company

  o where the company's name was mentioned, the results would not be published without the written permission of the Academic Board of the company

  o the company would receive one copy of the completed research once it had been finally approved by the tertiary institution

  o she would comply with all the legal requirements regarding patient rights and confidentiality (in all cases where patients or information about patients was incorporated in the research)

  o she would agree to abide by the conditions and requirements of the Research and Development – Clinical Trials and Medical-related Research Policy of the institution

  o she would request the permission and written consent of the management of the institution before initiating any kind of research

  o she would obtain the written consent of all the clinicians who were involved in the research

o she would acquire telephonic consent from all the participants (whether patients or family members)

4.8.2 Permission to conduct the study

The researcher obtained written permission to conduct the study from:

- the management of the private hospital group (see Annexure A)
- the Ethics and Research Committee of the Department of Health Studies of the University of South Africa (UNISA) (see Annexure C)

The researcher also obtained telephonic permission from all the patients and/or their families (where applicable) and visited all the clinicians who were involved in order to obtain their written consent.

The Hospital Management, the head office of the Ethical Research Committee of the institution in which the study took place, and the Ethics and Research Committee of the Department of Health Studies of Unisa, all granted the researcher permission to use her research findings for academic purposes.

4.8.3 Securing informed consent and disclosure of the study

Stommel and Wills (2004:387) regard informed consent as a process by means of which a researcher and a potential study participant communicate about the goals, benefits, and risks of the research.

Burns and Grove (2005:193) define *informing* as the transmission of essential ideas and content from the investigator to the prospective subject. They also define *consent* as the prospective subject's agreement to participate in a study as a subject under conditions that are clearly defined and communicated by the researcher.

Stommel and Wills (2004:387) borrow the opinion that the purpose of informed consent is to allow a person to make an informed decision about whether or not to participate in research. According to the principles in terms of which all ethical research is undertaken, *informed consent* is an indispensable condition for ensuring that all research subjects and participants retain their right to:

- remain free from harm and undue exploitation
- participate in any benefits to which they are entitled because of their participation in the research
- receive fair treatment that will ensure the protection of their personal privacy
- be fully informed of the risks that are associated with participation in research
- freely decide whether or not to participate (or to continue to participate) in research at any time, without forfeiting any benefits to which they would otherwise be entitled

Burns and Grove (2005:193) are of the opinion that it is impossible to conduct ethical research without first having obtained properly informed consent from potential human participants. This implies a disclosure of fundamental information, clear comprehension on the part of volunteers, a legal capacity to give consent and to engage in voluntary activities of this kind.

In pursuit of all these requirements, the researcher contacted all of the participant and/or relatives by telephone and explained the title, purpose, and significance of the study and the intended method of data collection. In addition to this, the researcher assured the participants that he would maintain their privacy, confidentiality and anonymity because the data that she would obtain from the health records would in all likelihood be reported in scientific journals. In spite of this, she assured them that no information would be disclosed that will enable any third party to identify them as participants in the research. The researcher also informed the participants that participation would be voluntary and that no payment would be made for

participation. They were also informed that the findings of the study would contribute to improvements in the existing knowledge of how to manage patient transfers to higher-level care.

In order to protect the patients, families, and health professionals involved, the hospital concerned has committed itself to a non-blame culture in which all can learn from others in order to improve the quality of health care. It is nevertheless a part of the clinical governance strategy of the hospital to prevent errors and to improve the quality of care and health outcomes.

4.8.4 Voluntary participation in the study

According to Stommel and Wills (2004:389), study participants must be informed that participation is entirely voluntary. This means in practice that possible participants may choose not to participate at all, that agreed participants may refuse to participate in certain procedures or answer certain questions, or that participants have the right to discontinue the experiment at any time without any kind of penalty or loss of benefits to which they might otherwise be entitled. Even though this study did not involve any experimental procedures, the records of the participants were closely examined. In order for this to happen, they were required to give their free and voluntary consent to the researcher.

Burns and Grove (2005:198) define voluntary consent as the action whereby a prospective subject or participant decides to take part in a study on his or her own volition without any kind of coercion or exercise of undue influence. Voluntary telephonic consent was obtained after the prospective subject had been given all the essential information about the study and had demonstrated to the researcher that he or she possessed a clear understanding of this information.

4.8.5   Legal capacity to give consent

When a subject (patient) is unable to give consent, a researcher presents all the necessary information that will enable consent to be given by the legally authorised representative, such as a parent or guardian, of a prospective participant (Burns & Grove 2005:196).

In this study, telephonic consent was personally obtained from participants in most cases. Sufficient information about the study was given to the patient in order for them to be properly informed about its possible implications. Since some of the participants had already passed away either in hospital or at home, the researcher had to obtain consent from their legal spouse, their children or their next of kin.

4.8.6   Maintaining anonymity and confidentiality

Stommel and Wills (2004:382) note that while *anonymous* data collection means that the researcher has no way of linking the information provided with the participants involved, *confidential* data collection means that the researcher can (by one means or another) link information that identifies study participants with data, but that he or she undertakes never to disclose participant identities.

In this study, all the participating patients and families were assured of complete confidentiality. The researcher also informed all participants and their families that although the data obtained from the health records might be reported in scientific journals, no information would ever be disclosed that will enable any third party to identify them as participants in the research.

4.9 CONCLUSION

This chapter presented a thorough discussion of the research methodology of the study, and it included discussions of the research phases, the population, the sampling method, the development of development of a pro forma, issues of validity and reliability, the conditions under which consent was obtained, as well as the processes of data analysis and data collection.

Chapter 5 presents the data analysis and the findings of the study.

CHAPTER 5

"You must be the change you want to see in the world."

Mahatma Gandhi *(1869 - 1948)*
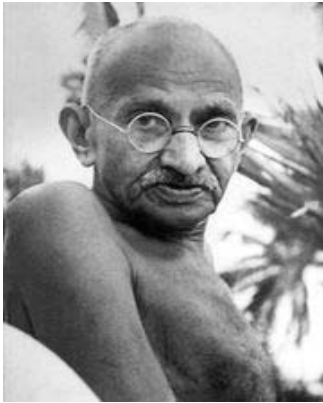
Mohandas Karamchand Gandhi, an Indian political and spiritual leader.

SITUATION ANALYSIS

5.1   INTRODUCTION

This chapter presents a situational analysis that the researcher based on Donabedian's model, as well as the process, outcome, pillars and culture components of the NHS clinical governance model.

This situational analysis formed part of the first research phase of this study, in which the aim was to identify trends in current practice. The implementation and intervention phase formed the second research phase of this study, and its purpose was to provide indications of how current practice could be improved. The purpose of the third phase of the research was to re-assess practice so as to determine how outcomes could be improved.

5.2 STRUCTURE

The delivery of healthcare is always based on a structure that takes into account the characteristics of the service provider. In the section that follow, the attributes of the structure of the hospital in which this study took place, and in which various forms of care were delivered, are described and discuss. The structures that will be scrutinised in the section include the facilities of the hospital, its personnel structure, its equipment and supplies, as well as its management, the effectiveness of its leadership and finances.

5.2.1 Facilities

The facility on which this study was based is situated in a picturesque suburb of Pretoria, South Africa. The hospital concerned is an internationally accredited hospital which also happens to be the largest private hospital in South Africa and on the African continent. The hospital is a 470-bed facility, and is the flagship of a hospital group that operates in various places in South Africa and that offers health care services in combination with the latest technology and expertise. The hospital employs a team of highly experienced medical professionals who are committed in terms of their contracts to provide a very high quality of service to all stakeholders and clients. The facilities of a hospital examining the study include an emergency department, intensive care units, a high care unit, general wards, 20 theatres, 2 catheter laboratories, and an interventional radiology unit. The hospital's premises also include facilities for doctors' suites, overnight accommodation for the families of patients, and a pharmacy that operates on a 24-hour basis.

In the description of the hospital's structure which is provided below, the information is condensed (where possible) in tables, which are accompanied by brief commentaries where appropriate.

5.2.1.1   Emergency department, intensive care units, the high care unit and general
wards facilities

Table 5.1 summarises salient information about the emergency department, ICU, the high care unit and the general wards. Additional facilities in each of these units are also be contained in table 5.1.

Table 5.1   Emergency department, ICUs and high care unit facilities

EMERGENCY DEPARTMENT, ICUs AND HIGH CARE UNIT FACILITIES	
Emergency department, intensive care units, the high care unit, and the general wards	The following facilities are available on a 24-hours basis: • Pharmaceutical services and supplies such as intravenous fluids, as well as plasma expanders, sterile and disposable items and resuscitation/reanimation drugs. • Blood bank, radiology, MR-scan and laboratory services.
Emergency department	Number of bays: One 4-bed resuscitation bay. Additional facilities: • A 5-bed trauma intensive care unit • An emergency theatre
Intensive care units	Number of beds: The ICU has 79 beds which are distributed as follows: • coronary care unit – 16 beds, • trauma ICU – 5 beds, • multidisciplinary ICU – 29 beds • neonatal ICU – 20 beds • paediatric ICU – 9 beds
High care unit	Number of beds: 29
General wards	Number of beds: 362

5.2.2   Personnel

The section below discusses the various categories of medical and nursing personnel in combination with their qualifications, experience, competencies, training and development.

5.2.2.1   Categories of hospital personnel

The categories of personnel who were relevant to this study were the medical, nursing and support personnel who working in the hospital. It is a practice in South Africa for

private hospitals to employ only nursing personnel (fully qualified and registered nurses). All the other health care providers who offer services in private hospitals function only in their capacity as private practitioners. Because these people are not actually employed by private hospitals, private hospitals are in no position to monitor or manage their performance.

- **Medical personnel**

Table 5.2 summarises information about the medical personnel who work in the emergency department, intensive care units, the high care unit, and in general wards.

Table 5.2   Categories and medical personnel

CATEGORIES	MEDICAL PERSONNEL
Emergency department, intensive care units, the high care unit and the general wards.	These facilities constitute the hospital's resuscitation team, and it is managed by a trauma physician.
Emergency department	The trauma physicians who work in this department are experienced in both emergency and aviation medicine and are available 24 hours a day. When the services of specialists are required, it is possible to summon them by means of an on-call system. Among the specialists who are on call for emergencies are those who have specialised in, for example, general surgery, cardio-thoracic surgery, orthopaedics, anaesthetics and paediatric medicine. Emergency theatre staff such as anaesthetists, surgical specialists, operating theatre nursing personnel, are also available on a 24-hour basis.
Intensive care units	The various ICUs on the hospital's premises are under the separate management of a single disciplinary specialist. The coronary care ICU is, for example, managed by a cardiologist. An intensivist, specialist physicians and trauma surgeons similarly manage the trauma ICUs. The Multi-intensive care unit accommodate a variety of specialists who are qualified in different specialities. These specialities include cardio-thoracic surgery, general medicine, vascular surgery, and general surgery. The Multi-intensive care unit is managed by intensivists, general physicians, neurologists, general surgeons, pulmonologists, and cardio-thoracic surgeons.
High care unit, and the general wards	Since all specialists (no matter what their speciality) have to treat patients in high care, the high care unit is therefore a multi-disciplinary unit. The specialists who work in the high care unit come from backgrounds in which they have specialised in orthopaedic surgery, vascular surgery, general surgery, cardio-thoracic surgery, neurosurgery, trauma surgery, ENT surgery, obstetrics and gynaecology, cardiology, pulmonology, general medicine and gastro-enterology.

- **Nursing personnel**

The nursing personnel who work in the emergency department, in ICUs, in the high care unit, and in the general wards are unit managers, clinical nurse specialists, the shift leaders who are responsible for each shift, registered nurses, enrolled nurses, and enrolled nursing assistants. While a nurse-led the outreach team services the general wards, a doctor-led resuscitation team services all the nursing units.

In order to encourage talented nursing clinicians to remain in practice, the category of *clinical nurse specialist* has been created to allow for upward mobility. Twenty percent of all the registered nurse vacancies in the hospital in which the study took place occupied clinical nurse specialist positions. These positions were deliberately created for the purpose of encouraging innovation, involvement in teaching, and the establishment and maintenance of high clinical standards on the part of nursing personnel.

In contemporary hospitals, enrolled nursing assistants (ENAs) are employed to provide routine elementary care so that the registered nurses (RNs) are free to provide the kind of care that only they can perform – tasks such as the formulation of care plans, the performance of nursing assessments and the correct administration of medication. An ENA must not only be skilled in basic nursing care. She or he also needs to be able to observe a patient's state of health and report what she or he is seen back to the EN and the RN. Because of all the responsibilities of managing a ward, RNs are not in a position to spend a large amount of time with any particular patient. Under such circumstances, an EN and ENA becomes (and is often referred to as) "the registered nurse's eyes and ears". The scope of practice of an ENA is discussed in section 3.2.2.1of chapter 3.

The hospital in which this study was undertaken has witnessed various changes in the composition of the nursing personnel in the wards. While the nursing staff of the hospital consisted originally of registered nurses, it now consists mainly of ENs and ENAs who are employed to provide basic nursing care and to perform basic nursing tasks. Since these categories of nursing personnel are not as highly trained as are

registered nurses, they possess less knowledge and fewer skills than registered nurses. This change in the composition of the nursing personnel of a hospital has created a situation in which the lowest level of trained nursing personnel are charged with the direct nursing care of ward patients (including patients who are at risk), and with the monitoring and recording of vital patient data. The more highly qualified nursing personnel, namely the registered nurse, by contrast, assists doctors on their ward rounds, and are responsible for the general management and maintenance of the ward. This kind of differentiation means that nursing personnel with less training and fewer skills than a registered nurse are currently available to observe, recognise and report all signs of deterioration in patients and to manage the administration of medication.

o **Staffing (employment)**

The employment of nursing personnel depends on the occupancy requirements of the hospital, and takes into account factors such as the required skill mix, the estimated acuity of nursing care, and the envisaged nurse-patient ratio or number of nursing personnel that will be required for maintaining the services provided by the hospital.

o **Combinations of skills (the "skill mix")**

The *skill mix of nurses* refers to the number of registered nurses with no specialist training, the number of registered nurse with ICU training, the number of enrolled nurses and the number of enrolled nursing auxiliaries who are necessary for offering the kind of care that patients with widely differing needs and problems need. The skill mix that is required at different levels of care in specific wards, in high care units and in ICUs, varies enormously. The combinations of skills required by different departments are displayed in table 5.3.

Table 5.3 Nursing personnel skill mix

SKILL MIX	
Emergency department	This kind of unit requires 70% registered nurses, 30% enrolled nurses and no (0%) auxiliary nurses.
Intensive care units	This kind of unit requires 70% registered nurses, 20% enrolled nurses and 10% auxiliary nurses.
High care	The high care unit requires 35% registered nurses, 30% enrolled nurses and 35% nursing assistants.
General wards	Each general ward requires 30% registered nurses, 25% enrolled nurses and 45% enrolled nursing assistants.

o   **Acuity**

Acuity refers to the number of hours of nursing care that are required by each patient in any given period of 24 hours. (This figure will obviously change during any patient's stay in the hospital.) The hospital which was the locus of this study makes use of an activity-based budget that is adjusted daily to take account of the activities and needs of the patients. This particular kind of acuity system measures the total nursing workload, and this workload can then be used as a basis for predicting nursing care requirements. Most current acuity systems are based *only* on tasks, and do not measure non-direct care or the kind of care that is advocated by a caring philosophy of nursing.

o   **Nursing personnel-patient ratio**

The *nurse-patient ratio* refers to the number of nurses who will be required for a certain number of patients. Table 5.4 reports on the nurse-patient ratio in the emergency department, the intensive care units, the high care unit, and the general wards.

Table 5.4   Nurse-patient ratio

NURSING PERSONNEL: Nurse-patient ratio	
Emergency department	The number of nursing hours available for each patient is 2.5 hours.
Intensive care units	The number of nurses who are required for the ICUs is calculated according to a 1:1 ratio. In complex, difficult or demanding situations, each patient may require two nurses.
High care unit	The ratio of nursing personnel to patients is 1:2 in this unit.
General wards	In general wards, the nurse-patient ratio varies from between 1:5.5 and 1:8 – depending on the discipline and the complexity of the unit.

- **Support personnel**

The health professionals who deliver health care services require support from the health care providers in order to be able to perform their duties adequately. Table 5.5 describes the various functions, skills and branches of expertise of the support personnel.

Table 5.5   Support personnel

SUPPORT PERSONNEL	
Emergency department, intensive care units, the high care unit, and the general wards	Pathologists, radiologists, pharmacists, physiotherapists, social workers and dieticians are available on a 24-hour basis on the hospital premises. The clinical audit committee, the surveillance and assessment teams, the training department, and the outreach and resuscitation teams all function as support personnel in the hospital.

o   **Clinical audit committee**

A clinical audit is used for assessing the quality of care by means of a carefully structured programme. This kind of assessment is carried out by a clinical audit committee that comprises nursing personnel, clinicians and members of management. A clinical audit committee consists of representatives of the emergency department, the high care unit, the general wards and the day care clinics. It requires staff who have specialised in cardiac surgery, critical care, oncology, maternity services and theatre work. It also requires an adequately staffed catheterisation laboratory, a pharmacy,

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diagnostic imaging services, management, a training department and a clinician. Clinical audit measures current practice in order to identify trends. The clinical audit cycle is described in section 2.2.2.2 of chapter 2.

o **Surveillance and assessment team**

Personnel and resources are needed to carry out surveillance, assessments and audits. It is an enormous challenge for these teams to identify trends in current practice in a hospital and to make a significant contribution to the quality of patient care and safety. The usual procedure is that the team will present a written report which presents an analysis of their findings and conclusions, along with recommendations for improvements in various areas in which deficiencies have been observed. Such a team consists of members of management, the training department, the infection control coordinator, the unit manager and any other member of the nursing personnel who can make a decisive contribution.

o **Training department**

The training department consists of a unit manager and several clinical facilitators. All these people are registered nurses who have specialised in nursing education and who may also possess post-basic specialist training and experience in fields such as intensive care.

The role of clinical facilitators is to devise strategies that are based on the specific needs of their clinical areas so that they will be able to contribute to the professional development of the nursing personnel with whom they come into contact. The training department is responsible for providing the training that nursing personnel need to improve their technical, clinical and interpersonal skills and knowledge. Clinical facilitators provide the support that personnel need to achieve the hospital's goals by enabling individuals and teams to change attitudes, behaviour, and methods of

working. All these factors result in improvements in the quality of nursing care that the hospital can provide.

o **The outreach team**

The outreach team is based in the emergency department. The outreach team consists of registered nurses who are trained and experienced in critical care and who are considered to be clinical experts. The hospital in which this research took place introduced two systems represented by an outreach team and a separate resuscitation team in order to be able to respond appropriately and effectively in critical situations. This resulted in an improvement in the general quality of patient care provided by the hospital. These two systems are in line with the recommendations of Donabedian and of the United Kingdom's NHS clinical governance model of system awareness, risk management, the effective use of resources, and the creation of a learning environment that enhances a patient's safety and patient outcomes.

o **Resuscitation team**

The doctor-led resuscitation team consists of a trauma physician who is supported by a team of registered nurses. (For a discussion of their qualifications of the members of this team, refer to section 5.2.2.2.)

o **Clinical engineering technology assistants**

The facility possesses a clinical engineer and CETAs (Clinical engineering technology assistants) who are available at all hours by means of a call system. *Clinical engineering* is dedicated to the practice, management, support, development and quality assurance of health care technology so that health care which depends upon medical technology can be relied upon as safe, cost-effective and sustainable.

The clinical engineers and CETAs work in ICUs and support the nursing personnel in all matters that relate to medical technology and other forms of equipment. Their main responsibilities include tearing out all administrative tasks that are inherent in maintaining equipment in a sound state, the maintenance of all accessories that are dependent upon the equipment, the cleaning of equipment, setting up and running calibration tests on equipment, solving individual user problems, and adjusting alarms under the supervision of health care professionals.

CETAs provide invaluable support for other ICU staff because they can dedicate themselves to the care and maintenance of all the medical technology of a modern hospital and so permit the nursing personnel to devote themselves to the needs of the patients in the ICU.

o   **Physicians advisory board**

The physicians advisory board (PAB) consists of members who are chosen by specialists from each of the specialist disciplines (orthopaedic, surgery, ear nose and throat, paediatrics and neonatology, internal medicine, trauma, neurology and neuro-surgery and obstetrics and gynaecology). The PAB judges how well the medical personnel of the hospital have performed their work. It scrutinizes the circumstances of medical errors and reviews (by means of peer discussion groups) the possibility of instituting alternative practices for the benefit of the patient concerned.

5.2.2.2   Qualifications

The nursing personnel in general wards, the high care unit and the ICUs all possess the appropriate qualifications for the speciality in which they work.

o   **Nursing personnel**

Table 5.6 lists the qualifications of the nursing personnel in the different designated areas as well as the qualifications of the outreach and resuscitation teams.

Table 5.6   Nursing personnel qualifications

NURSING PERSONNEL: Qualifications	
Emergency department and intensive care units	Unit manager have a post-basic trauma or ICU qualification. Clinical nurse specialists and shift leaders have a post-basic trauma or intensive care nursing qualification. Some registered nurses have post-basic qualifications (although this is not compulsory). Enrolled nursing assistants have trauma and/or ICU experience.
Emergency department	The unit manager, clinical nurse specialist and the shift leader are qualified and experienced in advanced life support, advanced trauma life support, and in the techniques of advanced paediatric life support.
High care unit	A high care unit manager is a specialist in intensive care nursing or else possesses a minimum of five of high care unit experience. Clinical nurse specialists and shift leaders all are registered nurses with post-basic qualifications in intensive care work, or are experienced in high care nursing. Registered nurses, enrolled nurses and auxiliary nursing assistants all have experience in high care nursing.
General wards	General wards are staffed by unit managers, clinical nurse specialist, shift leaders, and registered nurses (with or without post-basic qualifications depending on the discipline), by enrolled nurses, and by enrolled nursing assistants.

o   **Outreach**

The outreach registered nurses are all trained in critical care, adult cardiac life support and paediatric advance life support so that they are all able to assist in emergency and resuscitation situations while waiting for the dedicated resuscitation team to arrive on the scene. Since at least one dedicated outreach nurse is on duty during each shift, this means that this service is available uninterruptedly in the hospital.

o **Resuscitation team**

The team leader of the resuscitation team is the emergency department's trauma physician who is qualified in advanced paediatric life support, advanced trauma life support and advance cardiac life support, together with one trauma-trained registered nurse, one registered nurse trained in advanced paediatric life support, one registered nurse trained in advance cardiac life support, and a porter. The outreach team assists the resuscitation team to perform during their resuscitation activities. In the hospital which was the focus of this study, the resuscitation team is similar to the medical emergency team that one encounters in Australia.

5.2.2.3 *Experiences*

It has become a common practice to change the composition of the nursing personnel staffing in any particular ward because of the frequency with which registered nurses leave the country, the difficulty of recruiting adequately qualified and experienced nurses, the reduction in the numbers of registered nurses who are being trained, and the financial implications of employing very highly qualified staff – to mention but a few of the constraints under which South African hospitals have to operate. One has therefore noticed how, over the past couple of years, the staff composition of a typical ward has changed from consisting mainly of registered nurses to the present situation in which a ward is staffed mainly by staff nurses and auxiliary nurses who perform the tasks of basic nursing care. This phenomenon is observable not only in South Africa but also in countries abroad. Table 5.7 depicts the experience of nursing personnel in their designated areas.

Table 5.7   Nursing personnel experience

NURSING PERSONNEL: Experience	
Emergency department, intensive care units, the high care unit and general wards.	The nursing personnel are trained and adequately experienced to deal effectively with the majority of patients and the emergencies that occur in the emergency department, the ICUs, the high care unit and among ward patients that present in the departments. Specialist, qualified and experienced nursing personnel are available at all times when they are on call.

5.2.2.4   *Competencies*

This section offers a brief discussion of the SANC's scope of practice, the development of competencies, and the acquisition of technical, cognitive and interpersonal skills.

- **South African Nursing Council's scope of practice**

The scope of practice as defined by the SANC indicates that nurses need competencies (knowledge, skills, and attitudes) together with the ability to assume certain responsibilities so that they will be in a position to deliver safe nursing care. The scope of practice defines those acts or procedures that may be legitimately performed by the different categories of nurses. For a brief discussion of scope of practice, see section 3.2.2.1 in chapter 3 and the outline presented in Annexure E entitled "South African Nursing Council Scope of Practice".

The new Nursing Act of 2005 mandates that auxiliary nurses should be educated so that they are competent to provide elementary nursing care in the manner and to the level prescribed. In the hospital in which this study took place, all enrolled nurses and enrolled nursing assistants have been trained in accordance with the requirements of the SANC regulations. They should all therefore have the necessary technical skills and knowledge to observe and record the vital data of patients correctly. While section 5.3.3.2 of chapter 5 discusses the clinical knowledge that nursing personnel should

possess, section 5.3.7.8 discusses the technical skills that are indispensable for carrying out the duties.

- **Technical, cognitive and interpersonal skills**

Table 5.8 lists the competencies that nursing personnel require to perform their duties.

Table 5.8   The competencies of nursing personnel

NURSING PERSONNEL: Competencies	
Emergency department, ICUs, the high care unit, and the general wards	All the personnel in these departments and units possess the *technical skills* that enable them safely to operate and utilise whatever equipment is necessary for performing certain procedures such as the ascertainment of vital signs. All these personnel also possess the *cognitive or intellectual skills* that they require for analyzing and solving problems, for engaging in critical thinking, and for making judgements about the needs of their patients. They also possess the necessary *interpersonal skills* for communicating effectively with others, for active listening, and for conveying knowledge and information.

In the hospital under study, the researcher devised a baseline for assessing the knowledge of nursing personnel prior to the intervention and prior to the implementation of an appropriate training programme. The findings of the baseline audit are revealed in section 5.3.7.1 (figure 5.2).

- **Development of competencies**

The training department of hospitals focus on technical, cognitive and interpersonal skills in order to ensure that nurses have an adequate understanding of all the knowledge that they need to perform their duties and that they are completely familiar with the form and significance of clinical marker indicators. Once this kind of basic knowledge has been acquired, clinical facilitators can continue to improve their critical thinking and decision-making skills by the experience they gain from interpreting clinical data. The outreach team programme therefore contributes to improve a nurse's

cognitive and interpersonal skills. In this way, nursing personnel become ever more effective in solving problems and communicating important information about a patient's clinical markers to the specialists who have to work with them.

5.2.2.5   *Training and development*

This section describes training, training programmes, clinical supervision, mentors and preceptors as well as the guidance given to novice nurses by experienced nursing personnel.

- **Training**

By means of education and training, the hospital in which the study took place, is instilling a culture of learning so that nurses will be more effective and ingenious in adapting to all the future changes that are inevitable in the health care industry. Table 5.9 sets out the training and development philosophy of the hospital in the study.

Table 5.9   Nursing personnel: training and development

NURSING PERSONNEL: Training and development	
Emergency department, intensive care units, high care and general wards.	Nursing management and the training department collaborate with all operational areas to ensure that education and in-service training meet individual and organisational needs and that care delivery is improved. Education and training programmes are designed to inform and supplement the personal development plans of individual nurses. The organisation thus provides an environment that fosters life-long learning.

- **Training programmes**

A training programme was especially designed to familiarise nurses with topics as diverse as clinical markers and indicators, normal physiological parameters, QRP indicators, techniques of pain management, biochemical indicators and how to recognise deterioration in a patient so that the nursing care provided in the hospital

would conformed to the requirements of the Donabedian model and the ideals of clinical governance.

- **Clinical supervision, mentors and preceptor**

Clinical supervision supports nurses in all their activities and enables individual nursing practitioners to develop their personal knowledge and competency. Experienced mentors guide and educate nursing personnel of all categories so that they will be in a position to develop both personally and professionally. It is a function of assessors to monitor and assess the ability of individual nurses to carry out required procedures and interactions, and (where necessary) to recommend training programmes that will remedy individual deficiencies.

- **From being a novice to being an experienced nurse**

It is a function of clinical supervisors, mentors, preceptors and the training department's clinical facilitators to guide and support novice nurse practitioners so that they will be able to develop whatever skills and attitudes they require and must be able to practise safe nursing. A number of guidelines, policies, procedures and development plans have been set in place so that they will know exactly how to guide novice nurses to improve their performance.

5.2.3   Equipment and supplies

It is the policy of the hospital in this study to continuously improve the utilisation and quality of all resources such as nursing personnel and equipment so that it will be in a position to provide more efficient and effective services delivery. Table 5.10 gives some idea of the amount of sophisticated equipment that is available in different units.

Table 5.10   The equipment and supplies that are available in various units

Equipment and supplies	
Emergency department, intensive care units, high care and general wards.	The following kinds of equipment are available in the emergency department, in ICUs and in high care: • Infusion pumps, bed warmers, and pulse oximeters for measurement of blood saturation • Life-saving equipment such as defibrillators, oxygen and suction at all beds, emergency trolleys, equipment for maintaining and securing the airway of patients, equipment for airway management in more complicated cases
Emergency department	• Overhead X-ray facilities at each resuscitation bay • Organ-support equipment such as ventilators • Pacemakers
Intensive care units	• Multi-channel invasive monitors • Organ support equipment such as ventilators, intra-aortic balloon pumps, pacemakers and haemo-dialysis equipment
High care	• A two-channel monitoring system

There is a whole range of essential equipment that needs to be available to the health professionals who monitor and treat patients, and all this equipment needs to be easily accessible and properly functional if the health care professionals who use it are to perform efficiently. The situation analysis determined all the equipment, such as saturation monitors, that had to be available to the health professionals in order to monitor and treat patients effectively.

5.2.4   Management and leadership

This section contains a discussion of the management and leadership style of the hospital, the hospital's vision, its mission statement, its official policies, and all its most important procedures and protocols.

5.2.4.1   Management

The company is run by a group of directors, by an executive management body, and by the hospital's management structure. A successful organisation requires managers and

leaders who possess all the qualities, knowledge and attitudes that are indispensable for managing a large organisation.

5.2.4.2   *Management style*

In the hospital upon which the study was based, the managers and leaders attempt to create a productive synergy between their various functions in order to achieve their goals and to ensure that the organisation will function successfully. The collaborative management style which has been adopted by this particular hospital is based upon a shared vision that inspires all the health care professionals who work in the hospital to realise their potential and to perform to the utmost limits of their individual abilities. In order to realise this vision, the hospital's managers invite employees to assume an active role in decision-making. As a result of this policy, one finds that the lines of communication move in both directions – from subordinates to leaders and from leaders to subordinates.

All the managers in the hospital have assumed what is called *an inspirational leadership style.* Such a style of management necessitates the coaching, guidance and education of all categories of personnel. The management of this hospital assumes full responsibility for monitoring and servicing the web of relationships that exist in the organisation because they realise that it is only by building and maintaining harmonious relationships between workers and managers and between employees and customers that their company will be able to achieve and maintain sustainable levels of growth in these difficult economic times. All the managers in the hospital have accepted that a mastery of the art of working harmoniously with other people is the most important skill that they need if they are to inspire and motivate those who work in the hospital to achieve the corporate goals of the organisation.

5.2.4.3   Leadership style

Since the leaders of the hospital in this study place a strong emphasis upon teamwork and collaborative style leadership, all their co-workers become effective partners in bringing about whatever changes are needed in the hospital. One may say that the leaders of the hospital manage all employees, associates, processes, and workflow *horizontally*. This means that all employees participate in all of the processes and workflow that characterise a hospital of this size and scope. The leaders of the hospital also strive to foster the personal and professional development of each individual employee, to realise the particular talents and gifts of each individual, and to encourage individual employees to contribute as much as they can to achieve the team's vision. It is the responsibility of all the leaders of a hospital to influence each member of their team by explaining, motivating, negotiating and, most importantly, by actively listening to each member of the team and thus identifying the best way for a team to accomplish its vision. This means that all leaders have to accept the responsibility of ensuring that the members of their team understand and articulate the team's vision and goals. A leader therefore needs to communicate effectively and clearly that all members of a team and influence them to succeed in what they are doing. On those occasions when this is achieved, it may be said that a team is performing as well as it can in the circumstances in which it finds itself.

- **Vision and mission**

The vision of the hospital that forms the basis for the study defines the mission and purpose of a hospital. It is up to the leaders in the hospital to convey this vision to each member of the workforce so that every person who works in the hospital or is associated with it in a professional capacity will be able to align his or her own personal vision and mission with that of the team and the organisation. When this happens, the hospital has succeeded in bringing out the best in each individual team member.

5.2.4.4 Policies and procedures

All the policies, procedures and statutory requirements that are applicable in all operational areas, are available on the hospital's intranet. These policies and procedures have been developed with the help of the hospital's personnel. They are all dated and published together with a date for review, the name of the group who was responsible for drafting the documents and who will be responsible for reviewing them in the future, the version number of the documents concerned. All these documents are contained in a centrally located index. All policies and procedures are reviewed every three years before they are signed by the leader or chairperson of each group and then officially ratified by the hospital.

5.2.5 Finances

The hospital that is the subject of this study expends a large amount of money to perform all of its functions and provide optimal patient care. The main categories of expenditure include salaries, supplies, depreciation, amortisation, interest, and the writing off of bad debts. The section reviews the budget of the hospital and the costs for which it is responsible.

5.2.5.1 Budget

The funds that are allocated for nursing in the hospital's budget are calculated by means of a formula that takes into account both the acuity rates and the combination of skills on the part of nursing personnel that are necessary for successfully nursing a specific number of patients.

The various sectors of the nursing hospital's budget are based on a set of predefined activities. These budgets are adjusted on a daily basis to conform with the activities that take place in the units and the particular needs of the units themselves. The various

factors that determine nursing budgets are rates of acuity (which are the number of nursing hours that are required for each patient in any given 24 hours), the rates of occupancy and bed utilisation, the combination of skills that are required in the nursing personnel, the permanency of the nursing personnel and the actual salaries that are the disimbursed, the individual profiles of personnel (the extent of their knowledge and reliability and their rates of absenteeism), working schedules, the number of student nurses and the cost of the supervision that they require, the layout of all the units, the size of various units, and the number of doctors who habitually utilise beds in the hospital by referring their patients to the hospital rather than to some other institution.

5.2.5.2   *Cost*

Revenue and costs both exert an impact on an organisation's profitability. One of the ways in which an organisation can improve its financial performance is by monitoring and controlling costs. In the hospital in this study, two major categories of costs that have to be carefully managed are *fixed costs* and *variable costs* (Netcare Education Faculty of Management And Leadership 2008:7). According to the nursing director of the hospital, who is quoted in *Education Faculty of Management and Leadership* (2008:78), it is the cost of nursing care that is the single biggest operational expense which the hospital is committed. It is therefore a great challenge to manage these costs effectively without compromising the quality of care that is received by patients.

5.3   PROCESS

The processes that the hospital in the study utilises to provide its services are comprised of all the health care interventions that are provided for patients by the doctors, nurses, and midwives who are associated with the hospital.

5.3.1 Process activities

The processes that are discussed in this section are patient flow, the number of hospital admissions, the monitoring of patients, and the interpretation of clinical markers.

5.3.1.1   *Patient flow*

The normal flow of the hospital process begins with the patient's admission and continues with communication with the patient and her/his family, the assessment of the patient, bed management, the transportation of hospital services, the synchronisation of all the necessary care and procedures, and the coordination of the patient's discharge.

According to standard set by the American College of Surgeons, the hospital under study is a level I unit and a tertiary referral hospital. The emergency department is integrated into the national trauma system. This allows the hospital to manage all incoming patients effectively, or, alternatively, to transfer patients to another facility that possesses more appropriate resources. Efficient and prompt inter-facility communication and transfers are motivated by the patient's needs. Patients are admitted to ICUs, the high care unit and to general wards from the emergency department, from the consulting rooms of doctors who see patients on the hospital premises and by several other general practitioners in the vicinity of a hospital.

If a patient's journey through the hospital's system is to be rationally and correctly managed, the flow of patients into the hospital first needs to be thoroughly and meticulously organised. Patient flow is the individual responsibility of each department in the hospital. This is achieved by means of effective communication with all departments, doctors and their consulting rooms, as well as with the hospital's management. The achievement of optimal patient flow through the hospital requires a seamless organisation of schedules for elective surgery, the reduction of waiting time

for patients being admitted to emergency departments, the organisation of timely and efficient transfers of patients to and from intensive care units and to and from medical/surgical units, as well as improvements in the flow of patients from a variety of inpatient settings to appropriate long-term-care facilities.

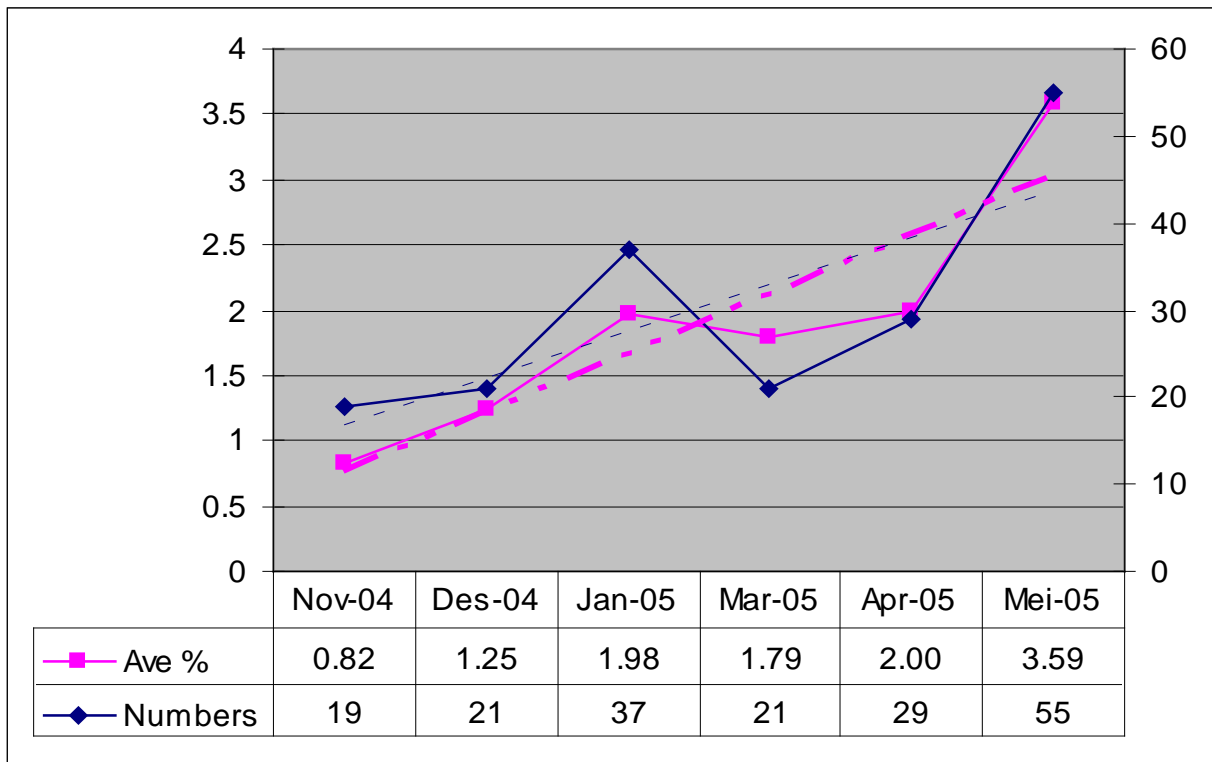### 5.3.1.2   *Number of hospital admissions and the availability of hospital beds*

The average number of admissions to the hospital in which the study took place continued to rise every year (with the exception of the year beginning 1 October 2007) and this produced a corresponding annual decrease in the number of hospital beds that were available in these years. The multiple bar graph (graph 5.1 below) illustrates the average number of hospital admissions for each month of each year (with each year beginning on 1 October) for the years 2004 to the 2008 (inclusive). The horizontal lines enable one to observe the accumulated year-to-date monthly average of hospital admissions for each of the years mentioned above.
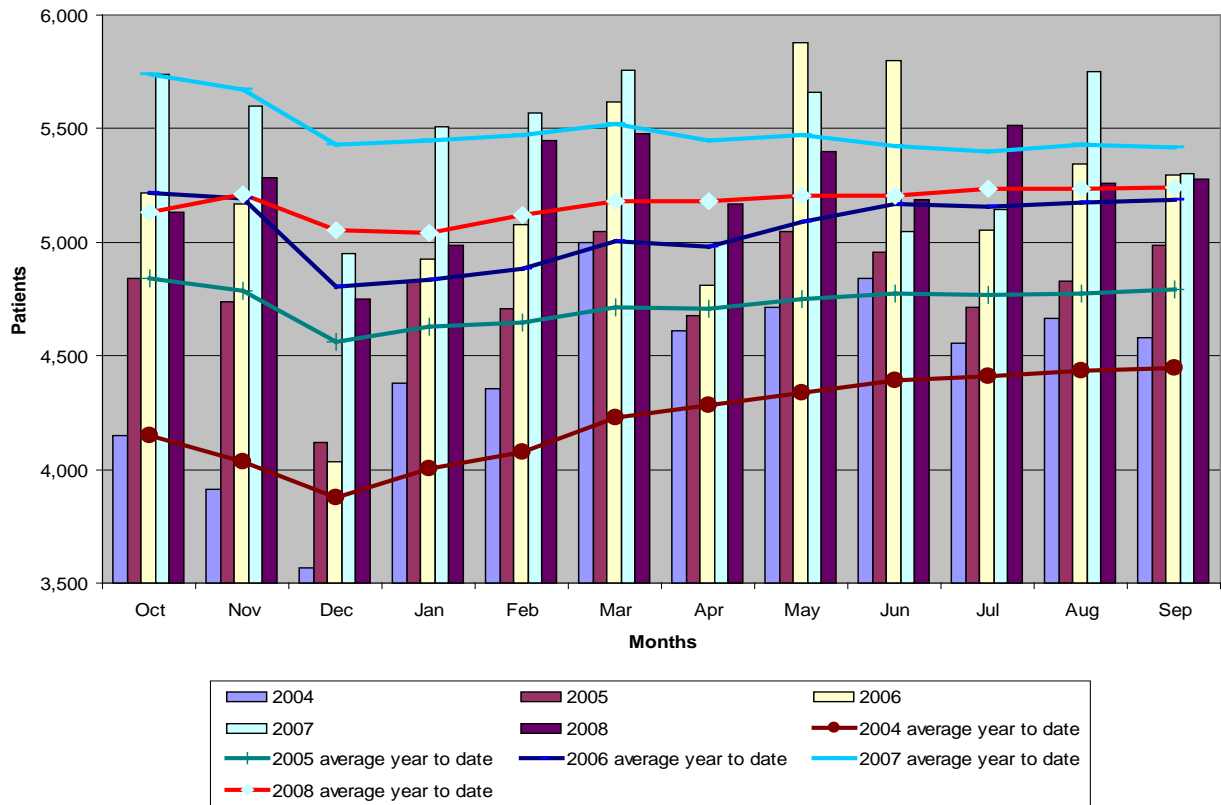
Graph 5.1   Hospital admissions between 2004 and 2008 (inclusive)

Since some ward patients deteriorated during their stay and required intensive treatment and/or immediate interventions, they were transferred to a higher level of care or were transferred back to an ICU as a readmission. This phenomenon confirms the purpose of this study, namely, the reduction of unplanned transfers to higher levels of care. Under such circumstances, the utilisation of scarce and costly ICU beds for which there is a greater demand than can be satisfied, becomes all the more significant.

The routine clinical audit reports from between November 2004 and May 2005 reflect a progressive increase in the number of patients who were transferred to a higher level of care (this is illustrated in graph 5.2 below).

	Nov-04	Des-04	Jan-05	Mar-05	Apr-05	Mei-05
■ Ave %	0.82	1.25	1.98	1.79	2.00	3.59
◆ Numbers	19	21	37	21	29	55

Graph 5.2 Records of patient transfers to a high level of care from between November 2004 and May 2005

This state of affairs placed an additional strain on already-overburdened ICUs and HCUs. A study by Young et al. (2003:78) reveals that the unavailability of ICU beds when required undoubtedly leads to delays in the transfer of patients to ICUs – a factor that is understandably associated with an increased risk of patient mortality.

5.3.1.3   Admission criteria

The admission criteria that the hospital in the study uses is described by Cuthbertson and Webster in section 3.3.1.2 of chapter 3.

5.3.1.4   Monitoring and interpreting clinical markers

Any patient who develops a critical illness in a ward requires needs to be regularly and systematically observed by nursing personnel who understands the significance of basic physiological parameters and their deviation from normal values. It is only the correct

and objective measurement of a patient's physiological status that will identify whether or not the patient is deteriorating. The well-being of all patients is therefore dependent upon how skilfully nurses and medical care personnel are able to interpret an array of physiological parameters. This in itself indicates the vital importance of how well nursing personnel understand the significance of any deviation from basic physiological parameters.

The frequency with which nursing staff monitor a patient's vital data depends on the physical and psychological condition of the patient. During the period in which this study was undertaken, it was noted that the vital signs of all patients in general wards were monitored on a four-hourly basis. Where necessary, the nursing personnel adjusted the frequency with which each patient was observed and adjusted each patient's personal care plan according to his or her needs and health status. The vital signs of a patient consist of eight clinical markers or indicators. A chart that recorded all clinical markers and biochemical indicators as well as the planned for the patient's pain management was placed inside each patient's file so that all professional health care givers could immediately familiarise themselves with the patient's past and present condition. These charts enabled the nursing personnel to interpret the patient's data whenever they needed to monitor and evaluate the patient's physiological status.

In the hospital that was the subject of this study, the researcher observed that alterations in physiological parameters were often overlooked or misinterpreted by nursing personnel because of their ignorance of the significance of clinical marker indicators, of biochemical variables and of pain management indicators. It was therefore decided to institute a training programme to educate nurses in these specific skills so that they would be able to obtain, monitor, and interpret the necessary data in an accurate and efficient manner.

Phase one of the research process therefore consisted of a situational analysis by means of which trends in current nursing practice could be identified.

5.3.2   Clinical audit

It is the purpose of clinical audit reviews regularly to assess the quality of clinical care so that any important emergent trends in health care delivery can be identified and analysed. The monthly clinical audit report that the researcher obtained from the general wards produced evidence over a six-month period (namely, from between December 2004 and May 2005) of a gradual increase of 2.45% in the number of in-hospital transfers of patients from the general wards to high care units (HCUs) or intensive care units (ICU).

The complete clinical audit cycle is described in section 2.2.2.2 of chapter 2.

5.3.3   Surveillance and audit

Since the clinical audit during this period revealed a progressive increase in the number of in-hospital transfers to a higher level of care, it became imperative for the researcher to obtain information about each patient's progress prior to transfer to higher level of care. The processes that the researcher used to obtain this data consisted of surveillance together with an audit that will enable her to determine how well individual nurses understood the significance of clinical markers. The ability of a nurse to obtain and interpret vital signs correctly is paramount to the well-being of every patient who is admitted to a hospital. One cannot overemphasise the importance of how well nursing personnel understand the meaning and significance of basic physiological parameters and the importance what any kind of deviation from these parameters means. It was therefore imperative for the researcher to make a thorough assessment of how well all the nurses in the study understood the meaning and importance of vital data and the significance of any deviations from normal values.

5.3.3.1   Surveillance

The researcher undertook these monitoring activities during May 2005. The results of the surveillance thus performed revealed the following areas of concern:

- **Routine physiological parameters**

The researcher's observations identified the fact that only six evidence-based clinical markers were used by the nursing personnel as indicators of the patient's vital signs. The six routine physiological parameters that were being measured in the general wards were blood pressure, pulse rate, respiratory rate, temperature, level of consciousness and urine output. These clinical markers together indicate the physiological status of the patient at any given time.

- **Oxygen saturation**

Obtaining a measurement of oxygen saturation was not one of the clinical markers or indicators that were collected by the nursing staff. Pulse oximetry monitoring and the interpretation of the oxygen saturation value therefore did not form part of the physiological observation process in the general wards. Because of this, the nursing personnel in the general wards were unfamiliar with the significance of the degree of a patient's oxygen saturation and the use of a pulse oximeter.

- **Pain management**

The observation of each individual's pain threshold was also not one of the clinical markers that was being used in the general wards. Because of this, none of the nursing personnel were directly involved in pain management even though all of the treating doctors prescribed pain medication.

- **Biochemical values**

The researcher observed that blood tests were ordered in the hospital on the request of any treating specialist, and that these results were used to determine the physiological and biochemical status of the patient. The researcher's observations indicated that since nursing personnel of all categories were unfamiliar with the significance of biochemical variables, they did not react to abnormal biochemical values.

5.3.3.2   *Clinical marker audit*

The researcher performed a clinical marker audit in May 2005. In the hospital that was the subject of this study, all auxiliary nurses and staff nurses monitored the above-mentioned vital signs of patients on a four-hourly basis.

The findings of the baseline audit indicated in figure 5.2 of section 5.3.7.1 indicate that since the nursing personnel who collected the vital data lacked any kind of coherent understanding of the meaning of the normal values of clinical markers, they were unable to identify and interpret any sign of deviance or abnormality in the vital signs of patients. The consequence of this far is that nursing personnel were unable to recognise and understand the need for active intervention or the need immediately to report significant deviations to senior nursing personnel and/or the relevant clinician(s). They were therefore in no position to practise the kind of routine follow-up that should immediately be performed when abnormal or deviant data emerges in the vital signs of patients. A study conducted by Hillman et al. (2002:1634) confirmed the inability of nursing personnel to recognise significant deteriorations in the condition of patients condition and their consequent lack of any considered response to such deteriorations with timely interventions on the part of senior nursing personnel and doctors.

5.3.4   Retrospective study of patient records

The researcher conducted a retrospective study during May 2005 of the patient records of patients who had been transferred to a higher level of care. A full description of the health record review will be presented in chapter 6.

5.3.5   Assessing nursing personnel's technical skills

The ability of a nurse to correctly interpret vital data is paramount to a patient's well-being. This emphasises how important it is for health professionals to master the technical skills involved in monitoring and interpreting the vital signs of patients. The researcher therefore felt that it was imperative for her to assess the technical skills of the nurses involved in this study and their ability to obtain and interpret all vital physiological health data. It was a main purpose of the study undertaken by Kozier, Erb, Berman and Snyder (2004a:245-253) to emphasise the importance of each nurse's mastery of *technical skills*. Technical skills, in this context, include whatever knowledge and skills are necessary to collect and interpret data, and the correct manner of utilising whatever equipment is used in the performance of medical and diagnostic procedures. The first phase of the researcher's procedure was therefore to identify all important current practices, the extent of the nursing personnel's skills, and their ability to obtain vital information from the data that they were able to collect.

It was thus essential for the researcher to evaluate the nursing personnel's knowledge and techniques of how to monitor their patients. In November 2006, therefore, she set in motion an assessment of the nursing personnel's technical skills and their ability to obtain vital physiological data correctly under the scrutiny of a scientific observer. She briefed the training department of the hospital on how to observe and evaluate the performance and knowledge of 85 nursing personnel as they went about the necessary procedures on a daily basis. Figure 5.1 illustrates the results of the number of practitioners (expressed as a percentage) in this particular sample of nursing personnel

who were able to utilise their technical skills to obtain the vital physiological information that was of interest to the researcher.
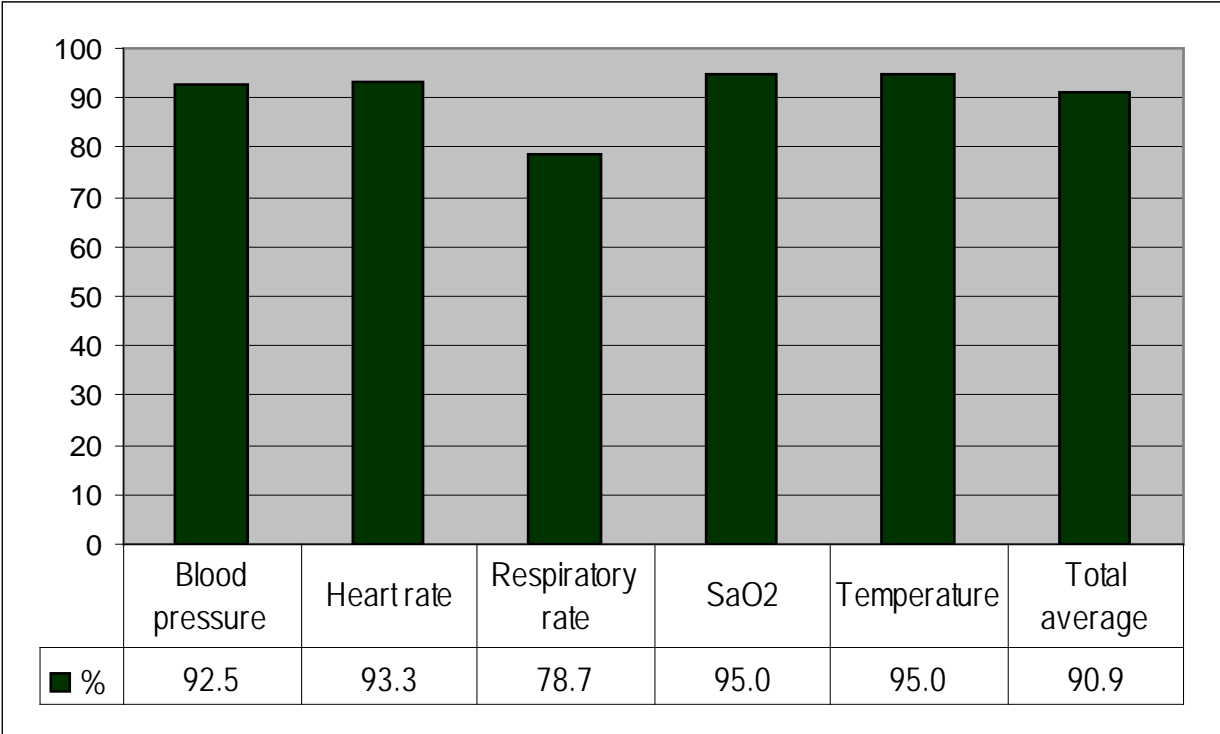

Figure 5.1:   Technical skills of nursing personnel November 2006 (n=85)

These results show that the majority of the nurses who were observed appeared to have little problem in collecting the data correctly. It therefore follows that whatever problems they had, were concerned with the recognition and interpretation of this data.

The analysis of the data in chapter 6 of this study shows that most of the admissions to the hospital tend to consist of medical patients with a higher rate of cardio-respiratory problems than the average population. The success rate of the nurses in the sample in determining the respiratory rate (78.7%) was therefore a matter of concern. Since 78.7% of the sample were able to determine the respiratory rate correctly, 21.3% were obtaining incorrect readings. This high percentage of nurses who were unable to obtain the correct reading may explain to some extent the reasons why they also failed to recognise signs of deterioration in patients in the reasons why the levels of transfers to a higher level of care were increasing in tandem with an increase in the occurrence of in-

hospital cardiac arrests. This data tends to be confirmed by the conclusions of the research undertaken by McGloin et al. (1999:255) and Schein et al. (1990:1390). The study conducted by Schein et al. (1990:1390) provided empirical evidence that physiological deterioration in patients usually preceded the cardiac arrests that occurred inside hospitals. Since this has been demonstrated to be true, it should be possible to identify at an early stage those ward patients who have so seriously ill that they require critical care. If the patients who are most in need of critical care are accurately identified before the crisis occurs, they can be treated appropriately. This should logically lead to an improvement in patient outcomes throughout the hospital as a whole.

The results of these observational procedures showed that an average of 90.9% of the nursing personnel were able to manage the technical aspects of observing vital signs in an in-hospital setting correctly. This means of course that 9.1% of patients would, on average, fail to have their deterioration recognised by the clinical staff and would therefore fail to receive proper and timely treatment. This is such a high percentage that it warrants further investigation and remedial action on the part of the hospital's authorities.

5.3.6 Process coordination

This section describes how a proper service can only be delivered when the communication process in the hospital works so efficiently that is invariably leads to the cooperation and involvement of all the other departments whose input is needed.

5.3.6.1   *Reporting structure surveillance*

The final phase of the situational analysis in the first phase of the research consisted of gathering information from a concurrent auditing undertaken in general wards over a two-month period that revealed the responses and attitudes of shift leaders when

abnormal physiological data was reported to them by the nurses who were responsible for collecting such data. The findings from this phase of the research is set out in table 5.12 in section 5.3.6.2 of chapter 5.

For the purpose of this study, *reporting* refers to the process whereby nursing personnel notify the relevant clinical experts of any abnormal physiological indicators that they have observed, the speed with which they respond to observations of such abnormalities, their management of the pain being experienced by patients, and their understanding of the biochemical indicators that identify the various forms of deterioration that occur in patients.

5.3.6.2 *Reporting process*

The process of reporting in the general wards required nurses to communicate with or notify the relevant nursing or medical personnel in the wards once they observed abnormal data in a patient's readings, and thereafter to notify whatever medical experts in the hospital needed to be appraised of such information. This process always begins in the wards at a patients' bedside. From there it is communicated to the senior nursing personnel of the ward and then to the relevant clinical experts in the hospital. The relevant clinical experts in this case consist of the outreach team, the cardio-pulmonary resuscitation team and the treating specialist.

The *reporting process* for the purpose of this study refers to the line of communication that a nurse needs to follow, and this is determined by the seriousness of the patient's health condition or the sudden onset of signs of deterioration in a patient's condition. It is obviously obligatory for nurses immediately to report any signs of deterioration to the relevant clinical experts so patients can receive the kind of prompt interventions that are mandated by the presence of abnormal values and indicators. The reporting process may include verbal communication by means of telephone or available call systems. Reporting might also include written reports and the documentation of

slightly abnormal values. In both cases, documentation will always accompany a nurse's progress reports.

5.3.6.3 *Reporting structure surveillance*

It has been the researcher's experience that poorly trained auxiliary and staff nurses are sometimes unaware of their responsibility immediately to report the presence of abnormal clinical markers and deviant biochemical data to more experienced senior professional nurses. Such a failure frequently has serious consequences for the patients concerned, and prompted the researcher to conduct a survey of the actual reporting structures and processes that nurses use when they are required to respond to abnormal physiological indicators in the patient's record.

Adequate reporting would imply that all clinical markers, pain management indicators and biochemical abnormalities would immediately be reported to the shift leader. All shift leaders are registered nurse who are responsible for the management of particular wards and therefore for the patient care would choose provided for patients on a particular shift.

Table 5.11 depicts a variety of responses on the part of shift leaders to the abnormal data that was reported to them by the auxiliary and staff nurses who obtained and collated the data in the first place.

Table 5.11   The responses of shift leaders to abnormal vital data (n=50)

	N	%
Reported cases observed		
Number of cases in which abnormalities were reported to the shift leader	30/50	59.74
Number of cases which were managed by the shift leader	26/30	85.51
Number of cases in which no action was taken by the shift leader	4/30	14.48
All cases observed		
Management of all cases in which abnormal data was reported to a shift leader	26/50	52.98
Number of cases in which follow-up by the shift leader occurred after treatment had been administered	28/50	57.35
Number of cases in which abnormalities were recorded/documented in the patient's health record by the shift leader concerned	24/50	48.91

During the two-month period in which this survey was conducted, there were fifty cases in which the occurrence of abnormal vital or/and biochemical data could have produced devastating consequences for the patients concerned. Of the fifty cases that were reported, thirty cases of abnormal data (or 59.74%) were reported to the relevant shift leaders by the nursing personnel who observed and collected the data. The shift leaders who were responsible for all the patient care in their specific wards in each of these cases responded to 26 (or 85.51%) of these cases by reporting them to the correct authorities. In four instances (14.48%), the shift leader concerned did *not* respond to the reported abnormal values by reporting them to the correct authorities.

Out of a total of the 50 cases that were included in the survey (including the unreported cases of abnormal data), the shift leaders attended to 26 (52.98%) of the affected patients. Twenty-eight of the 50 patients (or 57.35%) received follow-up from the shift leader concerned after interventions had taken place. Out of a total of 50 cases, the shift leaders documented only 24 (48.91%) of the cases in which deterioration, treatment and other actions were taken. This is easily recognisable as a very poor rate of response under the circumstances. The survey also identified the phenomenon of under-reporting information to experts who would have been able to intervene, as well as a lack of response to abnormal data in general.

The purpose of **phase 2** of the research process was to devise means of improving the current levels of practice in the hospital with regard to responding to and reporting abnormal physiological data.

The second phase of the study followed naturally from the first phase. The purpose of phase 2 of the research was to organise the implementation of training programmes and an in-hospital nurse-led outreach programme that would have the effect of improving current practice. The researcher therefore measured the results of the interventions that occurred in order to determine any improvements that might have occurred in the response rate of both the nurses and the shift leaders.

5.3.7   Clinical markers

Clinical markers in this study refer to physiological indicators, rapid response parameters, pain management parameters, and biochemical indicators.

5.3.7.1   *Audit*

A training programme was implemented by the hospital on the basis of the results of the clinical markers survey carried out in May 2005. The hospital clinical facilitators were given the responsibility of training all nursing personnel in the hospital to the correct methods of collecting vital data from each patient as often as is necessary on a daily basis daily. A learning culture was established on the basis of the continuously active clinical markers training programme. (This supported the learning effectiveness pillar of the clinical governance model.) Several audits were carried out in subsequent years to monitor the progress and outcomes of the training programme.

Figure 5.2 depicts the results of the clinical markers and technical skills audit that was carried out between May 2005 and June 2007.

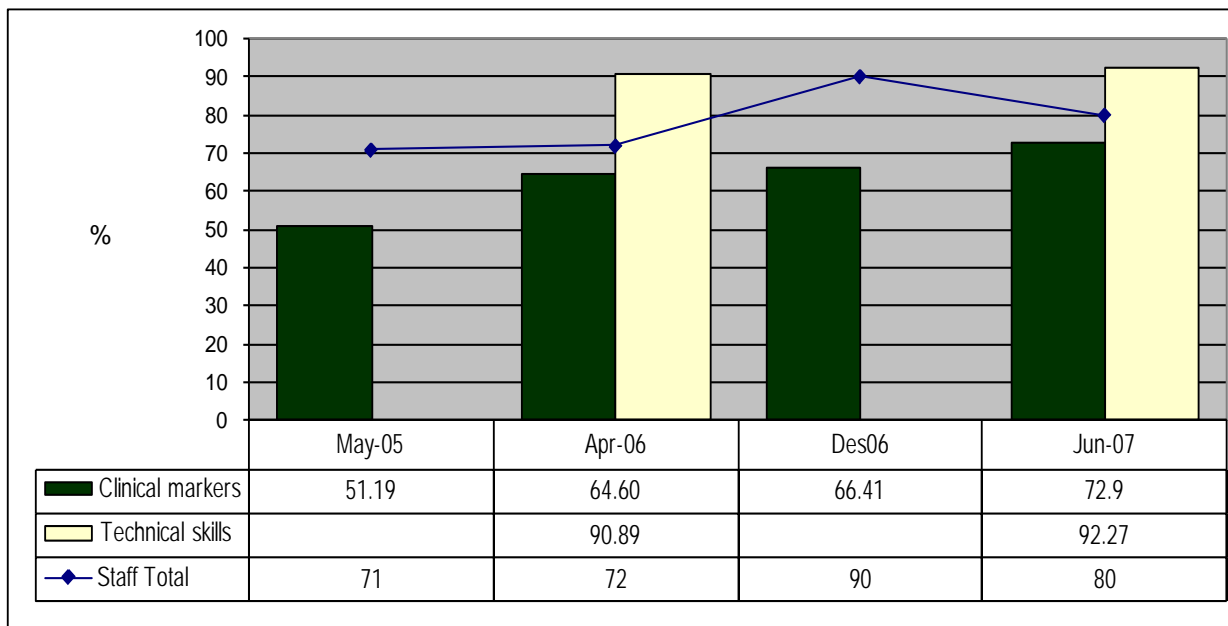|	May-05	Apr-06	Des06	Jun-07
Clinical markers	51.19	64.60	66.41	72.9
Technical skills		90.89		92.27
Staff Total	71	72	90	80

Figure 5.2   The nursing staff's knowledge of clinical markers and proficiency in technical skills (expressed as percentages) recorded in the survey carried out between May 2005 and June 2007

The May 2005 statistics indicate that the nursing personnel in the hospital scored an average of 51.9% in the survey that tested their knowledge about clinical markers and related technical skills. These results strongly suggest that all the nursing personnel who were employed in a hospital in 2005 urgently needed to be trained in how to collect and interpret the meaning of normal physiological parameters and any deviances from the norm.

Apart from what they learned in the training programme, nurses were able to consult a chart kept in all patient files that set out the normal ranges of all the vital data. This chart helped nurses to compare and rapidly identify any deviances from normal vital data readings in the patients for whom they were responsible. The purpose of this

chart's aim was to help nursing personnel to identify any kind of deterioration in the patient – and to interpret its significance – as soon as it appeared.

The research conducted by Lee et al. (1995:183) produced evidence that the early recognition of deterioration in the condition of patients could lead to timely interventions and to the necessary nursing and medical management and treatment of patients.

5.3.7.2 *Physiological clinical markers indicators*

For the purposes of this study, seven evidence-based clinical markers were accepted and established as indicators of the patient's vital signs by a team of expert from the hospital that was the locus of this study. Taken together, these clinical marker indicators give a comprehensive picture of the physiological health status of each patient. These seven routine physiological parameters (which are blood pressure, pulse rate, respiratory rate, oxygen saturation, temperature, level of consciousness and urine output) are applied in the general wards, in the high care unit and in the ICUs. (The pain threshold was also added as an eight parameter to the clinical indicators mentioned above.) Any deviation from normal baseline readings in these eight clinical indicators give nurses and doctors in early warning of the presence of physiological abnormalities, and permit the nursing and medical personnel of the hospital to do whatever is necessary to prevent patients from further physiological deterioration. (See table 5.13 of this chapter for the clinical marker parameters.)

5.3.7.3 *Oxygen saturation*

The research conducted by Schein et al (1990:1388) has revealed that the respiratory rate of patients can be regarded as a sensitive and reliable early indicator of deterioration. The importance of being able to monitor oxygen saturation motivated the management of the hospital to place pulse oximeters in all the general wards of the hospital in the

study. Since then, the monitoring of oxygen saturation with a pulse oximeter has provided a seventh clinical indicator of rates of patient deterioration in the hospital. (Consult table 5.2 for the normal oxygen saturation value.)

5.3.7.4   *Quick response parameters*

The quick response parameters (QRPs) are physiological parameters that indicate the presence of physiological abnormalities beyond the limits of normal parameters. When used together, they constitute a valuable bedside tool that nurses can use to activate the process of summoning expert clinical resources and specialist personnel to the bedside of a patient in crisis. This concept is based on the Track and Trigger System that has been used for some time in the United Kingdom and Australia.

The QRPs enable ward nursing personnel to respond to any serious deviation from abnormal physiological parameters (which are set out in Table 5.3). The QRPs differ from the clinical marker indicators in the sense that the QRPs function as warning signs or alarm signals for nursing personnel so that they can activate the outreach team immediately. The outreach team of dedicated group who are trained to give emergency attention to patients whose vital data has reached extreme levels. Problems associated with vital data between normal values and QRPs value should be managed by the ward personnel themselves as far as possible. But when a patient's vital data reaches the level of QRPs values, then intervention by clinical experts, such as the outreach team and/or the treating doctor, are needed immediately. These differences may be illustrated by the following example. The patient with a temperature between $37°C$ and $39.5°C$ needs to be managed by ward nursing personnel. But if a patient has a temperature of $39.5°C$ or higher, he or she needs to be attended to immediately by the outreach team and/or the treating doctor. The outcomes of the use of the QRPs by the nursing personnel warrants further research and investigation.

Table 5.12   Parameters of clinical markers

	TEMP	PULSE RATE	RESPIRATORY RATE	BLOOD PRESSURE	SPO₂	URINE OUTPUT	GLASGOW	PAIN MANAGEMENT
	°C	per minute	per minute	mmHg	%	ml/kg/hour	Rating scale	Pain Faces scale
Adult	37	60 - 100	12 – 20	120/80	≥ 90	>0.5-1ml	15/15	≤ 3
Adult >70 years	36	60 - 100	15 – 20	Possible rise in diastolic value	≥ 90	>0.5-1ml	15/15	≤ 3
Teenagers	37	50 - 90	15 – 20	120/80	≥ 90	>0.5-1ml	15/15	≤ 3

Source: Kozier, Berman & Burke (2000); FCCS (2002)

Table 5.13   Quick response parameters (QRPs)

Temperature	°C	**<35.5 or >39.5**
Systolic Blood Pressure	mmHg	**<100 or >200**
Respiration	Breaths per minute (**Count for one minute**)	**<10 or >30**
Oxygen saturation	%	**<90**
Pulse Rate	Beats per minute	**<50 or >120**
Urine Output	ml / per kg / hour	**<0.5-1ml/kg/hour**
Level of Consciousness		**Change, Decrease**

Source: Morgan at al. (1997)

5.3.7.5   Pain management

The pain level threshold was added as an eight parameter of clinical marker indicators because of deficiencies in the pain management skills of the nursing personnel in general wards. The scale that is contained in each patient's file should prompt nurses to evaluate every patient's pain level regularly so that the pain management methods that are used in general wards can be improved.

Whaley and Wong (1987:1070) point out that the pain assessment tool helps patients to describe the intensity of their pain. The *pain faces scale* makes use of six cartoon faces with a different expression on each face. Each face is meant to show a person who feels happy because he or she has no pain (or only a limited amount of pain) or who feels sad because he or she is experiencing some pain or even a great deal of pain. Patients are asked to choose the face that best describes the amount of pain (if any) that they are feeling. Even children of three years old and older can use this rating scale.

Nursing personnel use ratings provided by this assessment tool to provide the appropriate kind of treatment indicated for each level of pain. Both drugs and certain methods that do not make use of drugs can be successfully used to control the levels of pain being experienced by patients. The pain faces scale shown in figure 5.3 shows the cartoon faces that are used as pain management indicators by health professionals.

PAIN FACES SCALE
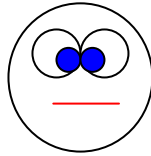
0	2	4	6	8	10
NO HURT	HURTS A LITTLE BIT	HURTS A LITTLE MORE	HURTS A BIT MORE	HURTS EVEN WHOLE LOT	HURTS WORST A

Figure 5.3   Pain management indicators

Source: Whaley & Wong (1987:1070); Wong & Baker (1988:9)

5.3.7.6 *Biochemical indicators*

Biochemical profiles provide a comprehensive view of the general health of an individual at any given time. Although biochemical values were not used as parameters or clinical markers in the hospital in the study, they are nevertheless regarded as so important that they have been introduced into the general wards as significant indicators of a patient's condition. It therefore became necessary to create guidelines that the nursing personnel would be able to use to gain a fuller and more detailed picture of the physiological condition of their patients. A chart with biochemical indicators was therefore devised and inserted into every patient's file so that nurses would have some point of reference for evaluating and interpreting the biochemical values of their patients. Table 5.14 sets out the biochemical indicators that are used by health professionals for monitoring the condition of a patient at any particular time.

Table 5.14   Biochemical indicators

SAMPLE	NORMAL VALUES	HIGH RISK - CALL OUTREACH / DR	REPORT DURING DOCTORS ROUNDS
Sodium (Na⁺)	130-145 mmol/L	↓125 ↑ 150	126 – 149
Potassium (K⁺)	– 5.5mmol/L	↓ 2.5 + diuretic ↑ 5.5 + low urine output	
Ureum	– 8.2mmol/L	Abnormal value + low urine output	Abnormal value + normal urine output
Creatinine	– 115mmol/L		✓
Calcium	– 2.55mmol/L		✓
Magnesium	– 0.91 mmol/L		✓
Phosphate	4 – 1.2mmol/L		✓
CRP	8 mg/L	↑ 50 without antibiotics,↑CRP 72-96 hr normal post-op	↑ value with antibiotics
Hb	– 18 g/dL	↓ 10 & ↓ 10 with active bleeding	↓ 10 without active bleeding
HCT	– 52 %	↓ 30 & ↓ 30 with active bleeding	↓ 30 without active bleeding
Platelets	0 – 45010^9/L	↓ 80 or ↓ 140 or with active bleeding	↓ 140 ↑ 450 without active bleeding
WBS	1010^9/L	↑ 50 CRP + ↑ WBC **without** antibiotics	↑ 50 CRP + ↑ WBC **with** antibiotics
D-Dimere	– 0.3 ug/mL	↑ 0.3 without anti-coagulant	↑ 0.3 with anti-coagulant
Trop T	3 ug/L	↑ value + chest pain	↑ value without chest pain
CK	– 174 IU/L	↑ value + chest pain	↑ without chest pain
CK-MB	– 4.94ug/L	↑ value + chest pain	↑ without chest pain
Mioglobin	– 58 mmol/L	↑ 500	↓ 500
Amylase	– 151 mmol/L	↑ value	
Lipase	57mmol/L	↑ value	
Blood glucose	8 mmol/L	↓ 2.5 or ↑ 20	
BLOODGAS			
pH	pH 7.35 – 7.45	Respiratory distress + pH↓ 7.35 pH ↑ 7.45	↑ pH 7.45 + ↓ pH 7.35 without respiratory distress
pCO²	35 – 45 mmHg	↑ 45	
pO²	60 – 100 mmHg	↓ 60	
SaO²(Saturation)	90 – 96 %	↓ 90 with oxygen	↓ 85 without oxygen – start oxygen

Source: Pathologists: Professors Hayward, Vermaak and Partners (2008)

The clinical marker indicators, the quick response parameters, the pain management indicators, and the biochemical indicators were compiled by a team of clinical experts from the hospital in which the study took place. All these indicators and parameters were supported by a literature overview and evidence-based research. The team that compiled this table and its supporting evidence and references, consisted of a clinical nurse specialist, physicians, an intensivist, an anaesthetist, pathologists, unit managers, local nurses from the training department of the hospital, and the clinical governance coordinator and chairperson. The selected clinical marker indicators, the quick response parameters, the pain management indicators and the biochemical indicators were all selected and approved by the team in consultation with the hospital's policy makers and all the members of the hospital's management board.

5.3.7.7   *Monitoring and interpreting clinical markers*

The physiological variables in the study were adapted from Morgan at al. (1997:100) – as is indicated in table 5.13, and the biochemical variables were compiled by local pathologists (as is indicated in table 5.15). All these physiological and biochemical variables are used in the hospital by nursing personnel to measure the physiological and biochemical levels of patients. They are used to assess the physiological status of patients, and they enable the nursing and medical staff to identify physiological and biochemical variables that deviate significantly from normal values.

The Quick Response Parameters (QRPs) therefore enable nursing personnel to respond to abnormal physiological parameters (as depicted in table 5.14).

5.3.7.8   Technical skills

Figure 5.2 in section 5.3.7.1 illustrates the technical skills that nurses need in order to use equipment correctly and to obtain accurate readings of vital data.

Although 90.9% of the nurses who were surveyed possessed the technical skills that are needed to obtain technically correct readings, the hospital that is the subject of this study nevertheless implemented a continuous training and evaluation programme of measures the technical skills of all nursing personnel. Such a continuous training programme complies with the requirement for continuous improvement set out in the clinical governance model.

5.3.7.9   Reporting structure surveillance and audit

Research conducted by Andrew and Waterman (2005:473) produced evidence of how the ward-based nursing personnel in their sample used vital sign readings and early warning signs to detect various forms of physiological deterioration, and how they were able to successfully report such information to the treating doctors. Their success in this regard implies that they understood the significance of the information that they collected from the patient. These nurses were therefore in a position to report abnormal vital data to doctors wherever they encountered it. The hospital's team of experts (who were mentioned above) therefore decided to prepare guidelines that would enable nurses correctly and quickly to interpret the clinical marker indicators, the QRPs, the biochemical indicators and the pain scale indicators of the patients under their care. The proper interpretation of these guidelines enables nurses to activate the outreach team and/or the treating specialist when they observe readings that exceed normal ranges and that therefore may be a sign of an imminent crisis. The biochemical indicators enable nurses to collect coherent and

important information to present during doctors' rounds or – if the information collected indicates the onset of a crisis or emergency – to activate dedicated emergency staff such as the outreach team.

The effect of these indicators on the reporting process warrants further research and investigation.

5.3.8 Education, training and development

The hospital's training department for nursing personnel gave clinical facilitators the responsibility of improving the nursing personnel's extremely poor knowledge of clinical markers, oxygen saturation, QRPs, pain management and biochemical values as well as the responsibility of devising and implementing an extensive and continuous training programme in the hospital. The purpose of this training programme was to improve the ability of nurses to recognise the kind of abnormal vital and biochemical data that is indicative of patient deterioration. For this purpose nurses were able to resort to making personal contact with senior staff who are able to help them or to resort to the chart that is inserted in all patient files and that supplies comprehensive information about the normal ranges of vital and physiological data. For those nurses who were already competent in this regard, the continuous training programme would be a useful instrument for refreshing their knowledge and skills.

Six months after the institution of the training programme mentioned in the previous paragraph, an improvement of 13.41% in the nurses' ability to recognise and interpret clinical markers was achieved. Graph 5.2 exhibits this improvement in the ability of nurses to recognise and interpret the importance of deviations from the normal range of vital and physiological data. This existence of this ongoing training programme supports the

recommendation of the clinical governance model that nursing personnel be subjected to continuous professional development and improvement.

5.3.9 The outreach team

The outreach strategy that exist in the hospital complies with the NHS clinical governance model's recommendations about teamwork and communication.

It was possible to introduce the outreach team successfully into the hospital because of the enthusiastic manner in which the senior ward nursing personnel and nurse managers of the hospital received this innovation and used it whenever and wherever it was needed to treat patients in emergency situations.

5.3.9.1   Objectives of the outreach team

The main objective of the outreach team is to improve and optimise the quality of care that is available to patients in the hospital that was the locus of this study.

The key objective of the outreach team is to prevent, or forestall and even reverse deterioration of patients in general wards, to minimise the number of unplanned emergency transfers to ICUs, to lower the rate of readmissions to ICUs and higher care units, and to decrease the number of CPRs that the occur within the hospital. It is the purpose of the outreach team to empower ward nursing personnel by offering them immediate support wherever they need it, to increase the knowledge and skills involved in the management of emergencies for operatives in many different disciplines, and to enhance the quality of collaborative care and teamwork within the hospital. This concept therefore makes it possible for many different professional practitioners to contribute their

particular expertise, not only for patients in emergency situations but for patients in general. The activities of the outreach team may thus provide referrals to professionals such as physiotherapists and nutritionists, as well as referrals to specialist physicians and nursing staff .

In the opinion of Bright el al. (2004:39), *education* is the most important element for ensuring the success of outreach activities. In this context, education is understood to mean a two-way process that requires the willing sharing of expertise, active collaboration and support, and the intentional blurring of rigid traditional boundaries between disciplines. The most important attitudinal attributes of members of an outreach team would therefore include the capacity to teach, to learn from others and the ability to support the efforts of other clinicians – all often under the most difficult and stressful circumstances.

The concept of the outreach team was introduced so that nursing personnel would be able to flag and detect patients who are at risk because of critical illnesses as well as patients who had deteriorated to the point of needing immediate interventions. The other function of the outreach team is to identify, prevent and (if possible) reverse the progress of observable deterioration in the condition of patients and, by so doing, to forestall their admission to an ICU by means of timely interventions administered in the ward itself or – if necessary – to organise a rapid and smooth admission to an ICU. *The identification of critically ill or rapidly deteriorating patients in general wards is the key to forestalling admission (or readmissions) to critical care facilities.*

Outreach teams track the status of general ward patients by combining information from vital signs (that are monitored non-invasively) with the physiological information that is supplied by comparison to normal clinical marker parameters. Where there are physiological abnormalities, they should receive prompt and appropriate intervention from senior health care professionals. Although the rate at which patients deteriorate

varies from one patient to another, the early detection of deterioration in a patient's condition over the matter of hours or days presents the challenge that outreach teams were originally created to meet.

A daily surveillance by outreach teams identifies the training needs in particular areas of the hospital, and it is up to the hospital's training department to remedy these deficiencies in as soon as possible. The training and education that is provided by the hospital's training programme should lead to a direct improvement in the hospital's standard of clinical practice.

5.3.9.2   *The role and function of the outreach team*

The Donabedian and NHS Clinical Governance models recommend that the outreach team of a hospital (such as the one that is the site of this study) should adopt the following objectives, roles and functions:

- **Partnership**

An outreach team should enhance effective partnerships between all professional groups, between clinical nursing personnel and managers, and between patients and clinical nursing personnel.

- **Clinical effectiveness**

An outreach team should:
- assess whether intervention by ward nursing personnel is appropriate

- continuously monitor clinical effectiveness

- provide clinical support and guidance to nursing personnel

- have the necessary expertise to provide an early identification of an emergency situation and should support patients who need to be admitted to an ICU or a high care unit

- increase their support of the nursing personnel who are caring for patients who have been discharged from an ICU, and should assist nursing personnel in wards to monitor such patients accurately and frequently

- promote continuity of care and should be active in the implementation of established clinical guidelines and standards

- forestall admissions to critical care units through the effective clinical management of high-risk patients by early detection of signs of deterioration in patients

- facilitate smooth, efficient and timely admissions critical care or high care units where necessary

- **Risk management**

An outreach team should:

- flag and detect patients who are at risk of critical illness

- follow up, revisit and discharge patients from higher levels of care to general wards wherever such moves are justifiable and warranted

- reduce risks and prevent the risk of public liability

- **Communication**

An outreach team should:

- show nurses exactly how to call for immediate assistance in simple as well as in complicated high-risk cases as well as in the case of patients who are rapidly deteriorating

- show nurses how to activate the outreach team or the resuscitation team

- activate a resuscitation team where necessary

- perform referrals through two main pathways: **the informal route** which results in nursing support and advice (which may be offered by telephone or which may require a visit to the patient), and **the formal route** which results in a full outreach consultation that includes health professional involvement

- will discuss the most appropriate response or treatment with the ward nursing personnel and offer follow-up as required

- **Professional development and training**

An outreach team should:

- identify training needs (daily surveillance)

- create and establish a learning culture

- be seen as a means for developing skills and not as a means of deskilling

- focus on the development of nurses so that they will be able to cope with similar situations in the future

- share critical care skills and expertise by means of an educational partnership with all the health care personnel in the hospital

- be trained to enhance the acquisition of clinical skills on the part of nurses so that the professional development of all the registered nurses and health care assistants in the hospital will not be neglected

- emphasise how important it is to be constantly aware of any signs of patient deterioration

- encourage research and useful innovations

- ensure, in cooperation with the hospital's training department, improvements in the standards of record keeping and documentation so that any signs of patient deterioration and evidence of subsequent interventions will be well documented

- **Use of information**

An outreach team should:

- collect clinical data to assist the management of the hospital to monitor the quality of care that is taking place throughout the hospital

- invite experts evaluators to audit and evaluate the work of the outreach team

- enhance the work of the outreach team by making creative use of
    o audit results
    o evidence-based research

- use audit results and clinical data to plan and improve the strategy of the outreach team

- obtain whatever information may be needed to enable evidence-based clinical decision-making

- **Throughput of the process of the outreach team and its outcome**

An outreach team should:

- be active in reducing the length of time that patients remain in hospital
- improve the quality of nursing care and overall patient outcomes throughout the hospital
- encourage changes to working practices where such changes are necessary
- decrease the overall mortality rate in the hospital
- support the development of the outreach team as a means for improving the care of acutely ill patients in hospital wards

Source: Adopted from Stenhouse at al. (2002:1-15)

5.3.9.3   *Role and functions of the outreach team*

The outreach team undertakes regular ward rounds, liaises with health care professionals, encourages multi-disciplinary communication, and encourages ward nursing personnel to report abnormal vital data, follows up after treatment, and helps nurses to improve the completion of their documentation. In addition to regular ward rounds, a calling-system enables ward nursing personnel to activate the outreach team which has the authority and means to summon other forms of expert assistance – such as the treating specialist or the resuscitation team – if they are required to do so.

The members of the outreach team personnel all possess the status of visitors or guests in any particular ward, and they only function in a cooperative and supportive role. The outreach team defines itself in this way because any attempt to impose changes (no matter

how beneficial they may be), might well be perceived as a challenge to the authority of the ward leaders and the functional autonomy of all ward areas.

Although the outreach team serves both the wards and the high care unit, they are part of an integrated, multidisciplinary, hospital-wide system of delivery care, and their presence and activities improve liaison among the intensive care units, the high care unit, the wards and all the health professionals who work in them. This means that the outreach team will often function to intervene and advocate the cause of any particular patient at any level of care.

While the main function of the outreach team is to look for and identify patients who are at risk or patients whose condition is deteriorating, they also have a teaching function. This means that they have a responsibility to share their knowledge and expertise wherever they provide assistance. The outreach team thus provides feedback and pertinent information to all other departments of the hospital. The recipients of such information include the training department, the clinical governance team, the management team and the resuscitation team. This information therefore has the potential to influence the whole organisational strategy of the hospital, the training programmes, and the various initiatives that are designed to improve the quality of patient care (as is recommended in the Donabedian model as well as in the NHS clinical governance model).

One on the many functions of the outreach team is to conduct audits of current and past practice and to perform whatever research will improve the ability of the hospital to deliver an enhanced degree of clinical care and practice.

5.3.10   The resuscitation team

The hospital which is the subject of this study established a resuscitation team for the first time in 2003. The resuscitation team differs in composition and function from the outreach team. The resuscitation team is activated only for cardio-pulmonary resuscitation (CPR) anywhere on the hospital's premises. The resuscitation team has its space in the functions from the emergency department and responds when it is activated by doctors, nurses, non-nursing personnel, and the outreach team itself.

5.4   OUTCOME

Phase 3: Re-assessment of the situation

In the final phase of this study, the researcher's aim was to re-asses the situation by measuring and monitoring the effectiveness of the interventions by undertaking a **comparative study**. A comparative study that stretched over a one-month period was undertaken following the interventions and the establishment of a nurse-led, in-hospital outreach team. A detailed description of the data analysis is presented in chapter 6

Together with the comparative study, the outreach team, the resuscitation team and the training programme were monitored by means of a continuous clinical audit programme. These teams influenced the outcome of the transfers to higher levels of care and the number of cardio-pulmonary resuscitations.

5.4.1 Reporting

During the period of the second phase of this research in the hospital, the nursing personnel and doctors were not yet accustomed to activating the outreach team. Because of this, the outreach team undertook regular rounds of all the wards in order to identify any patients who might be at risk or any patients who were showing consistent signs of deterioration. The outreach team distributed and communicated their reporting structures and calling criteria throughout the hospital. Even so, eighteen months elapsed before the outreach team were able to gain the unqualified trust and respect of the specialists and nursing personnel in the hospital. But once the outreach team had gained the trust of the various health care providers who work in the hospital, they found that their colleagues were prepared to accept the structures and reporting processes by means of which they operated. Regular meetings took place between the outreach team, various specialists, the unit managers of wards, the managers of the high care unit and the ICUs, the members of the hospital's management team and the clinical governance chairperson. These meetings serve to improve and refined the usages, functions and operating procedures of the outreach team. The purpose of these monthly meetings was to present feedback about the results and performance of the outreach team and to improve the quality of communication, teamwork, ownership and trust throughout the hospital.

The literature review was useful for making the hospital managers and all the health care providers in the hospital more aware of the crucial importance of clear, intelligent and purposive communications.

5.4.2   Transfers to a higher level of care

The monthly clinical audit programme identifies the number of transfers to a higher level of care that have taken place in the preceding month. Figure 5.4 (below) indicates the progressive decrease in the number of transfers to a higher level of care from general wards over a period of three years.
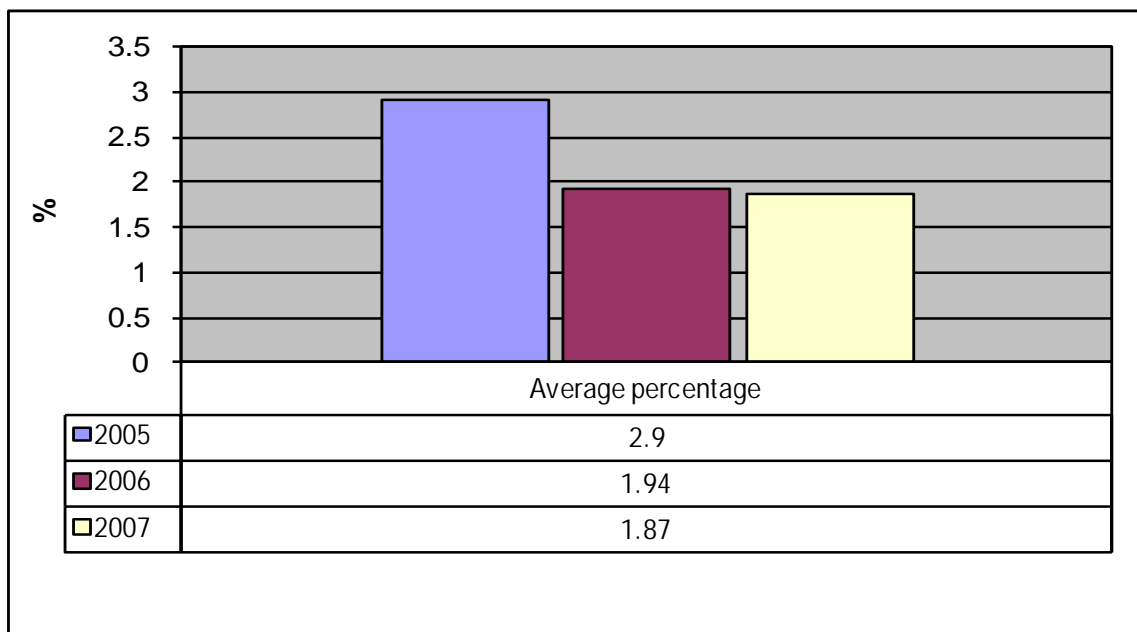
	Average percentage
■ 2005	2.9
■ 2006	1.94
□ 2007	1.87

Figure 5.4   Transfers to a higher level of care in the years 2005, 2006 and 2007

Figure 5.5 (below) indicates, by means of the two vertical arrows, the times at which the training programme and the outreach team were implemented. The clinical marker training programme was implemented first, and the outreach team was established as an active body three months later.
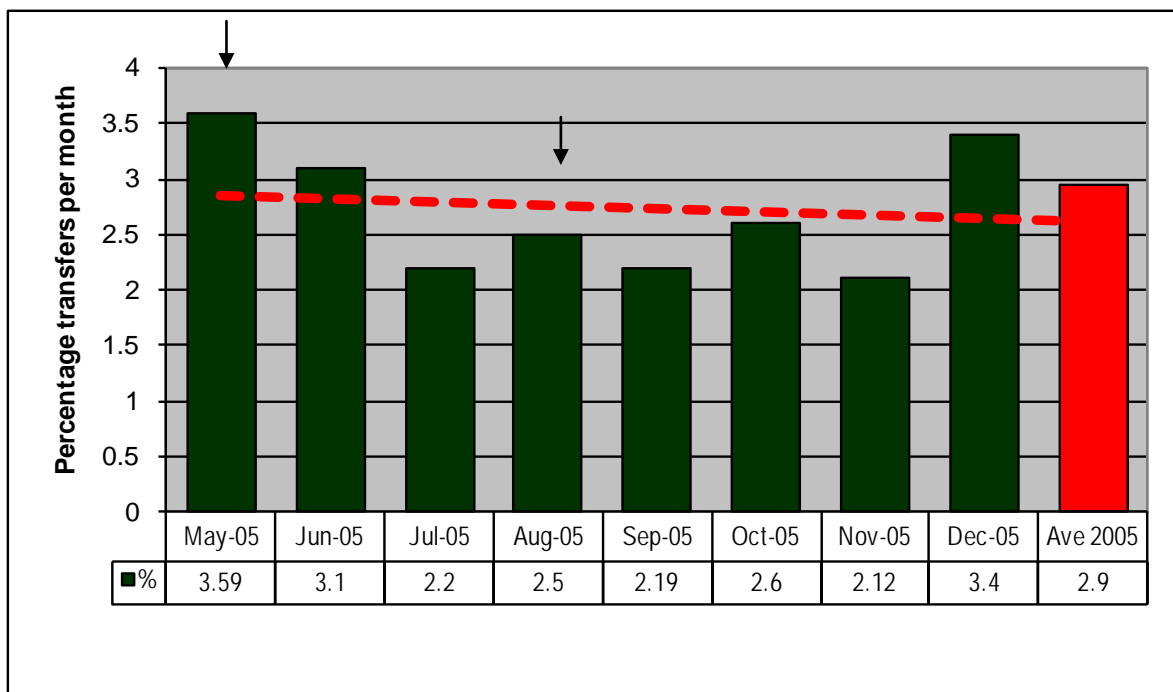
Figure 5.5 The average number of transfers of patients to a higher level of care over a period of eight months (May 2005to December 2005)

Figure 5.5 illustrates a gradual decrease in rate of general ward transfers to a higher level of care in the period between May 2005 in December 2005. This decrease in the rate of transfers is assumed to reflect the impact that the training programme and the activities of the outreach team had on the quality of nursing care provided by the hospital in general.

Figure 5.6 illustrates the average number of transfers of patients per month to higher lever of care between 2005 and 2007.

	Avg 05	Avg 06	Avg 07	Jan-07	Febr	Mch	Apr	May	Jun	Jul	Aug	Sept	Oct
%	2.9	1.94	1.85	1.5	1.8	1.7	1.79	1.81	2.15	1.56	2.4	2.4	1.36
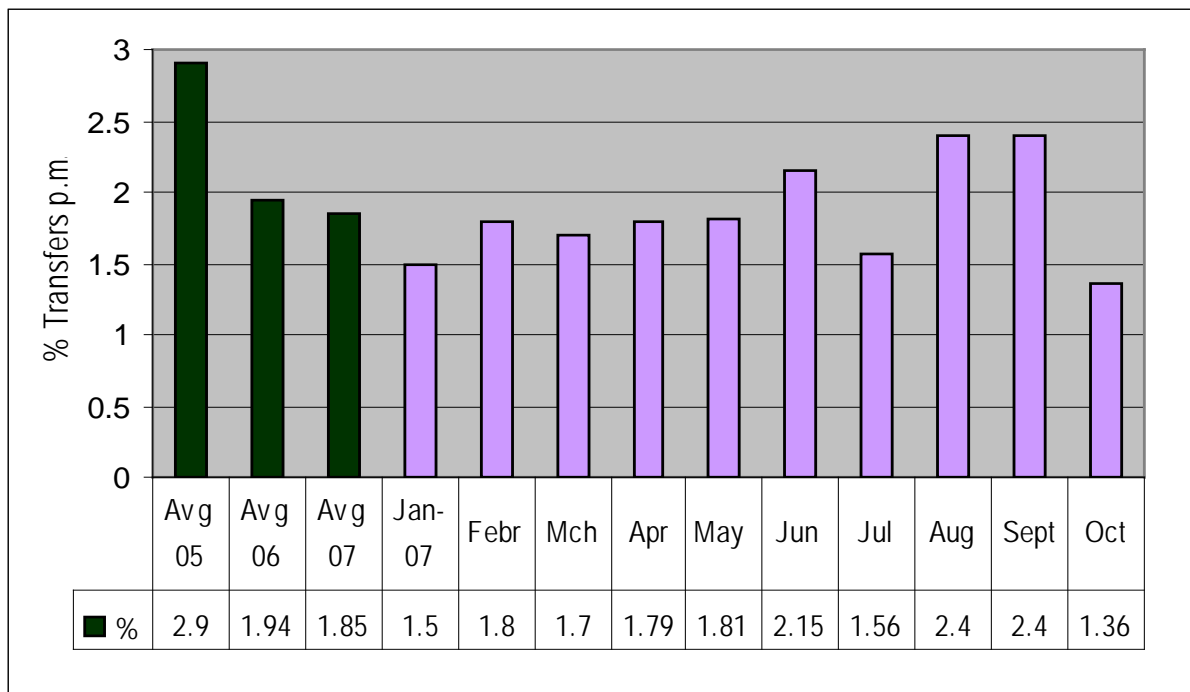
Figure 5.6   The average number of transfers of patients per month to a higher level of care in the years between 2005 and 2007

Figure 5.6 illustrates the average number of transfers of patients to a higher level of care between January 2005 and October 2007. The graph reflects a gradual decrease in the number of transfers to a higher level of care during this period.

The researcher concludes from the evidence presented in this study (shown in the graph 5.4, graph 5.5 and graph 5.6) the extent to which both the patients in the hospital and the various health care facilities benefited from the activities of the outreach team and the ability of nursing personnel to recognise the significance of abnormal vital and physiological data. Because these graphs reflect the results of a single monitoring process carried out in a particular hospital during a particular period, they warrant further research and investigation.

5.4.3 Re-admissions

The survey undertaken by the outreach team and the clinical audit both identified specific areas in which current practice could be improved. As was mentioned earlier, the rate at which patients were being re-admitted to an ICU after they had already been discharged, was also a matter of concern to the hospital's authorities.

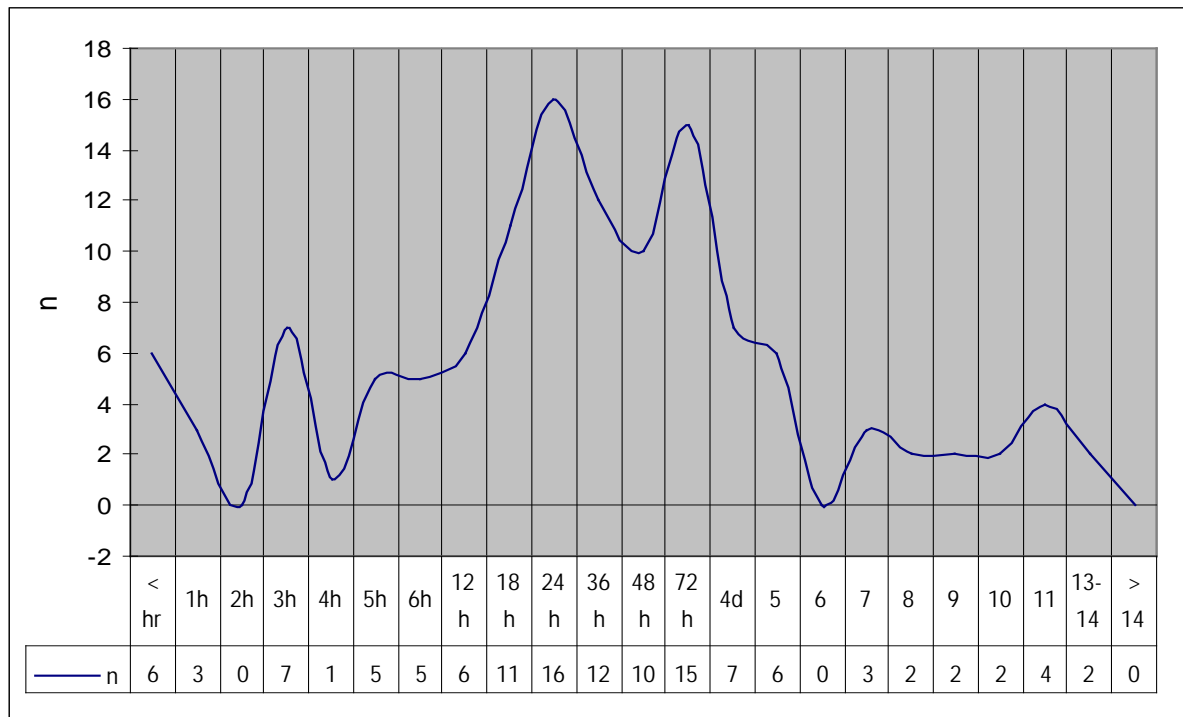Figure 5.7 (below) shows the number of general ward patients who were re-admitted to a ICU within a specific time period.

	< hr	1h	2h	3h	4h	5h	6h	12 h	18 h	24 h	36 h	48 h	72 h	4d	5	6	7	8	9	10	11	13-14	> 14
n	6	3	0	7	1	5	5	6	11	16	12	10	15	7	6	0	3	2	2	2	4	2	0

Figure 5.7   The number of patients who were readmitted to a higher level of care between January 2007 and October 2007 (n=125)

Figure 5.7 confirms how extremely important it is for the frequency of vital data monitoring to be increased in patients who have been admitted to general wards after being discharged from an ICU.

Figure 5.7 also shows that 16 patients (12.8%) remain for approximately 24 hours in a general ward before they were re-admitted to an ICU. The second greatest number of patients were re-admitted to an ICU after they had spent 72 hours in a general ward after being discharged from an ICU. This graph shows accumulative data from between January 2007 and October 2007 in the general wards. The research carried out by Boudesteijn at al. (2007:475) showed that nine out of 23 patients (39%) who were readmitted to an ICU, died during the course of their hospitalisation at a time when the overall average ICU mortality rate in the hospital was only 10.6%. The most important reason for readmitting patients to an ICU was a deterioration in their respiratory function (this was true of 68% of the cases we were readmitted). The implications of this research were discussed in section 3.4.2.10 of chapter 3.

The first change that was effected in response to this data was that all patients who were discharged from an ICU or a high care unit to a general ward were monitored for vital and physiological data at two hourly intervals during the first 24 hours after they were admitted to a general ward.

The outreach team regularly visited all patients who had been discharged from an ICU or a high care unit to the general wards during the first 24 hours after their return to a general ward.

The third change that was effected in response to this data was that the outreach team encouraged the nursing personnel to report *any* changes in the parameters of the clinical markers to them immediately. Otherwise the nursing staff utilised the Quick Response Parameters which guide nurses on how to respond to abnormal physiological parameters and deviations from normal biochemical variables.

The underlying principle behind all this activity was to identify instances of patient deterioration and to forestall unnecessary transfers and re-admissions to a higher level of care as well to reduce the incidence of in-hospital cardiac arrests. These activities address the legitimate concerns that have prevailed because deterioration in patients often goes unnoticed by the nursing staff and because the nursing care that is provided in general wards is sometimes sub-optimal. The highest priority for the outreach team was to provide early, timely and appropriate interventions in compliance with the Donabedian model and the NHS's model of clinical governance that encourages continuous improvements in the quality of care and patient outcomes.

5.4.4   Clinical markers audit

The effect of the training programme on the extent of how much nurses knew about clinical markers is depicted in graph 5.2.

The results the activities of the resuscitation team, together with the increase in the nursing personnel's understanding of the significance of clinical markers, are demonstrated below.

5.4.5   The resuscitation team

Bellomo at al. (2003:283) believe that it is highly probable that hospitals with high rates of ward-based cardiac arrests may well benefit from the introduction of systems that have been designed to identify and manage patients at risk more quickly than they have hitherto been able to do.

Figure 5.8 depicts the total number of times that the resuscitation team was called out as a result of the activities of the outreach team and the clinical markers training programme.
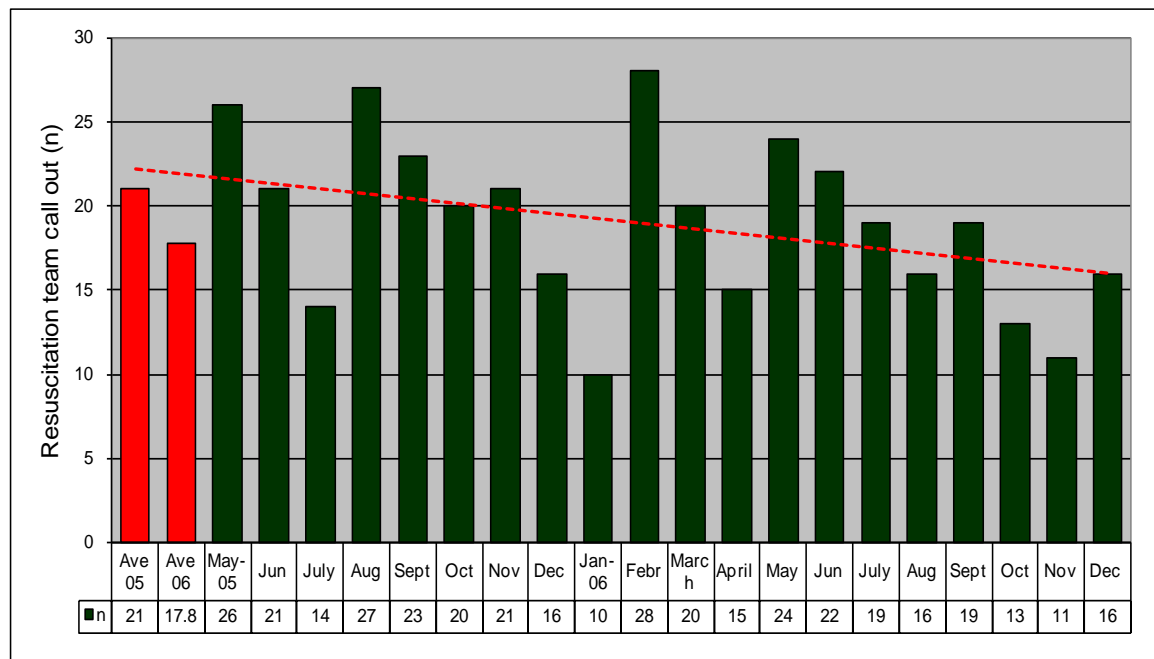
Figure 5.8   The rate at which the resuscitation team was called out in 2005

A recent study undertaken by DeVita at al. (2004:251-253) showed that more than half of all cardiopulmonary arrests in his sample were preceded by dramatic aberrations and deviations in vital signs and other clinical indices during the six to eight hour period before the cardiac arrest occurred. They also found that an increase in the involvement of a medical emergency response team was followed by a significant decrease in the incidence of cardiopulmonary arrests. Figure 5.8 illustrates a decrease in the total number of call-outs of the resuscitation team. This decrease may well be attributed to the activities of the outreach team – a hypothesis that warrants further investigation

Figure 5.9 plots the decrease in the total number of call-outs the resuscitation team in contrast to the total number of deaths that occurred in the period under review.

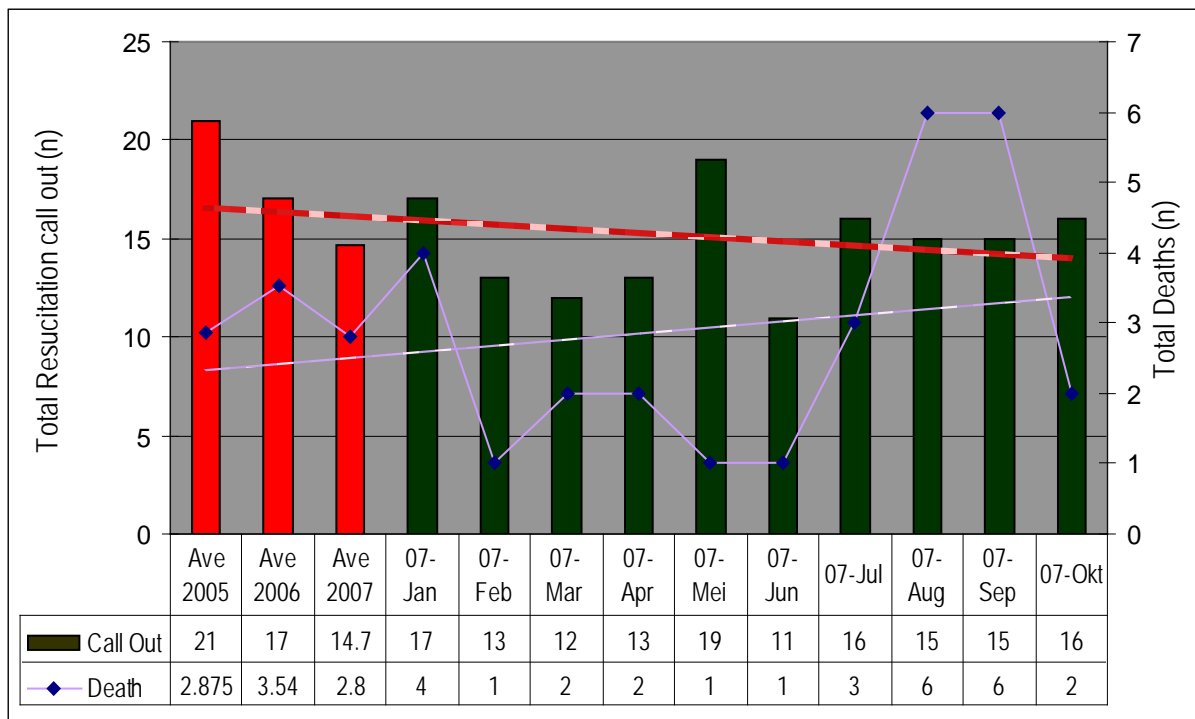|	Ave 05	Ave 06	Mei-05	Jun	July	Aug	Sep	Oct	Nov	Dec	Jan-06	Feb	Mch	Apr	May	Jun	July	Aug	Sep	Oct	Nov	Dec
Call out	21	17	26	21	14	27	23	20	21	16	10	28	20	15	24	22	19	16	19	13	11	7
Deaths	2.88	3	6	5	1	2	1	4	2	2	1	6	2	2	7	5	3	2	3	3	1	1
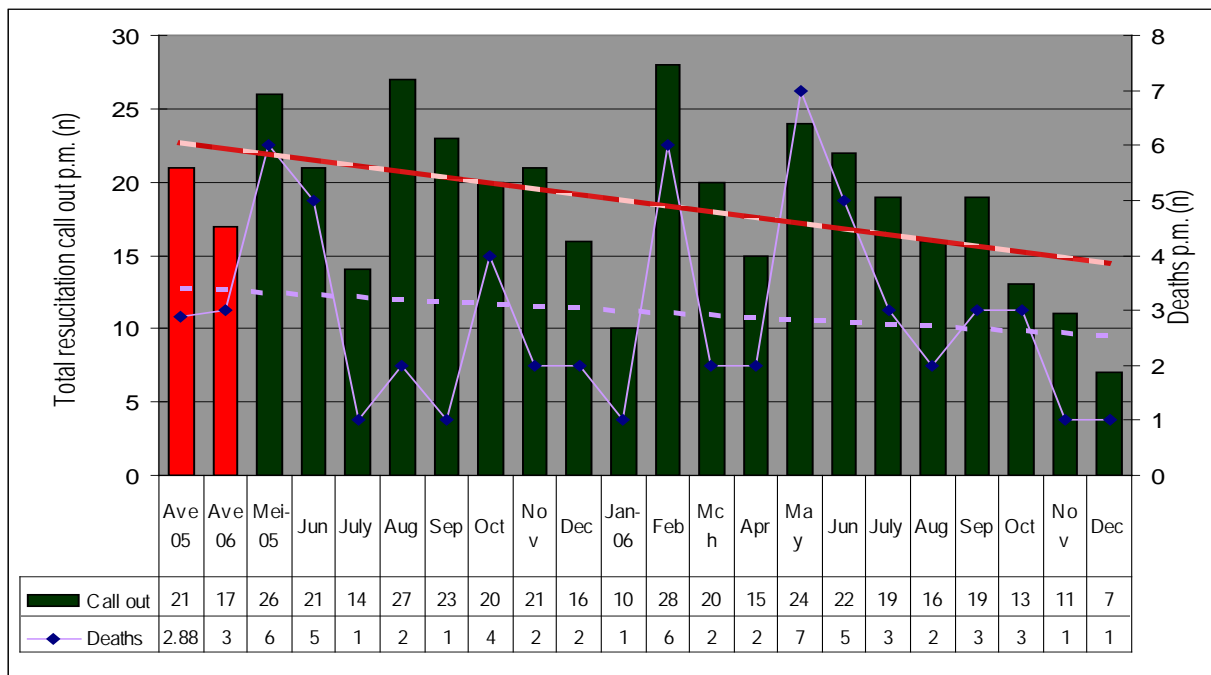
Figure 5.9   The total number of call-outs the resuscitation team in the context of the total number of deaths in the period between May 2005 and December 2006

Figure 5.10 depicts the total number of callouts of the resuscitation team in the context of the total number of deaths in the hospital during the period under review.

	Ave 2005	Ave 2006	Ave 2007	07-Jan	07-Feb	07-Mar	07-Apr	07-Mei	07-Jun	07-Jul	07-Aug	07-Sep	07-Okt
Call Out	21	17	14.7	17	13	12	13	19	11	16	15	15	16
Death	2.875	3.54	2.8	4	1	2	2	1	1	3	6	6	2

Figure 5.10   Total number of resuscitation team call-outs in contrast to the total number

of deaths in the period between May 2005 and October 2007

Figure 5.10 illustrates the total number of resuscitation team call-outs in contrast to the total number of deaths in the period between May 2005 and October 2007. Although the figures show a gradual decrease in the total number of resuscitation team call-outs, they also show a gradual increase in the total number of deaths during this period. A possible explanation may be that the resuscitation team only gets called out for more serious cases. In any event, these figures warrant further investigation and research. Most of these attempted resuscitations were performed in the ICUs.

Figure 5.11 shows the total number of resuscitation team call-outs in the context of the total number of cardio-pulmonary arrests that occurred during the same period.

	Mei-05	Jun-05	Jul-05	Aug-05	Sep-05	Okt-05	Nov-05	Des-05	Ave 2005
Call outs	26	21	14	27	23	20	21	16	21
CPA	12	12	3	9	7	6	5	3	7.13
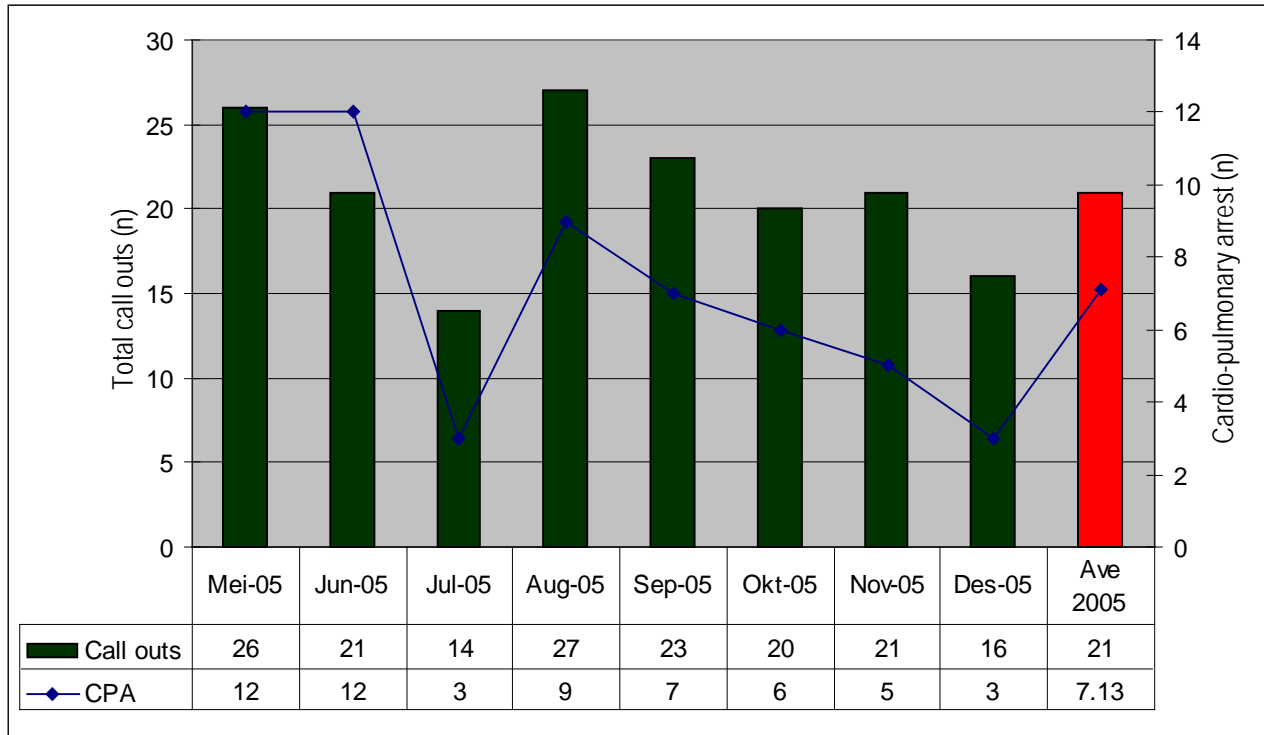
Figure 5.11   The total number of resuscitation team call-outs in the context of the total number of cardio-pulmonary arrests that occurred in the period between May 2005 and December 2005

Figure 5.11 indicates the influence of the outreach team that began to operate in the hospital from 15 August 2005. A gradual decrease in the total number of call-outs of the resuscitation team and the total number of number of CPRs is evident in the data

Figure 5.12 sets out the total number of times the resuscitation team was called out during this period in the context of the total number of CPRs that were performed during the same period.

	Ave 2005	Ave 2006	Ave 2007	Jan-07	Feb-07	Mar-07	Apr-07	Mei-07	Jun-07	Jul-07	Aug-07	Sep-07	Okt-07
Call Out	21	16.91	14.6	17	12	13	12	19	11	16	15	15	16
CPA	7.12	4.75	5.0	4	5	5	4	1	1	3	8	11	8
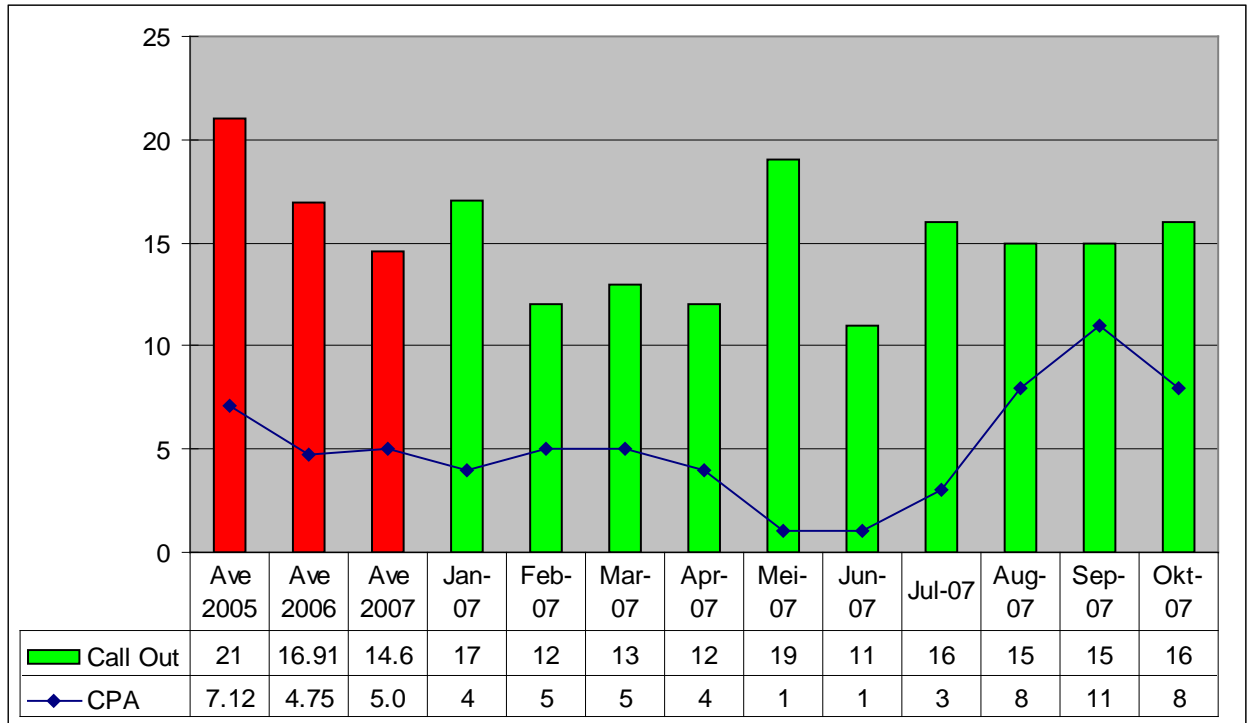
Figure 5.12   The total number of times the resuscitation team was called out during the period between January 2005 and October 2007 in the context of the total number of CPRs that were performed during the same period.

What can be observed is that the number of times that the resuscitation team was called out between 2005 and 2007 decreased gradually while there was a slight decrease in the total number of cardio-pulmonary arrests during the same period. One may infer that early intervention in combination with the better management of patients by the outreach team resulted in a decrease in the total number of times that the resuscitation team was called out during this period. These conclusions nevertheless warrant further investigation and research.

One may infer, in conclusion, that the hospital benefited from the introduction of the outreach team as well as the training programme that was designed to improve the

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nursing personnel's knowledge of the significance of clinical markers as well as the skills and protocols that they needed in order to deal with the early stages of patient deterioration. The training programme enabled nursing personnel to identify patients who were deteriorating at an early stage, and this enabled them to summon the outreach team and to inform their superiors and the treating medical staff before the patients became the victims of a full-blown medical crisis.

5.5   CONCLUSION

This chapter presented a detailed discussion of the situational analysis at the researcher completed in the hospital in which the research took place. Chapter 6 presents an analysis of the data and the findings of the study.

CHAPTER 6

"This book fills a much-needed gap."
Moses Hadas (1900-1966)

American teacher, one of the leading classical scholars of the twentieth century and a translator of numerous works.

Professor of Greek, Columbia University 1930-1965. 1922 BA Emory University; 1925 MA Columbia University; 1926 Rabbinical degree, Jewish Theological Seminary; 1930 PhD Columbia University.

DATA ANALYSIS AND FINDINGS

6.1   INTRODUCTION

According to Polit and Beck (2006:57), the analytic phase is the forth-major phase of a quantitative research, consisting of the analysing of data and interpreting of the results.

In this chapter, the data analysis and the findings of the third phase of this research is presented. The study was conducted in a private, multi-disciplinary level 1 trauma hospital in Gauteng and can be sub-divided into 2 parts. To orientate the reader, a short description of the process of the research is provided below.

The initial motivation for this research was to identify the processes and problems encountered with transferring patients from a lower to higher level of care. The pilot study preceding intervention stretched over the period 28/04/2005 to 27/05/2005

(representing admissions from 14/04/2005 to 20/05/2005) followed a comparative study following interventions in the process and stretched over the period from 01/10/2005 to 28/10/2005 (representing admissions from 25/09/2005 to 26/10/2005)

6.1.1 Pilot study

Patients were identified on daily morning rounds in high care and the ICU's (M-ICU, T-ICU and CCU) by four senior nursing personnel (3 ICU and 1 Trauma trained); one currently an ICU clinical nurse facilitators and one a nursing manager (researcher).

The team obtained the number of transfers of the past 24 hours by examining the admission register, bed-to-bed visits and communicating with the shift leaders and unit managers. The amount was compared with the number of transfers in the clinical audit report to make sure it correlates.

The proformas of the patients were filled in at the time of identification and were used in conjunction with case note reviews by an intensivist and the researcher to construct the course of the transfer of the patients. The transfers were correlated with monthly clinical audit reports from the wards, high care units and ICU's. During this period, 4419 patients were admitted to the hospital. This excluded paediatric and neonatal admissions as well as admissions to the gastroenterology day unit, but included surgical day cases.

During this study period 35 patients were identifies as having been transferred to a higher level of care (representing 0.79% of admissions). After record review one of the cases transferred was deemed an elective post-operative high care admission rather than an unplanned transfer. Of the remaining, 31 were included in this study, the 3 exclusions being 1 missing file and 1 patients and 1 patients' family having refused consent for the data to be used.

Of the 31 patients included, 7 patients were transferred more than once to a higher level, therefore 31 patients (88.57% of patients) and 38 transfers (92.68% of transfers) were included in this study.

6.1.2 Comparative study

In the third phase of the research, Outreach obtained the number of transfers during the night on daily morning handover from the night manager. Furthermore, they examined ICU and High Care admission registers, did bed-to-bed visits and communicated with shift leaders and unit managers. The amount was compared with the number of transfers in the monthly clinical audit report to ensure correctness.

During this period, 4741 patients were admitted to the hospital. These again excluded paediatric and neonatal admissions as well as admissions to the gastroenterology day unit, but included surgical day cases.

During October 2005, 32 patients (representing 0.67% of all admissions) were transferred to a higher level of care that presents 39 transfers. Of these, 3 were excluded for the following reasons:

- Two patients denied request for their data to be analysed (one patient and one patient's family).
- In one case, a proforma was completed but the patient was not transferred due to a "Do not resuscitate" order.

Of the remaining 29 patients that present 37 transfers, 5 further patients could not be used in the process analysis due to inability to recover the records from the hospital record storage system. These patients were however included in the demographic and time of day of transfer analysis since enough information could be retrieved from the electronic hospital information system (HIS) as well as the proformas filled in by the outreach registered nurse. Therefore 90.63% of patients were analysed for the

demographic data and time of day of transfer analysis and 75% for the subsequent analysis. Of the remaining 24 patients, 7 were transferred more than once to a higher level of care; therefore in the final analysis 30 transfers were used (75% of transfers).

The research instrument comprised six sections that were developed to ensure objectivity of data.

6.2   DEMOGRAPHIC DATA

Oxford English Dictionary (2005:389) defines demographic as vital statistics data relating to the population and different groups within it; the characteristics and statistics of human population: the characteristics of a human population or part of it, especially its size, growth, density, distribution, and statistics regarding birth, marriage, disease, and death.

Figure 6.1 to 6.2 depicted the demographic profile of those patients admitted to a higher level of care.

6.2.1   Gender distribution

In figure 6.1 (a, b and c) the gender distribution of the patients who were transferred to a higher level of care are depicted.
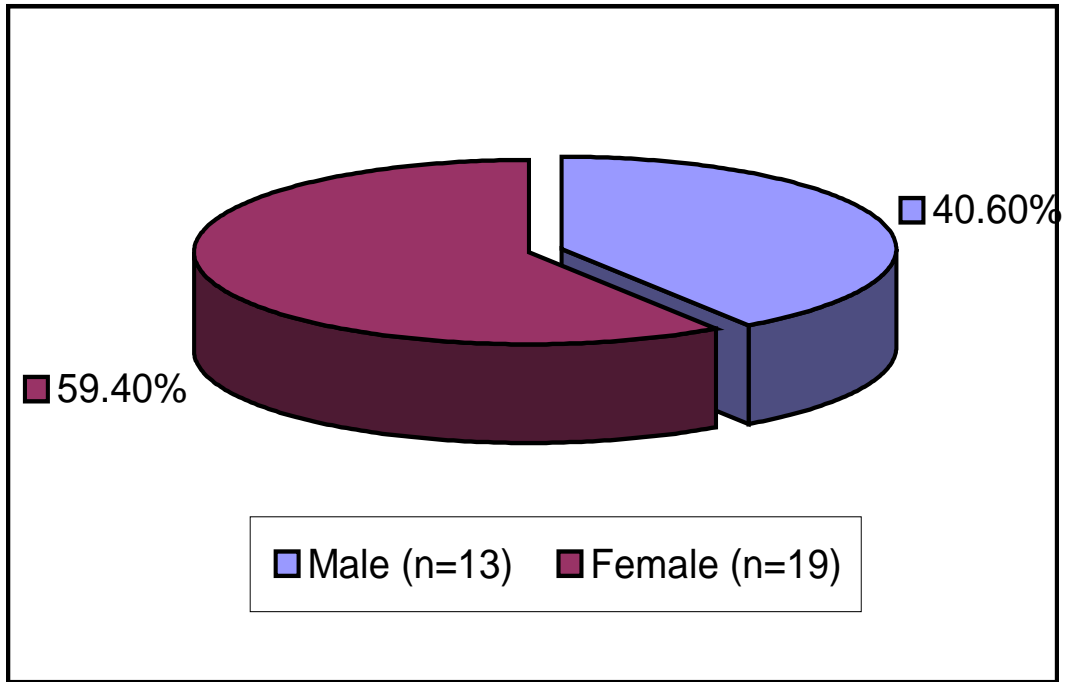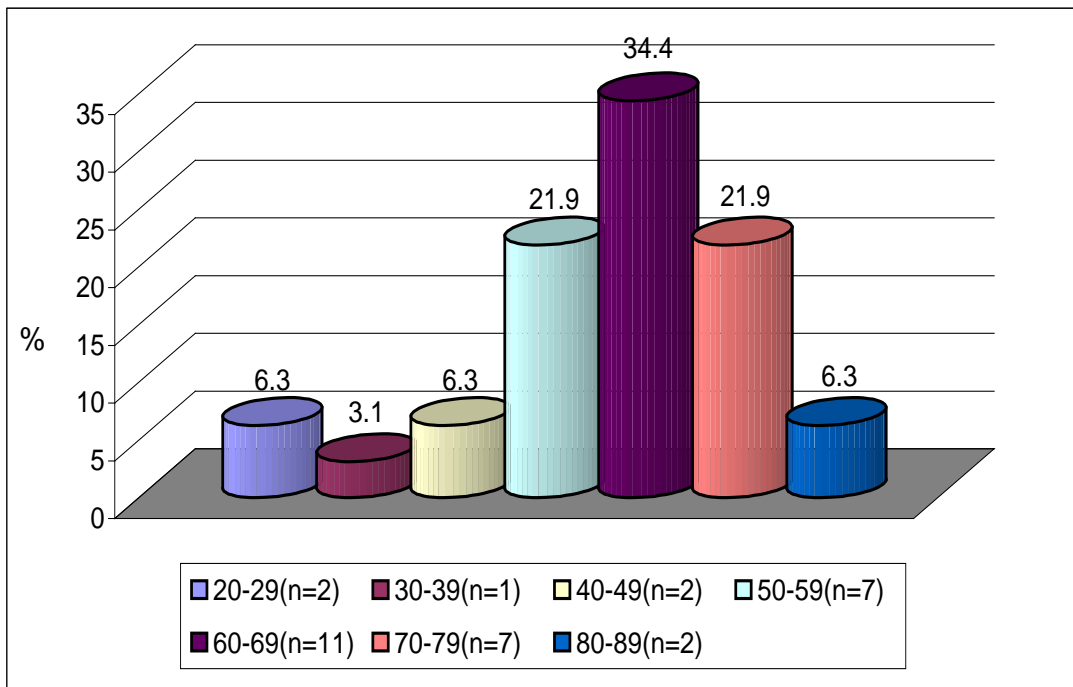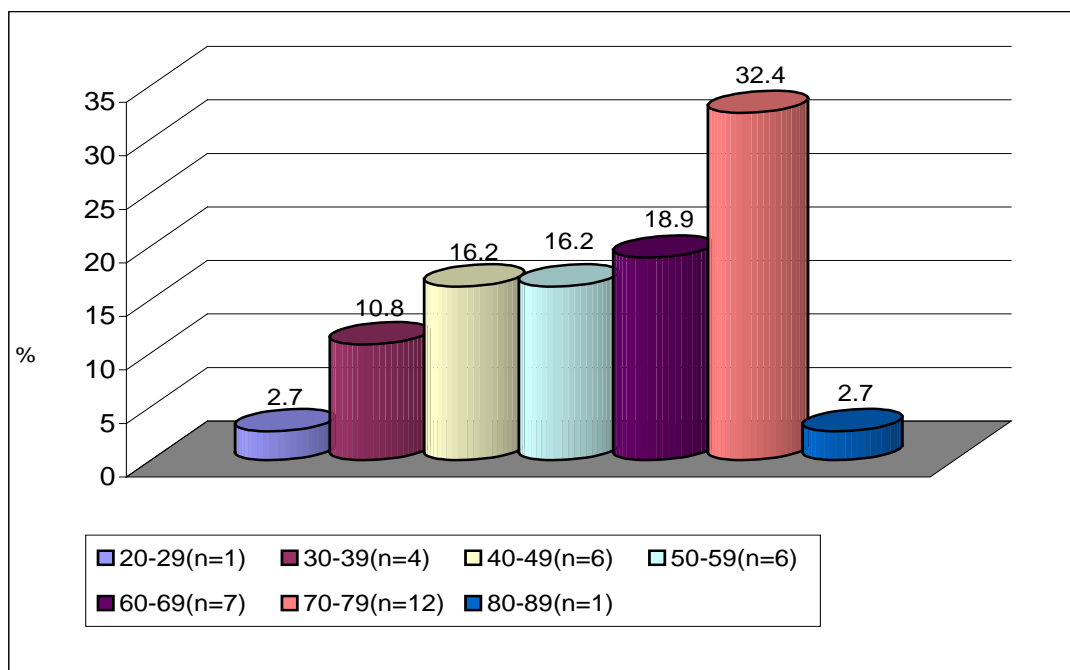
Figure 6.1 (a)   Gender distribution of patients admitted to a higher level of care

May 2005 (n=32)
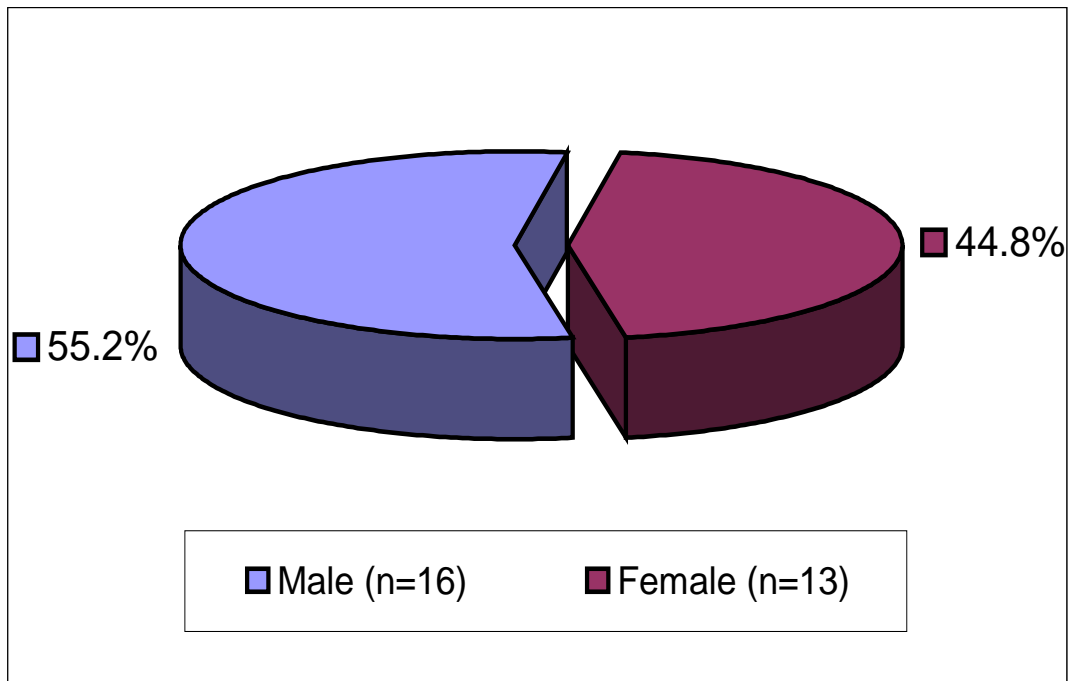
Figure 6.1(b)   Gender distribution of patients admitted to a higher level of care October

2005 (n=29)
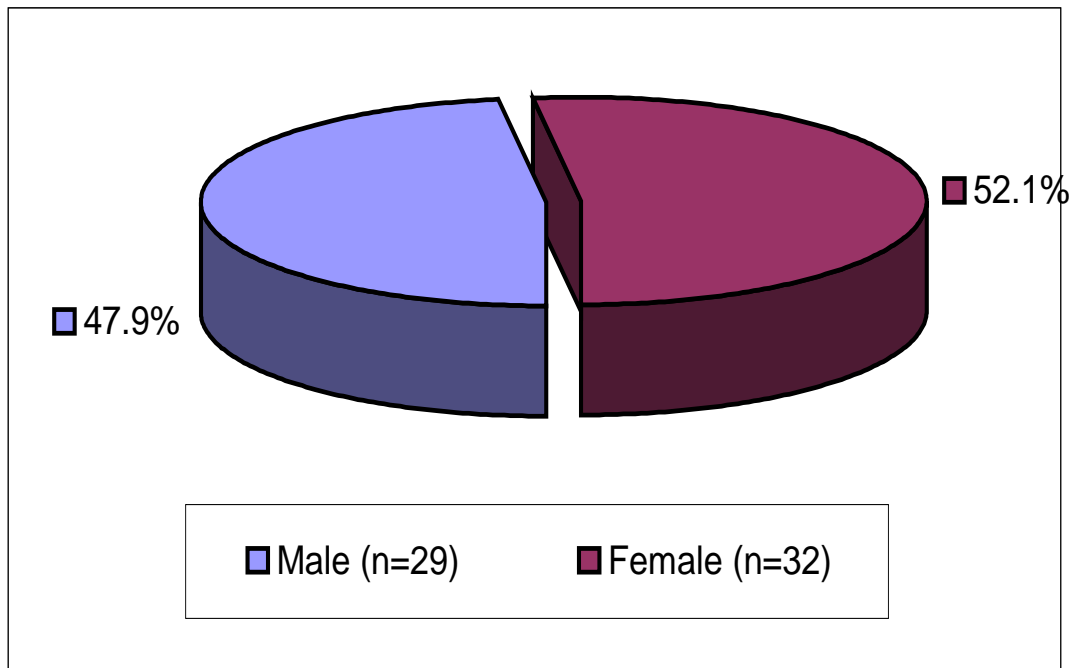
Figure 6.1 (c)   Combined gender distribution of patients admitted to a higher level of
care May 2005 and October 2005 (n=61)

Figure 6.1 (a) shows a predisposition of 3:2 for the female gender in the pilot phase of the study whereas 6.1 (b) for the comparative study shown no significant predisposition which is confirmed in the combined gender distribution in figure 6.1 (c).   When doing a statistical analysis on the complete data set, no significant difference could be show with p = 0.2531.

6.2.2   Age distribution

In figure 6.2 (a, b and c) the age distribution of the patients who were admitted to a higher level of care (transfers) is depicted.

Figure 6.2 (a)   Age range distribution of patients admitted to a higher level of care May

2005 transfers (n=38)

Analysing the data from the pilot study, of the 13 (40.6%) male patients the age ranged from 25 to 75 years. The mean age was 59 years and a median 62 years. Nineteen (59.4%) of the female patients who were transferred to a higher level of care fell in the age range between 29 to 85 with a mean calculated at 62, and the median of 60 years. The age distribution for males and females were therefore similar and overall variation in age was between 25 – 85 years with a mean of 61 and median of 60.

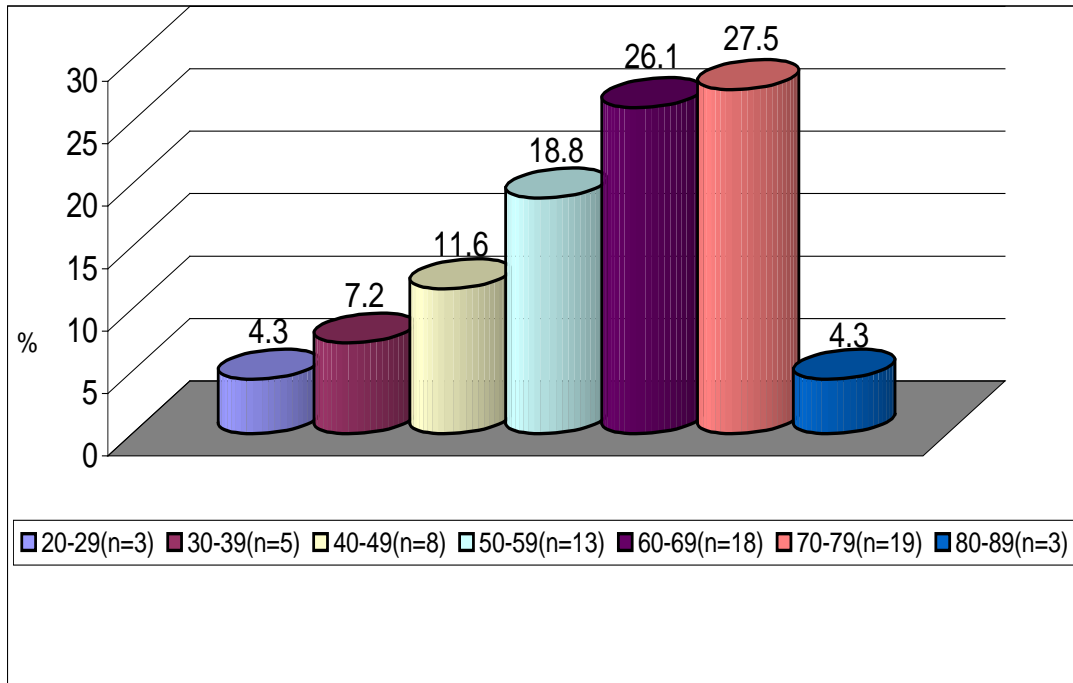*Figure 6.2 (b)   Age range distribution of patients admitted to a higher level of care*

October 2005 transfers (n=37)

Analysing the data from the comparative study revealed similar results where in 16 (55.17%) of the male patients the age ranged between 37 to 81 years. The mean was 62.2 years with a median of 66.5 years. Thirteen (44.83%) of the female patients who were transferred to a higher level of care fell in the age range between 26 to 70 with a mean calculated at 54, and the median of 57 years.

In comparing the 2 data sets, no statistical variation in the age could be shown with $p = 0.2791$.

The above is consistent with a study conducted by Cullinane et al (2005:4) who aimed to review the care of emergency medical patients referred to intensive care. In this study, it was found that the median age of these patients was 60 and the age distribution between 16 and 95 years and 55% were male, which is very similar to this study.

Figure 6.2 (c) Age range distribution of patients admitted to a higher level of care May 2005 and October 2005 transfers (n=69)

When grouping the study population a mean and median age of 60.51 and 62.5 years respectively. A study conducted by Hillman et al (2002) reported suboptimal management of patients during the period prior to their admission to the ICU resulting in a high mortality with a mean age of 64 years and median 68 years in the general ward. The age distribution varies mostly, 41.1%, between 60 -74 years of age. This study again reflected a similar age distribution.

6.3   ADMISSIONS

In the following section, the type of admission and the transfer per speciality has been analysed. In addition, a breakdown has been made into elective versus emergency admissions in order to identify high-risk patients.

6.3.1　Type of admission

In hospital, transfer to a higher level of care was the greatest for patients admitted for medical conditions, followed by orthopaedics and patient admitted for surgical procedures.

In the pilot study, as can be seen in table 6.1, by far the majority of transfers were medical patients; 9 (28.13%). These patients usually have a higher tendency for cardio-respiratory problems that has been shown to be a major contributor to a transfer to a higher level of care. According to Hillman et al (2002:1632) the primary reason for ICU admission from patients who were transferred from general wards were mainly due to cardio respiratory disorder that is consistent with the findings of this study. The fact that all were emergency admissions as depicted in table 6.3, could be taken as evidence.

However, in the comparative study, the majority of transfers were for surgical patients. The only difference in monitoring deterioration, when compared to the pilot study, was that saturations were now routinely preformed in the wards. Although small numbers, more than double the number of transfers occurred in post-operative surgical patients and of those, more than half occurred with 1 day following the surgery. This again confirms the high risk for post-operative respiratory compromise that was now monitored more frequent, contributing to the rise in transfers in this group when compared to the pilot study.

The same distribution was illustrated when comparing patients to transfers. This again confirms that the reason for transfer in general remains the same and is not speciality dependant; that being cardio-respiratory decompensation.

However when doing a statistical analysis on medical versus surgical admissions, no statistical difference could be shown with p = 0.3672

Table 6.1: Type of patient transferred by speciality in May 2005 (n=31) and October 2005 (n=29)

Speciality	May 2005					October 2005			
	Patients		Transfers			Patients		Transfers	
	n	%	n	%		n	%	n	%
Internal Medicine	9	29.03	11	28.95		9	31.03	11	29.73
Surgery	5	16.13	7	18.43		11	37.93	14	37.84
Orthopaedic Surgery	5	16.13	6	15.79		0	0	0	0
Gastro-enterology	3	9.70	4	10.53		3	13.34	6	16.22
Cardiology	3	9.70	3	7.89		0	0	0	0
Obstetrics and Gynaecology	2	6.45	2	5.26		1	3.45	1	2.70
Vascular	1	3.23	2	5.26		2	6.89	2	5.41
ENT	1	3.23	1	2.63		0	0	0	0
Neuro-Surgery	1	3.23	1	2.63		0	0	0	0
Trauma	1	3.23	1	2.63		0	0	0	0
Thoracic Surgery	0	0	0	0		2	6.89	2	5.41
Neurology	0	0	0	0		1	3.45	1	2.70
Total	**31**	**100**	**38**	**100**		**29**	**100**	**37**	**100**

6.3.2 Emergency versus elective admissions

This section compare emergency against elective admissions as depicted in table 6.2.

Table 6.2   Emergency versus elective patients and transfers May 2005 and October 2005

	May 2005					October 2005			
	Patients		Transfers			Patients		Transfers	
	n	%	n	%		n	%	n	%
Emergency	24	77.41	30	78.95		21	72.41	25	67.57
Elective	7	22.55	8	21.05		8	27.59	12	32.43
Total	**31**	**100.00**	**38**	**100.00**		**29**	**100.00**	**37**	**100.00**

In both the pilot and comparative study, there was a predisposition of 3 to 1 for emergency admissions to be transferred. Since patient selection was random this just therefore represents most probably the same patient profile.

The majority of transfers were emergency admissions in the specialities of Medicine and General Surgery and this remained for both study periods. Although no breakdown could be retrieved from the hospital information system as to admitting specialities for the pool of patients sampled, it is the researchers' experience that these represent the major admitting specialities. In a study of by Rose, Byrick, Cohen and Caskenette (1996:333) done on unplanned post-operative patients, the risk of requiring ICU admission was demonstrated as being 1 in 26 for emergency and 1 in 109 for elective cases; representing a four - fold increase in the likelihood of post-operative ICU admission after emergency procedures and is again confirmed by the researchers findings.

Furthermore, Muravchick (2000) cited by Manjula, Lalita and Shilpa (2007) [online] http://www.ispub.com/ostia/index.php?xmlFilePath=journals/ija/-vol13n1/icu.xml found all patients undergoing major or emergency surgery have an increased risk of severe adverse outcomes, including increased mortality. Emergency surgery has an additional risk because the preparation of the patient is not optimum. There is thus minimal time for correctable majors like correction of electrolyte imbalance, blood parameters, dehydration and acidosis, and the patient is in a compromised health status.

When comparing the data sets from the 2 studies no significant difference could be shown for type of transfer with p = 0.3759.

Table 6.3   Emergency and elective admissions transferred to higher level of care per speciality May 2005 and October 2005

| Speciality | May 2005 | | | | | October 2005 | | | | |
| | Emergency | | Elective | | Total | Emergency | | Elective | | Total |
	n	%	n	%	n	n	%	n	%	n
Internal Medicine	9	100	0	0	9	9	100	0	0	9
Surgery	3	60	2	40	5	6	54.55	5	45.45	11
Orthopaedic surgery	3	60	2	40	5	0	0	0	0	0
Gastro-enterology	3	100	0	0	3	2	66.67	1	33.33	3
Cardiology	2	66	1	33	3	0	0	0	0	0
Obstetrics and Gynaecology	1	50	1	50	2	1	100	0	0	1
Vascular	0	0	1	100	1	2	100	0	0	2
ENT	1	100	0	0	1	0	0	0	0	0
Neuro-Surgery	1	100	0	0	1	0	0	0	0	0
Trauma	1	100	0	0	1	0	0	0	0	0
Neurology	0	0	0	0	0	1	100	0	0	1
Thoracic surgery	0	0	0	0	0	0	0	2	100	2
Total	**24**	**77.42**	**7**	**22.58**	**31**	**21**	**72..41**	**8**	**27.59**	**29**

6.4 DETERIORATION TIME

In the following section, the deterioration times as recorded by nursing personnel and the actual deterioration times is provided and compared.

6.4.1 Deterioration time as recorded by nursing personnel

This section represents the deterioration times as recorded by nursing personnel in the patients' health records. The deterioration time was defined as starting from the first entry of deterioration in the cardex and/or intervention to limit deterioration and ended with the time of decision to transfer (thus eliminating the time taken to prepare the bed in the unit of higher care). The deterioration time discussed in this section is thus the times recorded by the nursing personnel and not necessarily the true time of deterioration.

In the pilot part of this study 6 of the 38 transfers (15.79%) had no entry in the patient health record that documented deterioration; a rather poor performance on recordation. A study by Cullinane et al (2005:1) consistently commented on the poor documentation of a large number of medical records.

Figure 6.3 depicts deterioration times in minutes as recorded by nursing personnel May 2005.

	Ward	High Care
Shortest	0	0
■ Longest	560	1050
◆ Median	0	35
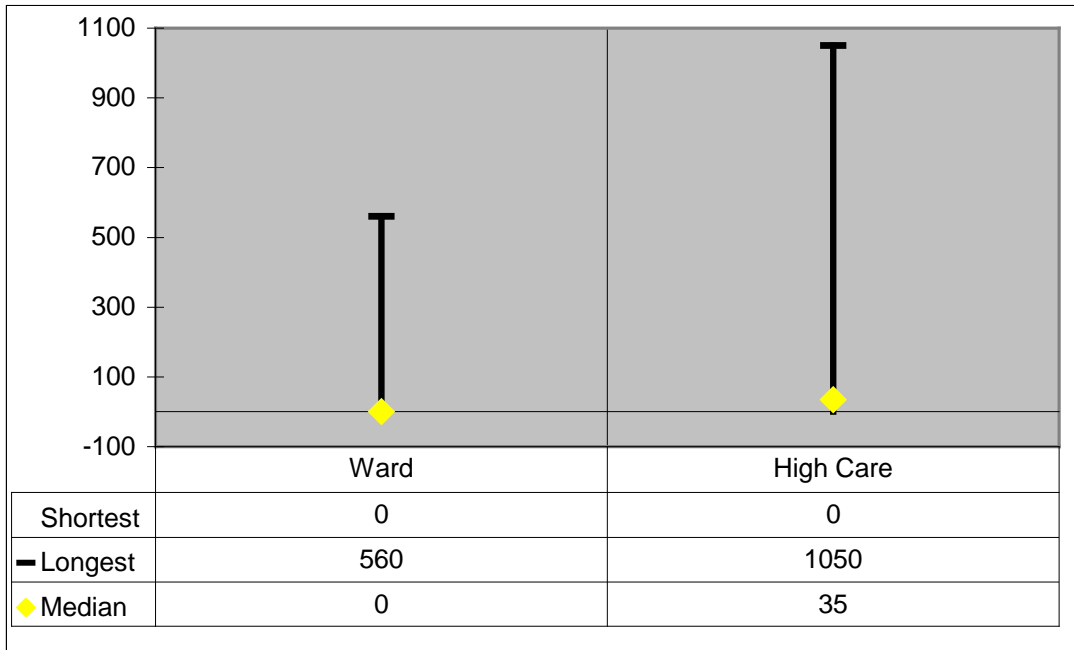
Figure 6.3   Deterioration times in minutes as recorded by the nursing personnel

May 2005

Median times for charted deterioration for the wards in the pilot study were 0 minutes for the wards and 35 for the high care unit. The data of the high care unit is however affected by an especially long deterioration for 3181 minutes, which skews the data significantly, this having been a patient post total knee replacement with borderline cardio-respiratory function transferred after 52 hours to ICU for non-invasive ventilation. Overall, data for the 2 categories are quite comparable bearing in mind the small numbers due to poor recordation.

Looking at the comparative study recordation could be retrieved in 24 of 37 transfers (64.86%). This represents a 20% decrease in recordation. Interventions to limit deterioration did not include improving or monitoring of recordation. The result is however disappointing since it would be accepted to improve as a secondary result. Although the median for the ward is similar the range seems to be much less that in the pilot study most likely as a result of the interventions aimed at the wards. High care performed similar that in the pilot study most probably due to the lack of intervention.

Figure 6.4 depicts deterioration times in minutes as recorded by nursing personnel October 2005.

	Ward	High Care
Shortest	0	0
■ Longest	365	3975
◆ Median	0	45
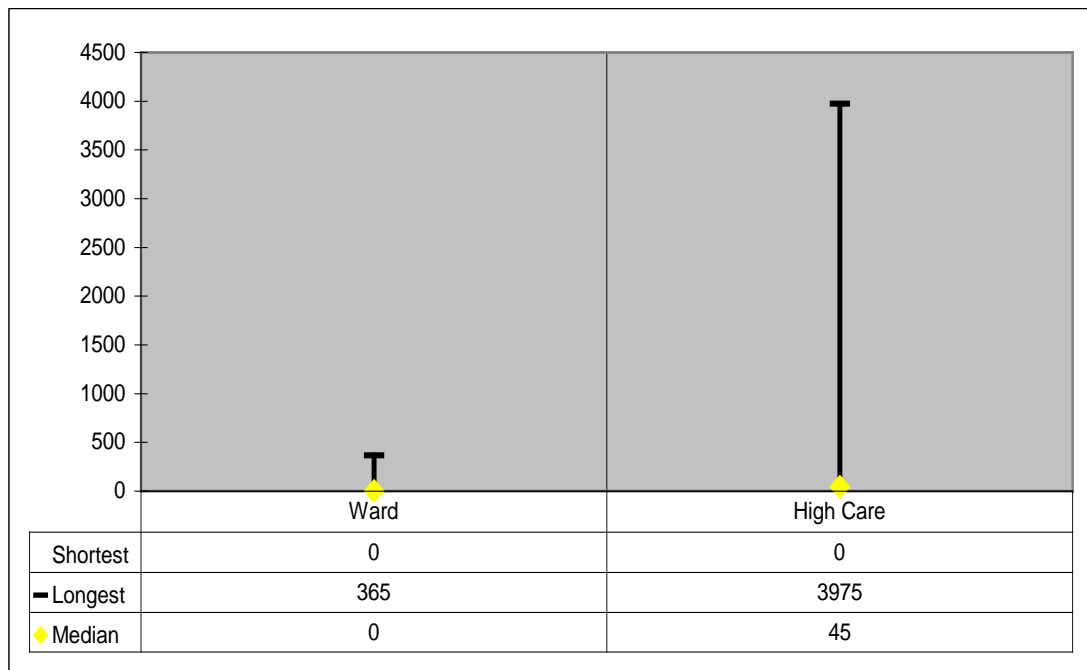
Figure 6.4   Deterioration times in minutes as recorded by the nursing personnel

October 2005

The short median deterioration times as recorded by nursing personnel (both pre and post intervention) implies that the nursing personnel do not recognise patient deterioration and do not feel empowered to react on the patients deterioration. Nursing personnel prefers that the treating physician should be informed as soon as possible to address the problem. The real proof of the intervention therefore will lie in the fact whether true deterioration as per chart review has occurred which will be discussed in the following section.

According to Damon and William (2002:2), often physicians and nurses may not have received suitable training in the care of seriously ill patients and consequently, may be poorly prepared to identify critical changes in a patient's status. This comment is consistent with the findings in this study.

6.4.2   Chart review deterioration time

The researcher and a qualified intensivist reviewed the patient's health record for the first signs which would herald deterioration, paying attention to especially abnormalities in vital signs, as indicted per QRP, which would then represent the patient's true deterioration as close as possible (taking into account problems with recordation). The true deterioration time is more important since it more accurately reflects the happenings in the wards and is less reliant on cardex recordation and interpretation by less skilled nursing personnel. It of course also has a much higher impact on the final outcome of the patient.

The results of the true deterioration times for May 2005 are listed in figure 6.5.

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Figure 6.5   True deterioration time as determined by chart review by researcher and intensivist May 2005

True median deterioration times are 387.5 minutes [6 hours 45 minutes] (versus 0 minutes recorded) for the wards and 300 minutes [5 hours] (versus 35 minutes recorded) for high care. Although appearing long, this concurs much more with published data, suggesting that most patients will exhibit major abnormalities in vital signs as long as 8 hours before ICU admission. Hillman et al (2002:1629) mention that specific concern was expressed in the patient notes by attending nursing and junior medical personnel in 70% of all patients within 8 hours of admission to the ICU from the general wards and in 43% of patients during the 8- to 48 hour period before admission. This is consistent with previous studies such as Hillman et al (2002:1634) also described that there is a lack of recognition of deterioration of patient condition, early recognition and response, and timely involvement and input from senior nursing personnel and doctors. McArthur-Rouse (2001:696) explored this phenomenon and concluded that suboptimal care in general wards contributes to physiological deterioration with major consequences on morbidity, mortality, and requirement for intensive care treatment. McQuillan et al (1998:1853) which have shown attending nursing personnel not to have appropriate skills and knowledge about seriously ill patients in the general ward environment.

When looking at the comparative interval following the interventions, comparative median times are now 175 minutes [2 hours 55 minutes] vs. 387.5 minutes [6 hours 45 minutes] for the wards and 465 vs. 300 minutes for high care. Since interventions were aimed at ward level, the decrease in the deterioration is a direct result of those efforts, improving deterioration times to well below that of published data. The chart review indicated that the nursing personnel recognises and documented deterioration much quicker, which implicates the clinical markers training program and the implementation of Outreach made a significant difference in recognising and documentation of patient deterioration.

Since no intervention at that time frame was aimed at high care, the failure to show improvement can be expected. The increased deterioration time due to the small amount of data can therefore simply be explained due to the sample size.

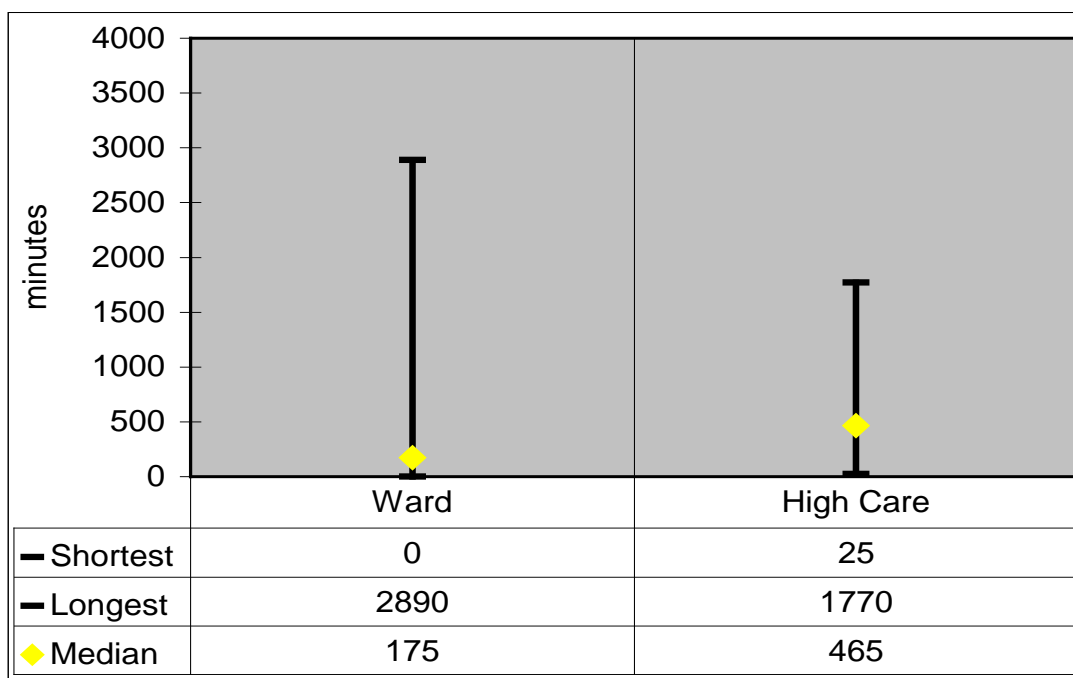The results of the true deterioration times for October 2005 are listed in figure 6.6.

	Ward	High Care
▬ Shortest	0	25
▬ Longest	2890	1770
◆ Median	175	465

Figure 6.6   True deterioration time as determined by chart review by researcher and intensivist October 2005

Due to a large variance in a relatively small sample size no statistical difference could be proven (F ratio 3.5729 and $p = 0.0726$) but median times do differ significantly. Follow up studies are therefore in process to proof this point.

Deterioration times were subsequently divided into the following time frames:

o   Those shorter than 6 hours: Since observation of vital signs is taken at a 4 hourly interval as a rule, problems here would indicate a lack of understanding and

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interpreting abnormal vital signs and or patient condition (auxiliary and staff nurses in the wards and registered nurses in the high care unit).

o Between 6 to 12 hours: More senior staff should as a routine see patients at least once per shift and problems here would then suggest a misinterpretation by more senior staff (registered nurses in the wards and shift leaders in the high care unit) or alternatively limited patient contact by the above.

o Between 12 to 24 hours: Problems here are likely to be due to incorrect handing over procedure or again due to limited patient contact by senior staff and or all of the above.

o More than 24 hours: As a rule, the physician in charge of the patient sees them at least a once in 24-hour interval. Therefore, problems with deterioration in this interval should represent problems with recognition of deterioration by the physician or other facts not recorded that were weighed in the decision not to transfer the patient.

The comparison for the breakdown in deterioration times are represented in Figure 6.7 for the wards and figure 6.20 for the high care and figure 6.21 cumulative for May 2005.
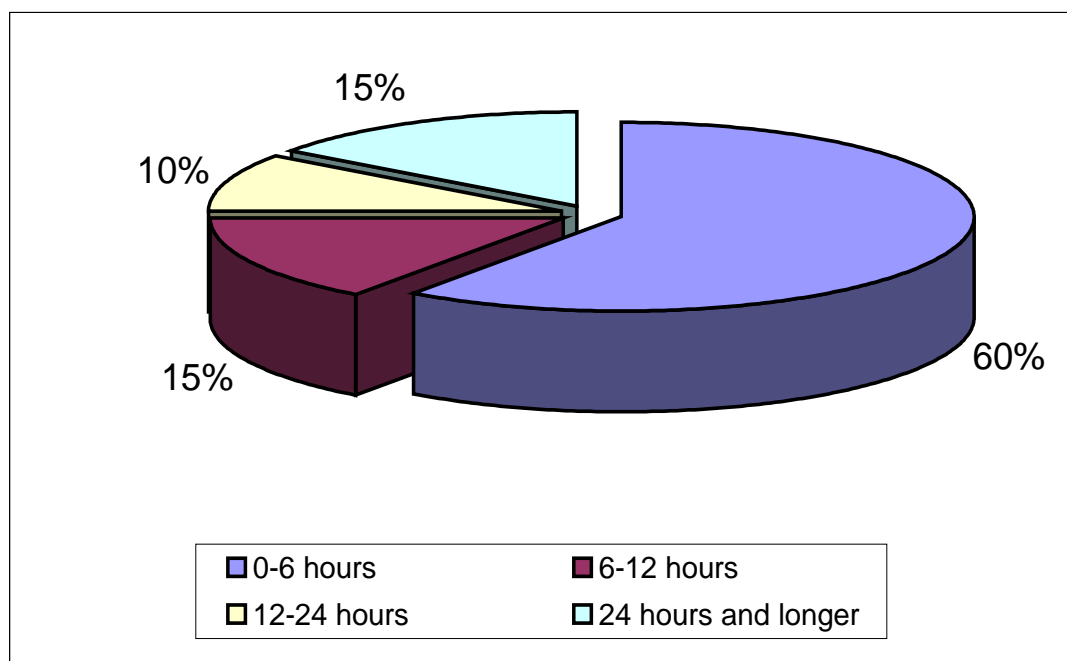
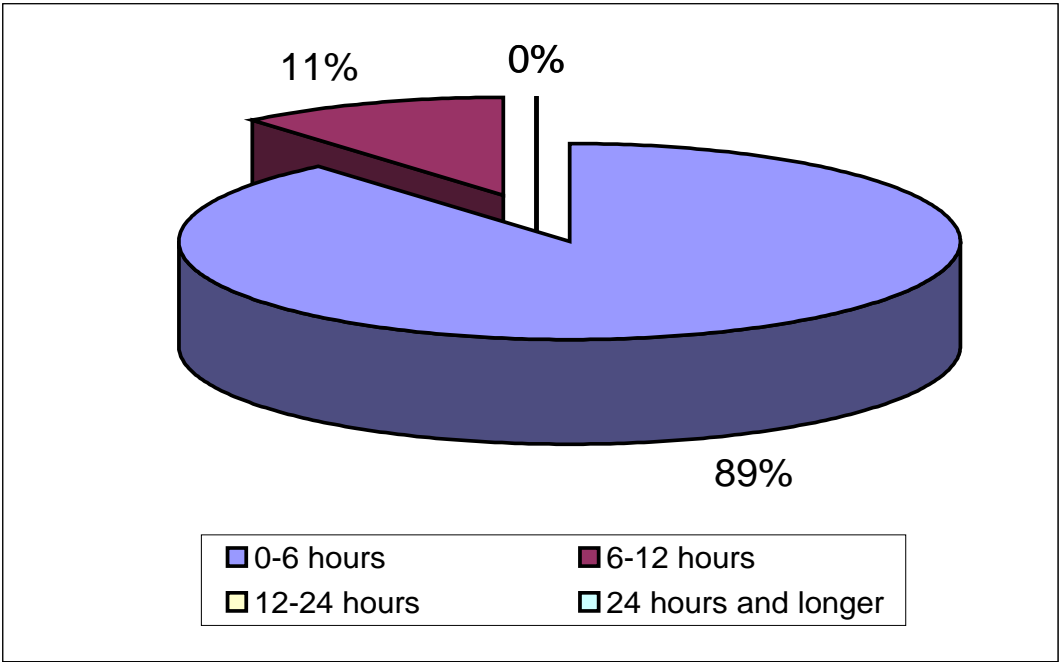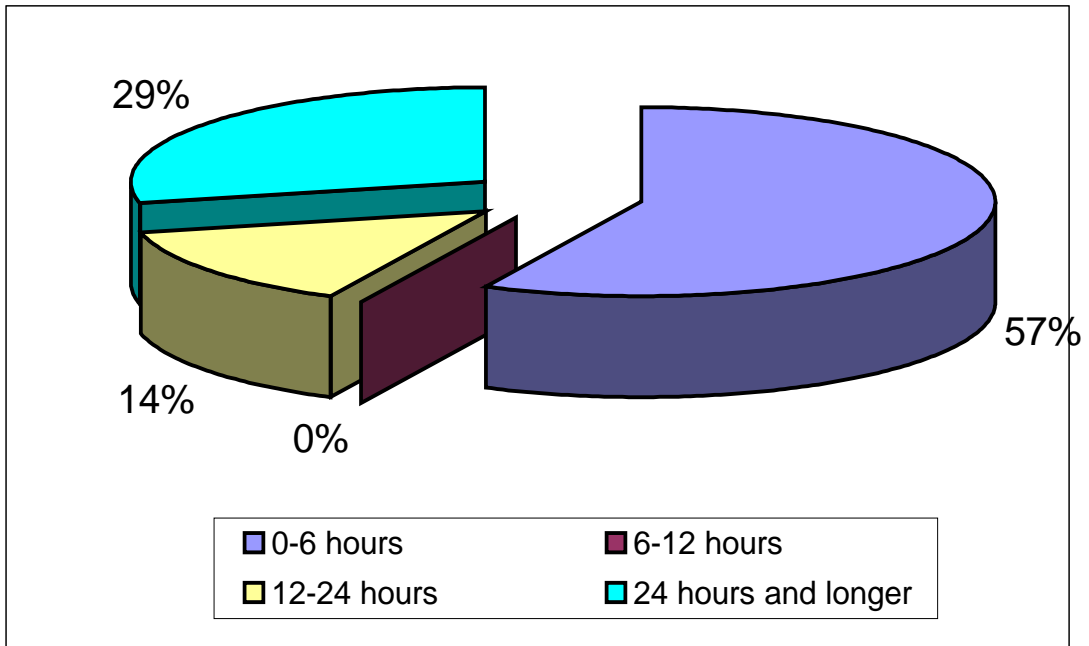*Figure 6.7   Breakdown of true deterioration times for the Wards May 2005*
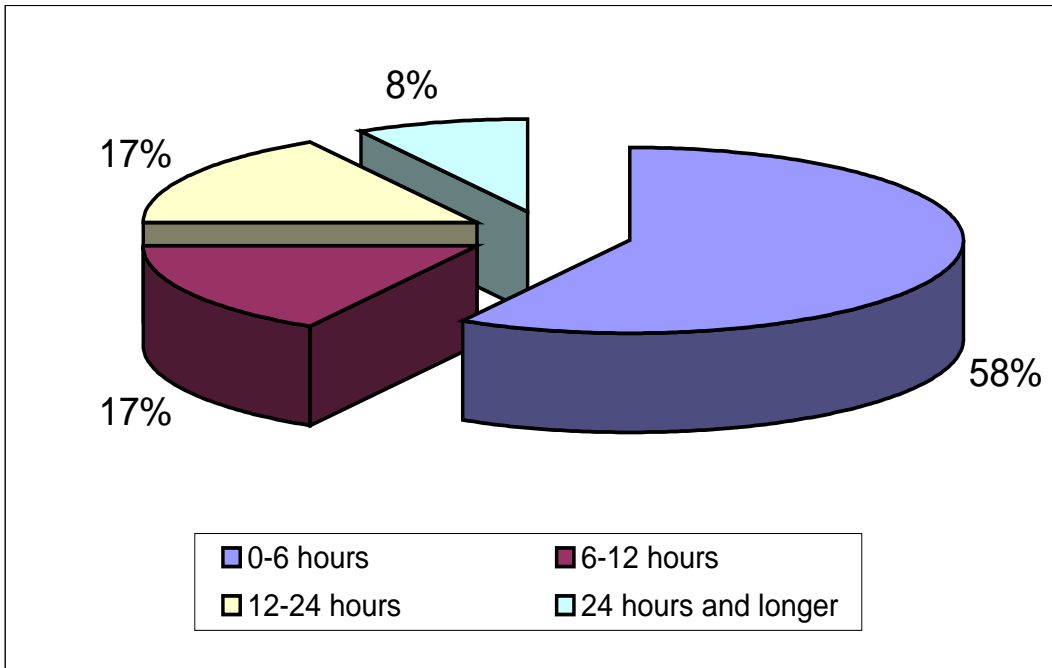
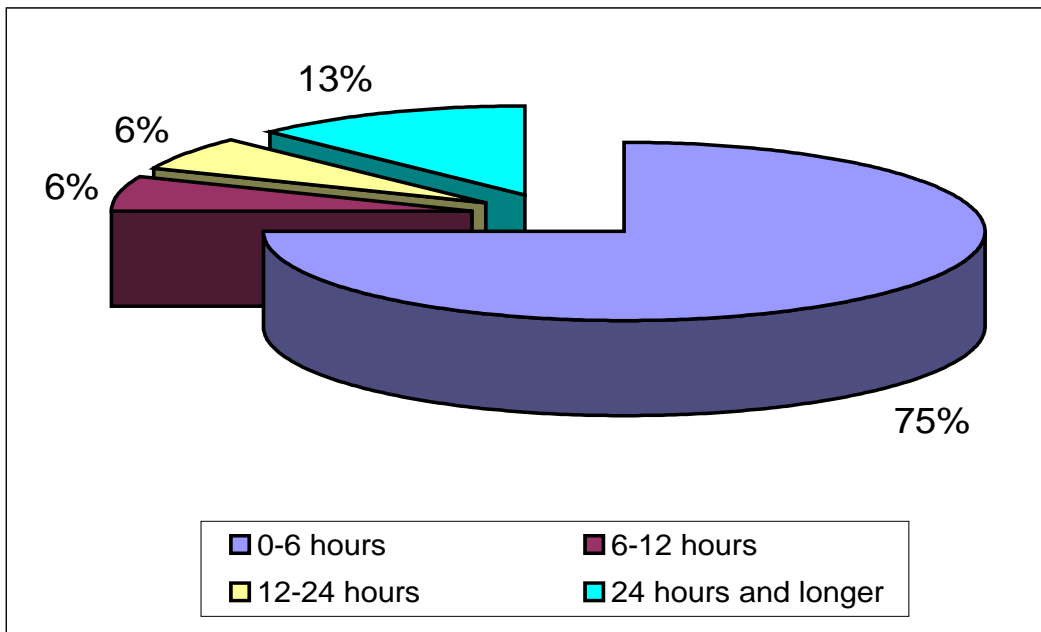*Figure 6.8   Breakdown of true deterioration times for High Care May 2005*
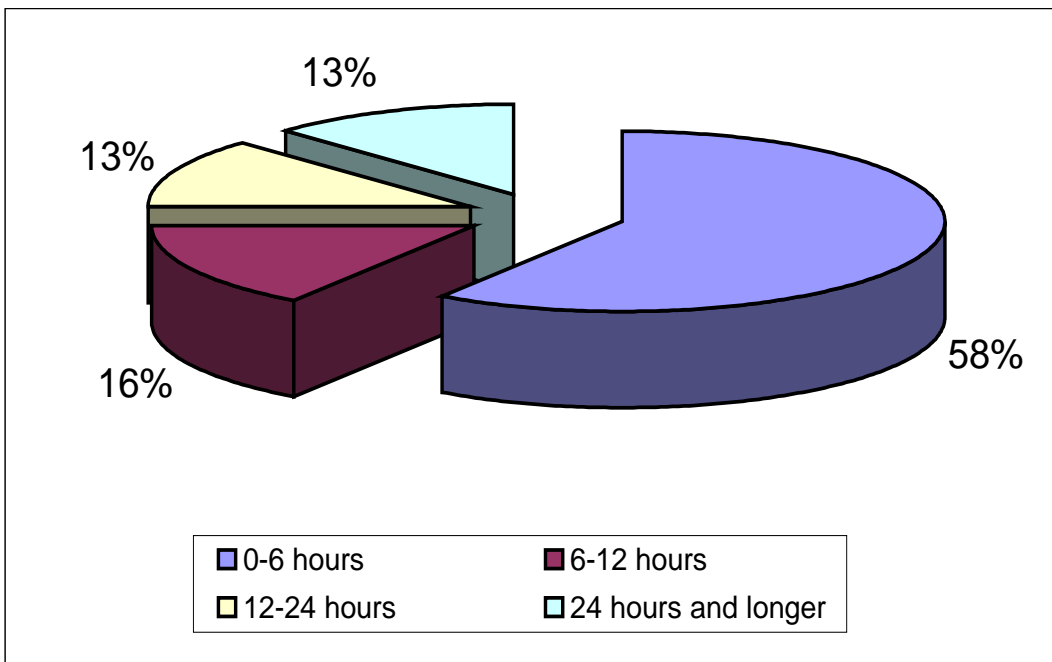
Figure 6.9   Breakdown of true deterioration times Overall May 2005 (Wards and High Care)

From the above it can be seen that in 57.50% of transfers, charted deterioration took less than 6 hours (with a median time in this group of 75min). Fifteen percent of transfers occurred between 6 to 12 hours and 12.50% between 12 to 24 hours. The same amount of transfers (12.50%) occurred with a deterioration time of longer than 24 hours. This finding compares very well with published data of significant abnormal values being present in a large group of patients admitted to ICU for 8 hours before transfer (keeping in mind that these are not necessarily the true deterioration times).

The comparison for the breakdown in deterioration times are represented in figure 6.10 for the wards and figure 6.21 for the high care and figure 6.21 cumulative for October 2005.

Figure 6.10   Breakdown of deterioration times for the wards October 2005

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Figure 6.11   Breakdown of deterioration times for High Care October 2005

Figure 6.12   Breakdown of deterioration times overall October 2005

Looking at the charted deterioration times for the ward most patients now are being transferred within the 6-hour interval. Interventions in this period included education

of normal vital signs values to those taking the observations and activation of the in-hospital Outreach which significantly improved percentage of patients being transferred (89% vs. 60%). It is also interesting to note that no patients are being transferred past 12 hours most probably due to increased communication on both nursing and nurse-physician level.

No specific intervention during the time interval between the 2 observations was done in high care, therefore on change can be expected. Also, remember the small sample size of the high care transfers, which can influence the outcomes. The only difference is the shift towards longer deterioration times

6.4.3   Comparison and analysis of nursing and chart review deterioration times

In this section the true and recorded deterioration times were compared and the level of admission to the higher dependency unit was analysed. For the pilot study the time of true deterioration concurred with those of the nursing personnel in 5 transfers (21.74%). For the comparative study concurrence of deterioration times was much higher at 66.67% (20 transfers). The analysis of concurrence reveals a median of 175 minutes vs. 0 minutes and an average of 606 minutes vs. 76 minutes. This improvement in concurrence is an improved recognition in deterioration that can be attributed directly to the institution of the in-hospital outreach program between the two study periods.

6.5   REPORTING

In the following section the researcher simply looks at whether the nursing personnel reported the patient's deterioration to the treating doctor.

6.5.1 Reporting of deterioration

In the pilot study, data was available for 35 transfers (92.11%). In 25 (65.79%) of the transfers the doctor was informed by nursing personnel of the deterioration and in 10 (26.32%) not. Of these ten transfers, eight were from the wards. In 3 cases (7.89%) there was no entry in the patient's health record on the fact of reporting deterioration to the treating specialist. Figure 6.13 portrays the reporting of patient deterioration by nursing personnel to the treating specialist May 2005.
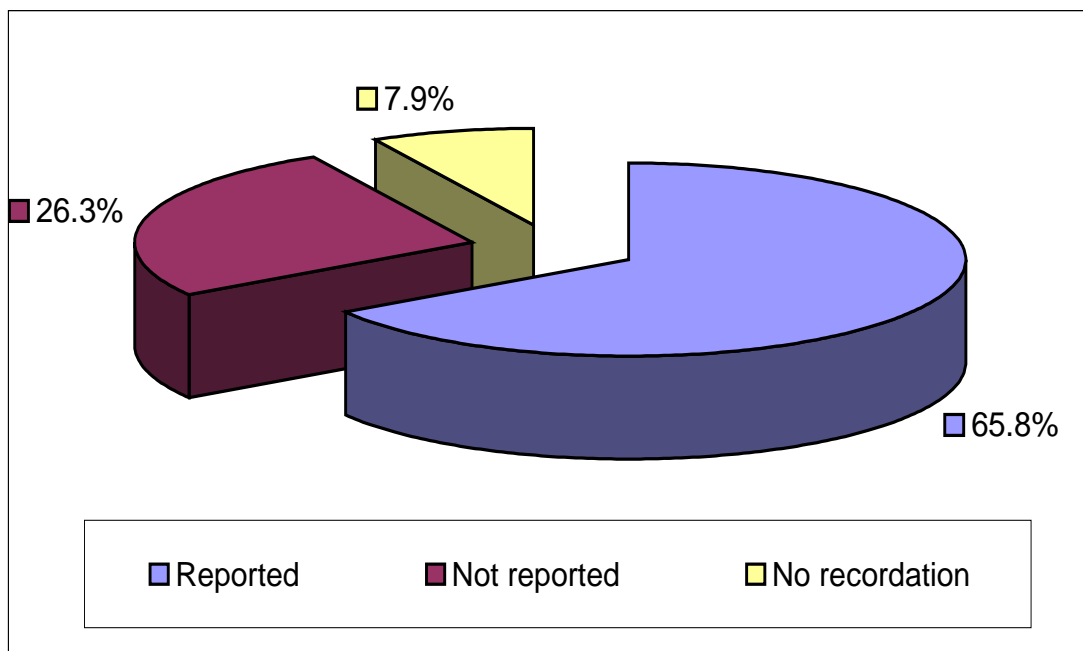
Figure 6.13   Reporting of deterioration May 2005 (n=35)

A study by Young et al (2003:80-83) showed a lack of physician notification and delays in physician bedside evaluation appear to have contributed to the delays in transfer. Their findings should be generalised with caution. However, this investigation suggests that timely evaluation and treatment of hospitalised patients showing evidence of physiologic instability may reduce the high mortality rate currently seen in hospitalised patients transferred to the ICU.

Figure 6.14 portrays the reporting of patient deterioration by nursing personnel to the treating specialist October 2005.
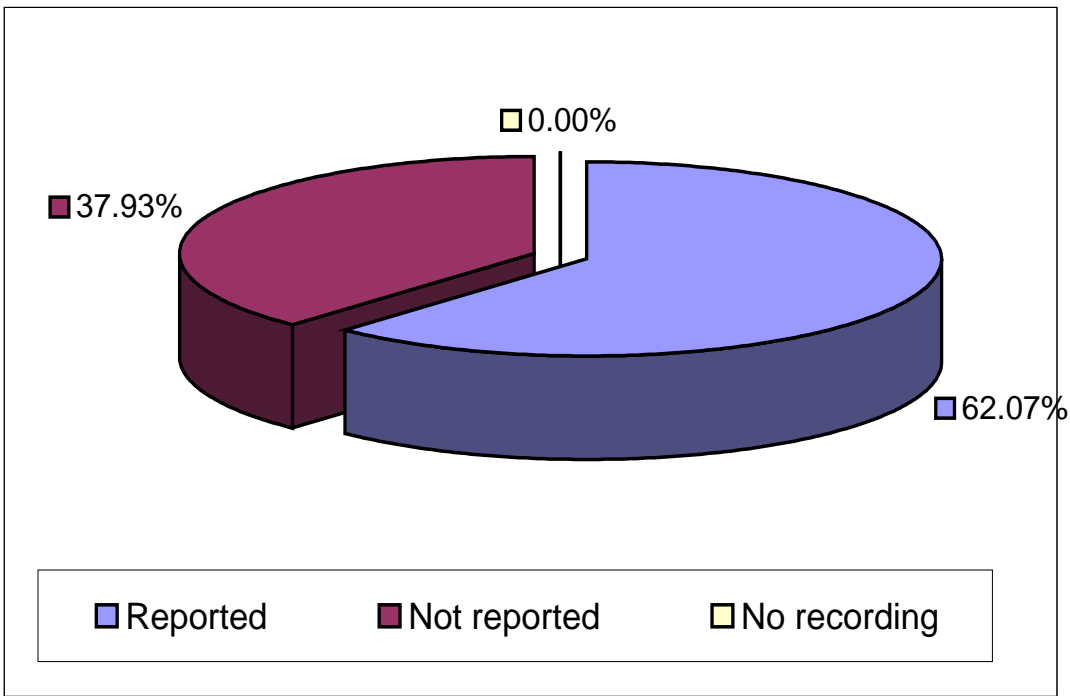

Figure 6.14   Reporting of deterioration October 2005 (n=29)

In the comparative study, data on whether the doctor was informed on the deterioration is available for 29 transfers. In 10 (62.07%) of the transfers the doctor was informed and for 11 (37.93%) not. Of these 11 transfers, seven (63.63%) were from the wards and 4 (36.36%) from high care. The lack of increasing reporting in the intervention period can be explained by the fact that the in-hospital Outreach personnel contacted the treating physician directly rather than through the ward personnel. Few recorded entries could be found in the health records on reporting of deterioration by the night Outreach.

Franklin and Mathew (1994:244) determine that nurses or physician documented deterioration into the patient's condition within 6 hours of cardiac arrest. Common finding included a failure of the nurse to notify a physician of deterioration in the patient's status. In a study conducted by Andrews and Waterman (2005:481),

participants reported that quantifiable evidence is the most effective means to referring patients to doctors, and the Early Warning Score achieves this by improving communication between professionals. Rather than reporting changes in individual vital signs, the Early Warning Score resulting in a much more convincing referral. It gives nurses precise, concise and unambiguous means of communicating deterioration and confidence in using medical language. Nurses are empowered and doctors can focus quickly on identified problems. The implementation of the Quick Response Parameter's in the hospital under study warrants further investigation to quantify evidence of the result in the outcome of patients to generalise the theory of Andrews and Waterman.

Åneman et al (2006:1263) mentioned that a significant body of evidence suggests the management of the acutely ill in-hospital patients can be improved by system changes which involve a medical emergency team, outreach services or a rapid response team. These teams have demonstrated significant reductions in the incidence of cardiac arrests, unexpected deaths and unplanned ICU admissions in several before-and-after trials.
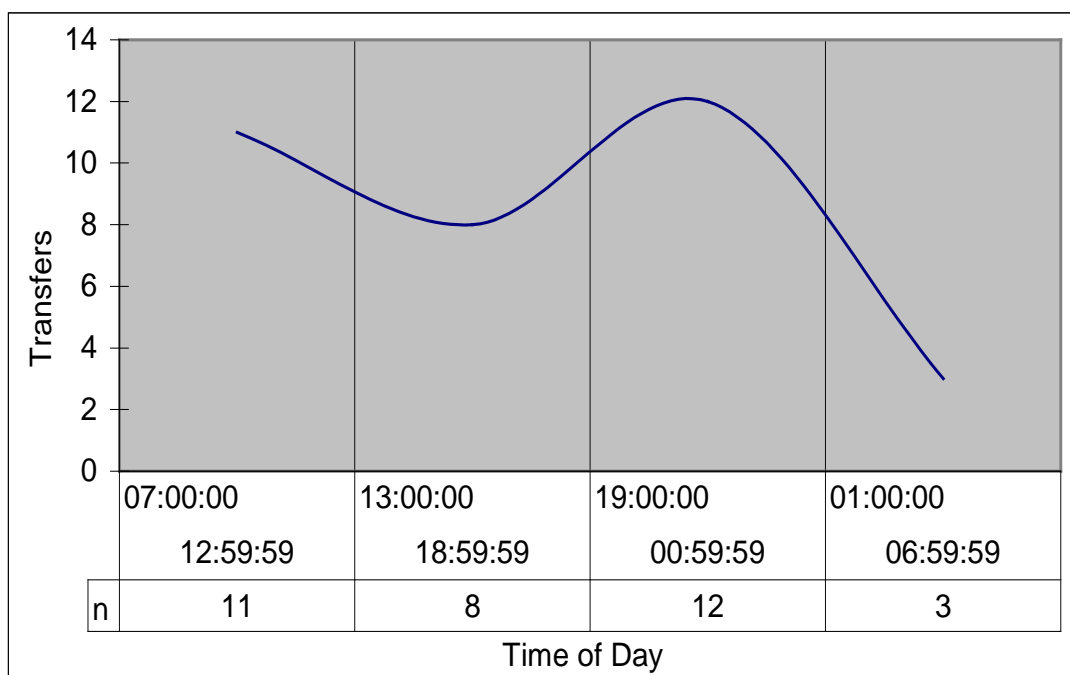
6.6   TRANSFERS

This section encompass the time of doctor's request to transfer, the time of day of transfer, the spread of duration from specialist request to transfer to actual transfer. The duration of transfer compared to time of day and the type of transfer are also included in this section.

6.6.1   Time of request for a transfer

Looking at the time of transfer it became necessary to look at the time lapsed from the request of transfer to the actual time that the patient was transferred; thereby identifying times during the day when logistic problems interfered with the process to

prepare the bed in the higher care unit. This also served to look at the accuracy of documentation in the patients' health record to see whether all requests for transfers were indeed entered into the patient's health record.

Figure 6.15 depicted the time of the physicians request for the bed in the higher level of care during May 2005.

Figure 6.15   Time of doctor's request for the bed in the higher level of care

May 2005 (n=34)

In the pilot study 34 (89.47%) of the 38 transfers had the request for transfer documented. There was a tendency of increased requests, 11 (32.35%) during early day and 12 (35.29%) during early night shifts as shown in figure 6.15. Comparing this to the actual time of transfer, it becomes clear that there is an increased delay in preparing the bed in the unit of higher care during the early day shift. This most probably represents the high demand on beds in the units of higher care and ward rounds not having been completed during early day shift when the beds are requested and needed. Often,

logistics, such as morning doctors' rounds made it more difficult to transfer patient to a higher level of care timeously.

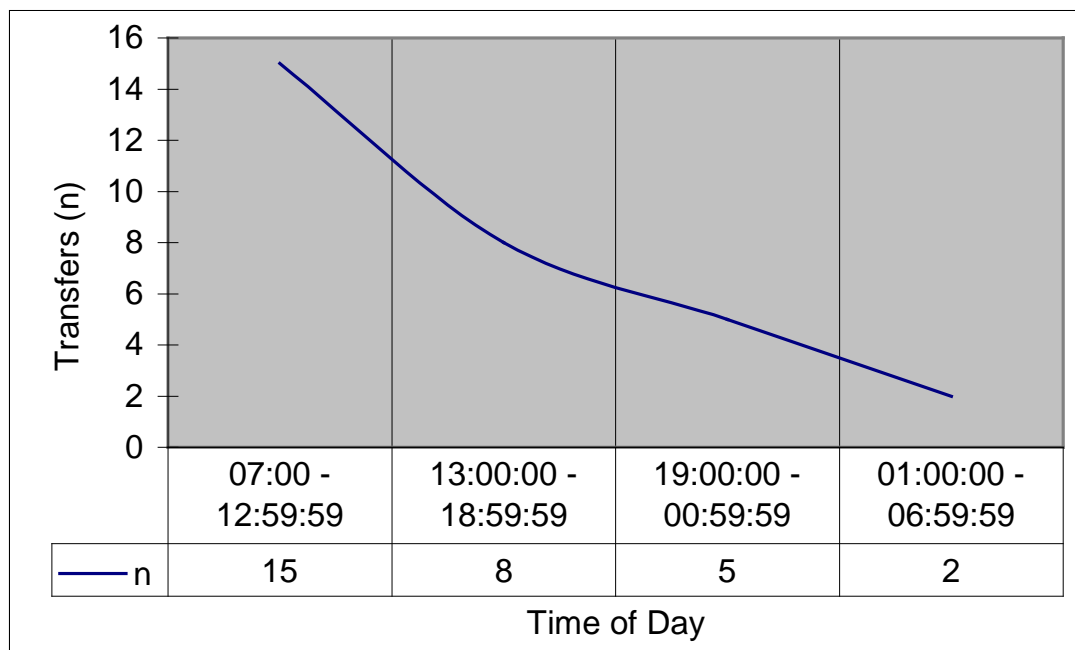Figure 6.16 depicted the time of doctors request for the bed in the higher level of care during October 2005.

Figure 6.16   Time of request for the bed in the higher level of care

October 2005 (n=30)

In the comparative study 30 (88.24%) of the 34 transfers had the request for transfer documented. Since intervention aimed at improving recognition of deterioration as well as the management of deterioration, the failure to increase the accuracy of documentation as a secondary effect is not surprising.

Figure 6.16 indicate that there is a tendency of increased requests from the treating doctor to transfer the patient to a higher level of care during early day, 15 (50%) which indicated that these patients were identified during the early morning shift (01:00 – 06:59 hours). It is clear that fewer patients were identified on the early night shift, which can indicate the involvement of Outreach. Comparing this to the actual time of transfer, it becomes clear that there is a decreased delay in preparing the bed in the unit of

higher care during the early day shift compare to May 2005. This improvement was most probably due to intervention of Outreach. The time of transfer disproportional increased on early shift until midday shift. At the time of the study Highcare, nursing personnel was not involved in the transfer processes.

Twenty-nine (93.55%) of the total of 31 transfers in comparison to the thirty four (89.47%) of the total of 38 transfers in May 2005 transferred to a higher level of care, the request from the treating doctor to transfer the patient to a higher level of care was documented in the patients' health records. This showed a remarkable improvement of 4.1% in documentation in the patient's health records. This indicates the impact of Outreach training responsibility to improve on recordation.

6.6.2   Time of day of transfer

Figure 6.17 illustrates the time of actual transfer as divided into time frames during May 2005.
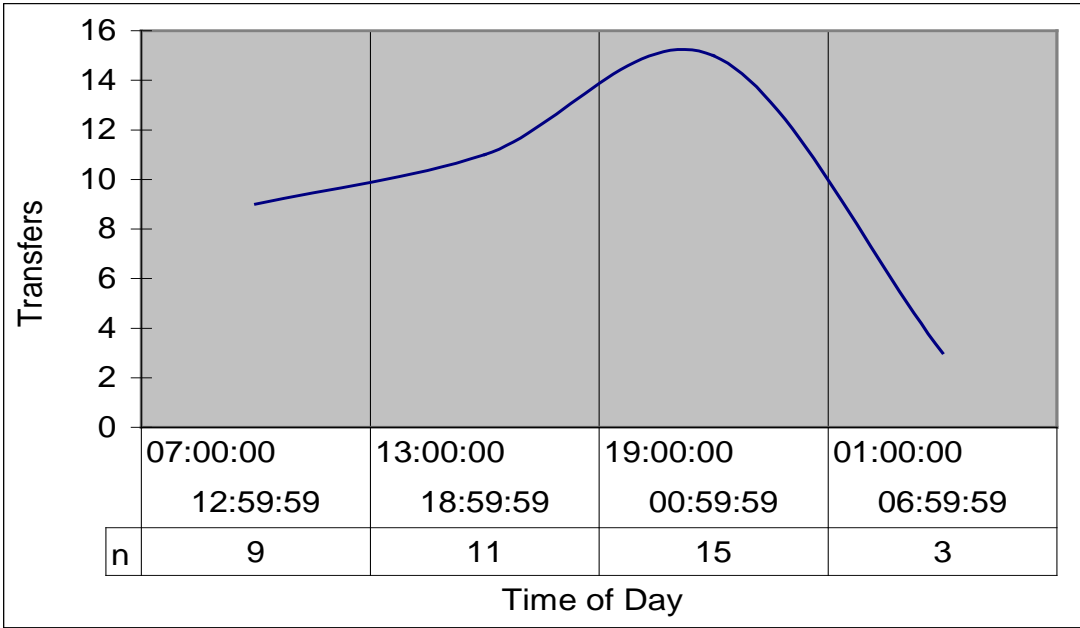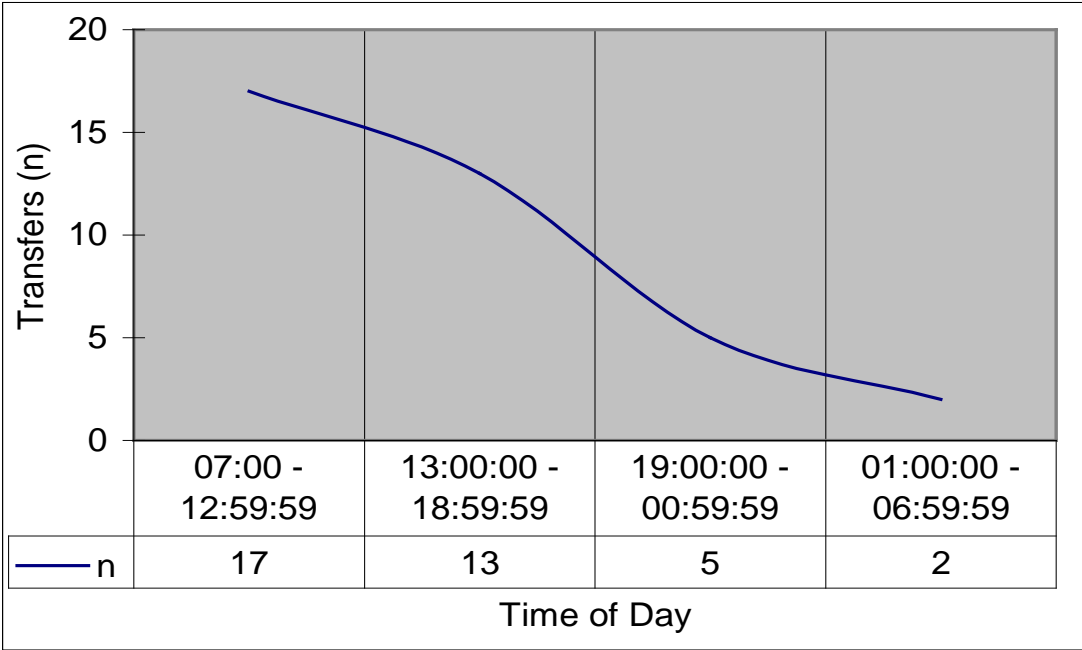

Figure 6.17   Time of actual transfer as divided into time frames May 2005 (n=38)

In the pilot study it is evident that more transfers, 20 (52.63%) occurred during the day shifts (07:00 until 18:59) when compared to the 18 during the night shifts (19:00 until 16:59). There is however a peak increase in the early night shift (19:00 to 00:59) accounting for 39.47% of all transfers.

Figure 6.18 illustrates the time of actual transfer as divided into time frames during October 2005

Figure 6.18 Time of actual transfer as divided into time frames

October 2005 (n=37)

In the follow up study, much more transfers occurred during the day shifts; 81.08% when compared to 52.63% during May 2005. The peak incidence in the early night shift has decreased (13.51% vs. 39.47%). There is however a clear increase in transfers during the early morning shift (07 until 12:59); 45.95% vs. 23.68%). This is attributed to the increased involvement of Outreach in their management of patients at risk. Involvement in the beginning of the process was especially active during the day and less so at night when the night manager took on the added responsibility of looking

after these patients. The outreach nursing personnel were also active involved in identifying a bed in a higher care unit as seen in figure 6.19 and figure 6.20 (refer to time taken to transfer patient)

This study showed a significant improvement in the decreased night transfers.

6.6.3 Time taken from request for bed till actual transfer

Figure 6.19 portrays the spread of duration taken from the time taken from doctor's request for a bed to transfer patients to a higher level of care till the actual transfer May 2005.

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Figure 6.19   Time taken from doctor's request for bed in higher level of care till actual transfer May 2005 (n=35)

Looking at the time from request for a bed in the higher level of care to the time of actual transfer, the median time was 65 minutes and a mean of 78 minutes with a range from 0 to 285 minutes. The distribution is shown in figure 6.19.

More specific information on the two long delays (more than 270 minutes) shows one case where additional examinations requested by 1 of the 3 treating specialists delayed the transfer. In the second case, an early morning request (06h15) resulted in a long waiting time.

Figure 6.20 portrays the spread of duration taken from the time taken from doctor's request for a bed to transfer patients to a higher level of care till the actual transfer October 2005.
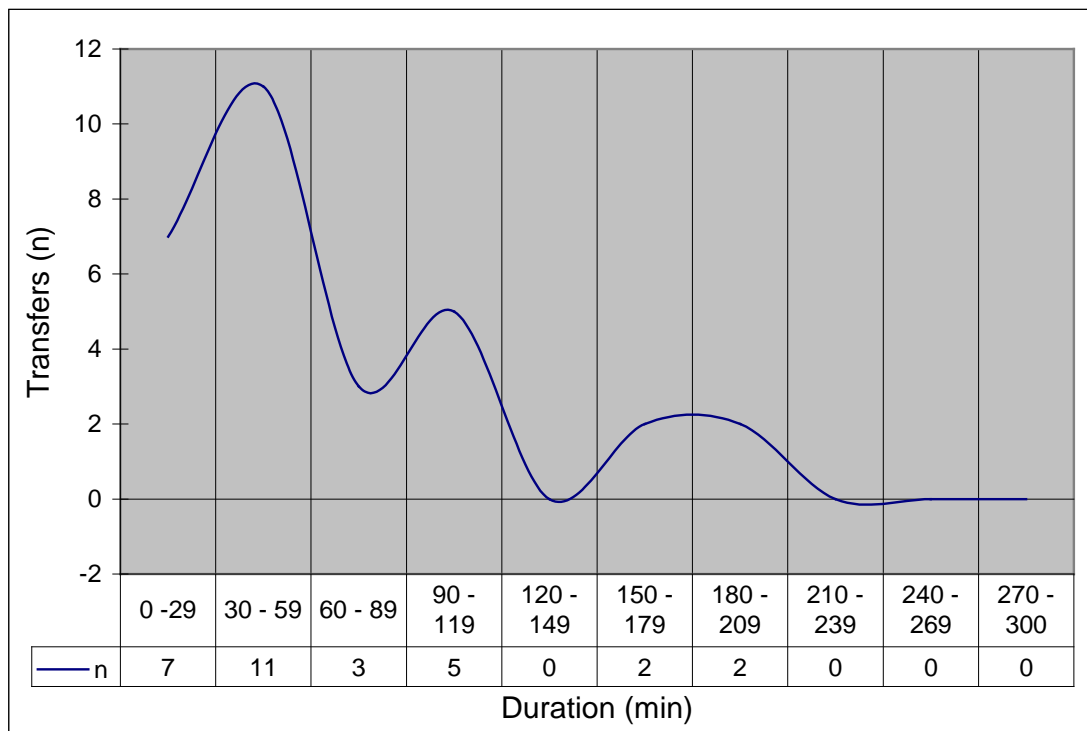
	0 -29	30 - 59	60 - 89	90 - 119	120 - 149	150 - 179	180 - 209	210 - 239	240 - 269	270 - 300
— n	7	11	3	5	0	2	2	0	0	0

Duration (min)

Figure 6.20   Time taken from doctor's request for bed in higher level of care till actual transfer October 2005 (n=30)

Looking at the time from request for a bed in the higher level of care to the time of actual transfer, the median time was 50 minutes and a mean of 60 minutes with a range from 0 to 195 minutes. The distribution is shown in figure 6.20. The spread shows an 18 minutes quicker response to the doctor's request until the actual transfer due to the involvement of Outreach.

Figure 6.21 portrays the spread of duration taken from the time taken from doctor's request for a bed to transfer patients to a higher level of care till the actual transfer May 2005 and October 2005.
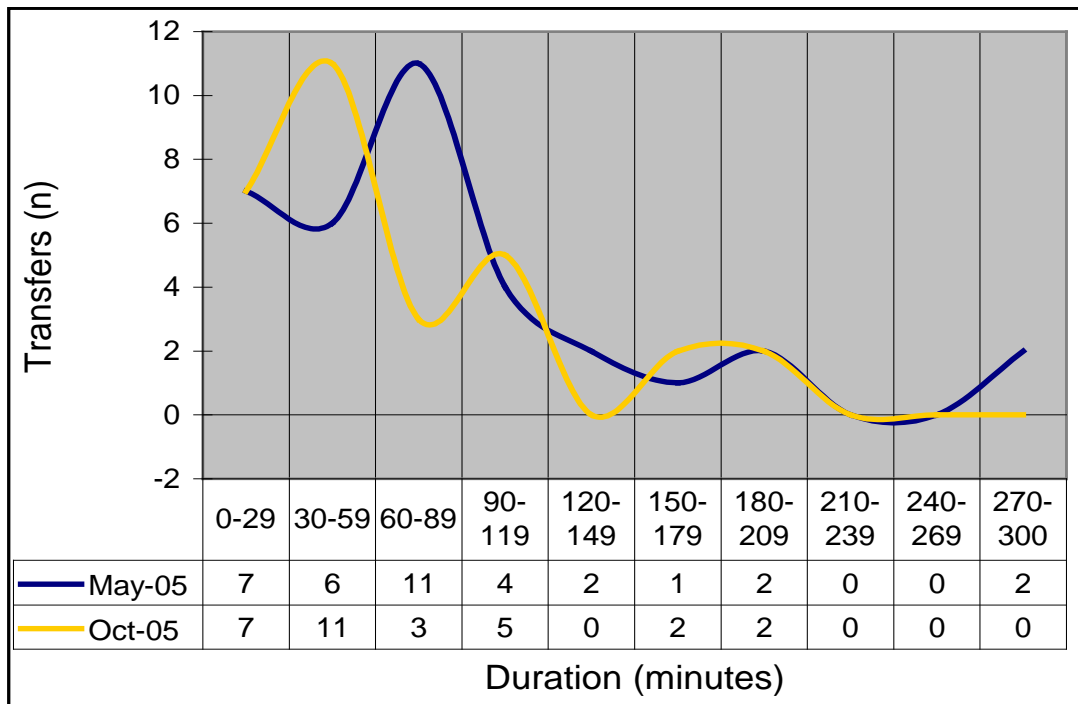
	0-29	30-59	60-89	90-119	120-149	150-179	180-209	210-239	240-269	270-300
May-05	7	6	11	4	2	1	2	0	0	2
Oct-05	7	11	3	5	0	2	2	0	0	0

Duration (minutes)

Figure 6.21   Time taken from doctor's request for bed in higher level of care until actual transfer May and October 2005 (n=65)

Looking at the comparative figure 6.21, reveals that 37.14% of transfers were within 59 minutes of doctor's request until actual transfer compared to 60% during October 2005. It shows a 22.86% improvement to transfer patients within 59 minutes, which means these patients can benefit from early intervention and treatment in an appropriate level of care.

The deficit of available beds, which develops during the early dayshift, is corrected by the end of dayshift. The conclusion therefore seems to be that more beds are available by the "end-of-business"; therefore, transfer times are decreased. No unduly delays occurred during the handover from day to night nursing personnel and the increase of transfers during that period is therefore either due to an increase in deterioration of the patient at that time or a delay in recognising the deterioration.

6.6.4   Duration of transfer process

In this section, the duration of the transfer process compared to the time of day is shown in table 6.22.

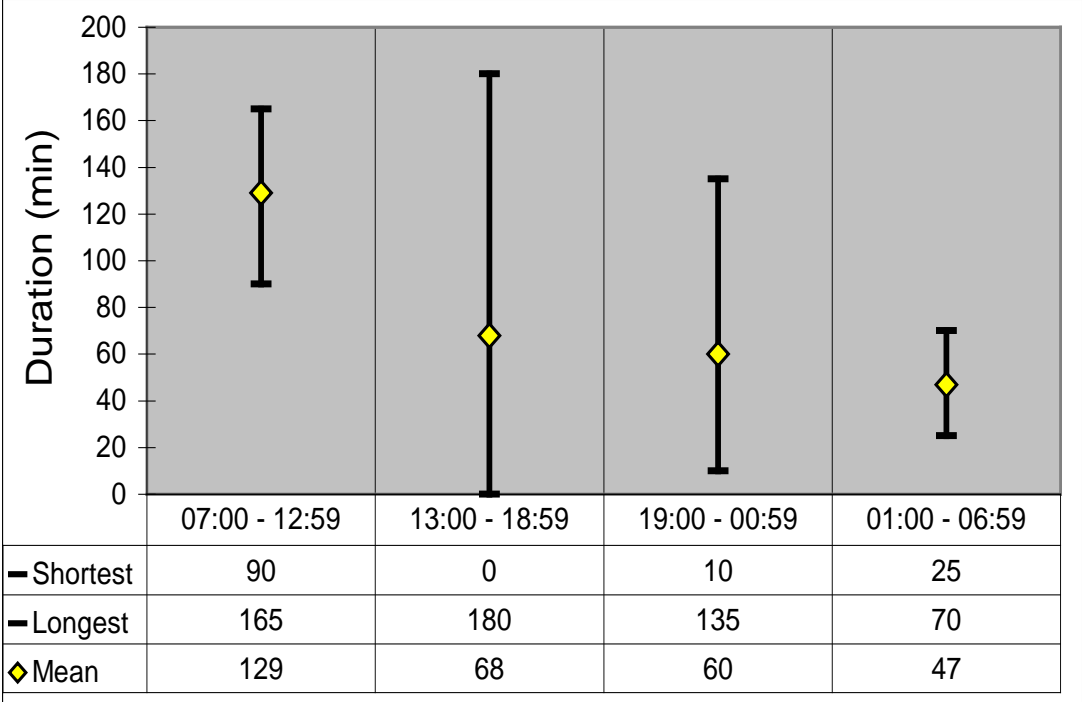|	07:00 - 12:59	13:00 - 18:59	19:00 - 00:59	01:00 - 06:59
▬ Shortest	90	0	10	25
▬ Longest	165	180	135	70
◇ Mean	129	68	60	47

Figure 6.22   Duration of transfer process compared to time of day May 2005

Looking at the time it takes to prepare the bed for admission of the patient in the unit of higher care and comparing this to the time of day (shifts), reveals that it takes twice as long in the morning to transfer a patient when compared to any other time during the day as shown in figure 6.22. This might be due to late doctors' rounds or delays in discharge procedures of patients from the hospital. This creates a bottleneck effect with delayed routine transfers from a higher level of care to the wards. Due to the high occupancy rates in the units of higher care, the request for transfer needs to wait for beds to empty in the unit of higher care.

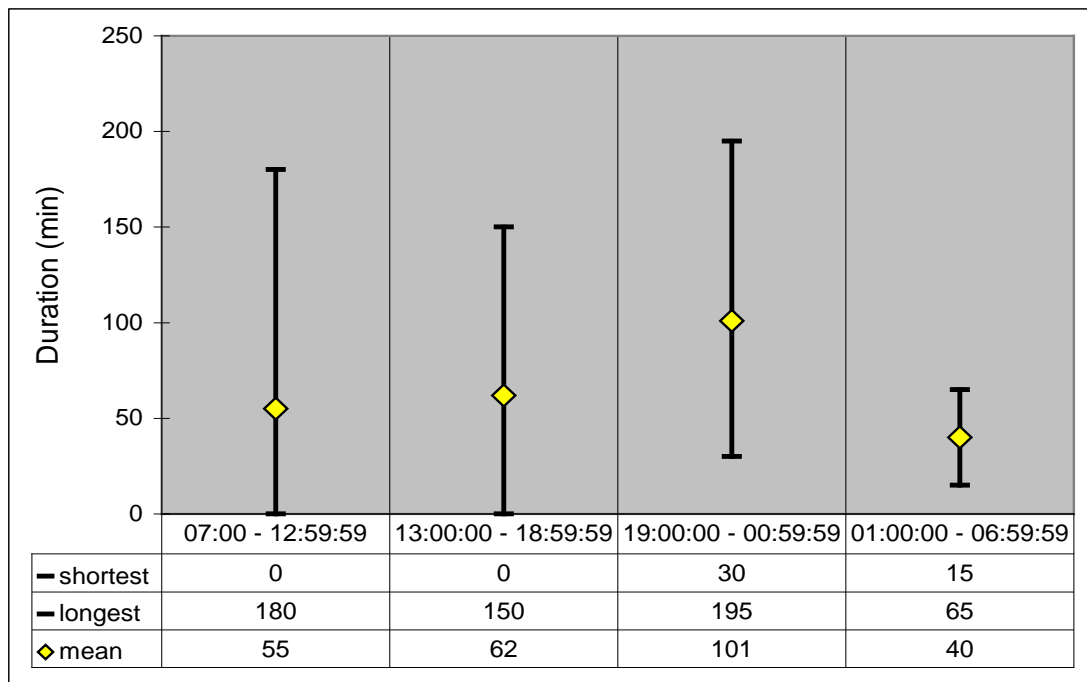Figure 6.23 depicted the duration of transfer process compared to time of day October 2005.

	07:00 - 12:59:59	13:00:00 - 18:59:59	19:00:00 - 00:59:59	01:00:00 - 06:59:59
▬ shortest	0	0	30	15
▬ longest	180	150	195	65
◇ mean	55	62	101	40

Figure 6.23 Duration of transfer process compared to time of day October 2005

Figure 6.23 indicate the duration of the transfer process during early day shift improved from 129 minutes to 55 minutes. This again indicates the influence and effect of Outreach. In the afternoon shift, there was less difference in time and the night shift stayed the same. There is less involvement of Outreach during the night shift.

6.6.5 Type of transfer

An analysis was performed to see what the type of upgrading of care was, i.e. ward to high care, ward to ICU or high care to ICU.

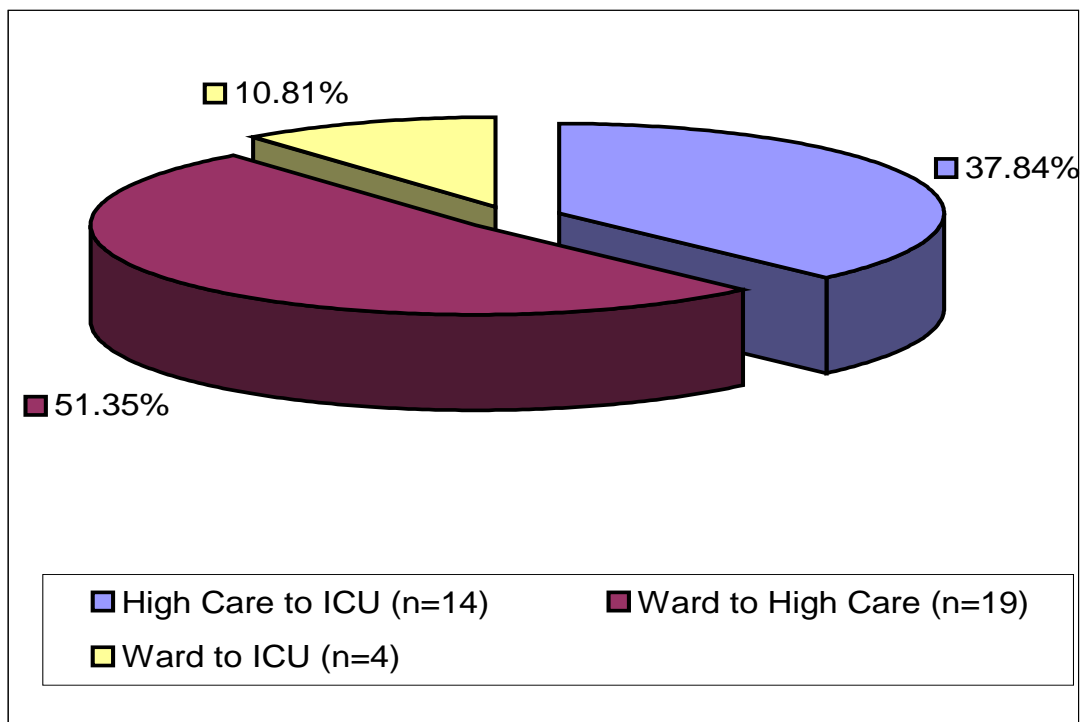Figure 6.24 illustrates the rate of transfers from Wards and High Care to a higher level of care.

Figure 6.24 Type of transfer of patients to a higher level of care May 2005 (n=37)

In 1 of the 38 transfers data was incomplete to such a degree that the type of transfer could not be reconstructed. Of the remaining 37 transfers, 23 (62.16%) were from the ward and 14 (37.84%) from high care. Of the ward transfers 19   (51.35% of total; 82.61 of ward transfers) were to high care and 4 (10.81% of total; 17.39% of ward transfers) to ICU. It is thus evident that rate of transfers is higher from the wards and more so preferably to high care than any other type of transfer.

Figure 6.25 illustrates the rate of transfers from Wards and High Care to a higher level of care during October 2005.
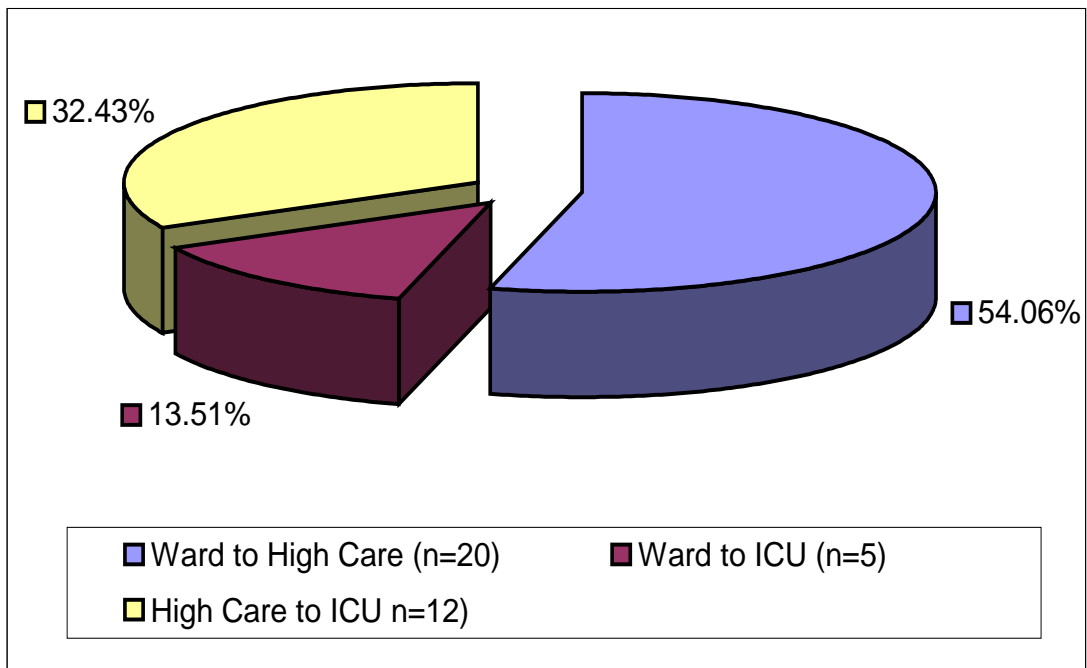
Figure 6.25 Rate of transfer of patients to a higher level of care October 2005 (n=37)

Figure 6.25 shows a similar distribution of transfer type with 25 (67.67) that were from the ward and 12 (32.33%) from high care. Of the ward transfers, 20 (54.05% of total; 80% of ward transfers) were to high care and 5 (13.51% of total; 20% of ward transfers) to ICU

The slight increase in ward to ICU with proportionate decrease in high care to ICU can show a tendency towards more appropriate placing in the required level of higher care attributable to the outreach.

Analysis confirmed that general wards seldom transfer patients in need of more sophisticated care to ICU and that wards mostly transfer their patients to the high care unit. For the pilot study, looking at the ward transfers to high care and following them up, seven of these were eventually transferred to ICU. This is 36.87% of all wards to high care transfers, 50% of all high care to ICU transfers, and 18.92% of all transfers. From the comparative data, the wards still mostly transfer their patients to the high care unit. When following the ward transfers to high care, five of these patients were

eventually transferred to ICU. This is a 35% of all wards to high care transfers, 58.33% of all high care to ICU transfers and 18.92% of all transfers. This result is very similar for both study periods. The possible explanations is that the ward or treating physician is underestimating the level of care needed or the fact that the ICU's are closed units as opposed to the open unit policy of the high care wards. It is shown by a prospective cohort analysis as well as a retrospective analysis conducted by Multz et al (1998) with the hypothesis that a 'closed' ICU was more efficient than an 'open' ICU that the organisation, resource utilisation and outcome of a closed ICU were more efficient as measured by a decrease ICU length of stay (LOS).

Analysing the seven re-transfers, three of these patients were managed by doctors with admission rights to the ICU and four of the doctors do not have practising privileges to admit patient to ICU. Therefore, the reasons for re-transfer remain most probably the combination of facts stated above.

Outreach identified patients that need higher level of care but had little influence on the decision to indicate the appropriate level of care. The introduction of Outreach is a new concept to nursing personnel and doctors and needs to familiarise the health care team to accept the involvement and decision making of Outreach. This area warrants further investigation to inquire on the stratification of Outreach.

6.7 ACTIONS TAKEN

In this section, the researcher was looking whether the health professionals in the general wards took actions before transferring patients to a higher level of care.

Figure 6.26 illustrates the action taken by the health professionals in the ward before transfer to a higher level of care May 2005.
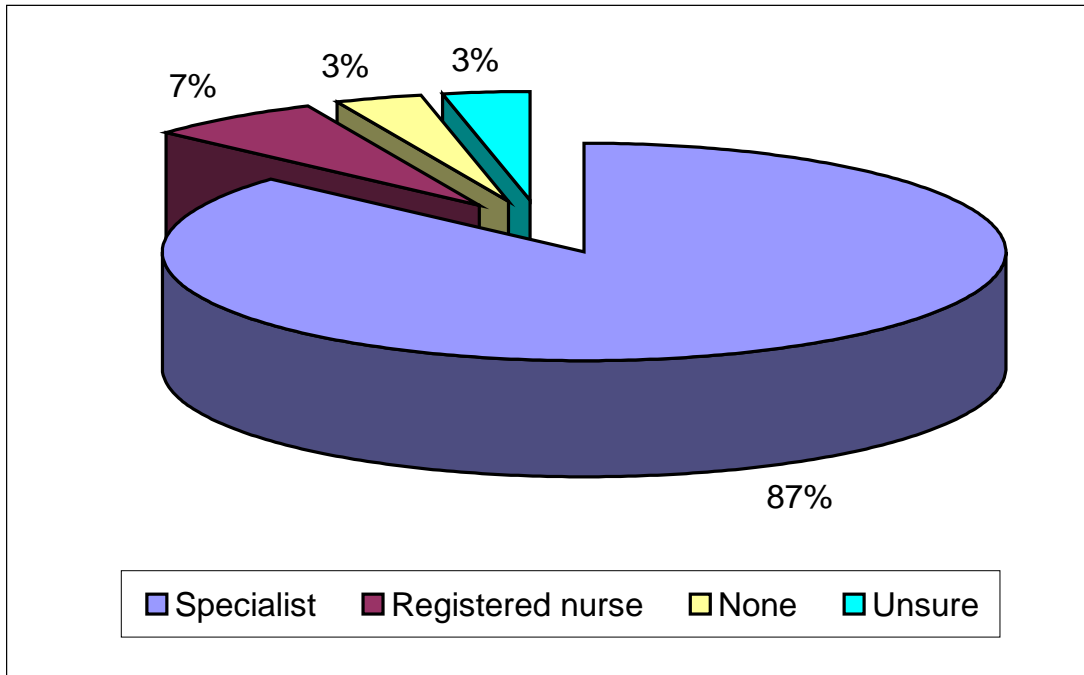
Figure 6.26   Actions taken before transfer May 2005 (n=30)

In the pilot study 30 of the 38 transfers (78.94%) had data sufficient to draw the following conclusions:

- In 26 transfers (86.67%) the treating specialist undertook the actions of treatment. This would be in keeping with the hierarchal system with is still widely used in private which does not allow interventions by nursing staff, perceived or true.
- In 2 cases (6.67%), the registered nurse took the initiative to institute some form of treatment.
- The remaining 2 transfers constituted 1 where no action was documented and 1 where the action taken was unsure.

Figure 6.27 illustrates the treatment and care action taken by the health professionals in the ward before transfer to a higher level of care October 2005.
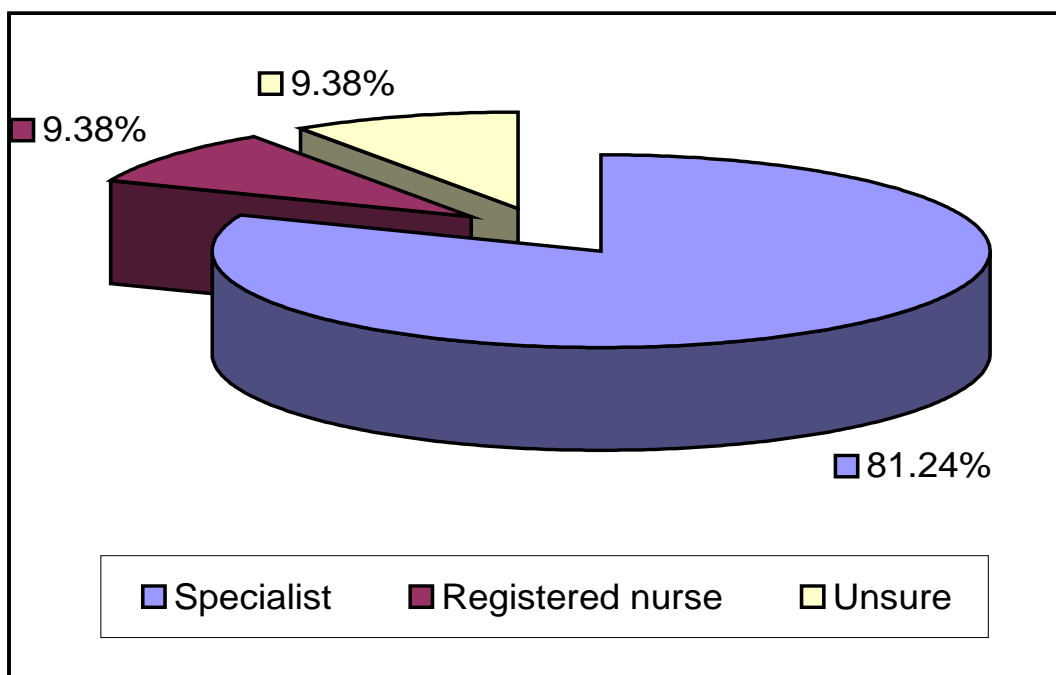
Figure 6.27   Actions taken before transfer October 2005 (n=32)

In the comparative study 32 transfers had data sufficient to draw conclusions from. In the comparative study period there was an increase in nurse involvement in actions taken before transfer as was hoped for with the institution of a nurse lead in-hospital outreach program. Although still quite low at 9.38% this only represented the starting phase of the program and with time there was hope for not only more intervention by the nurse lead outreach personnel but also by ward and high care nursing personnel.

6.8   DETERIORATION BEFORE TRANSFER

The patient's health records were reviewed and examined for signs and symptoms of deterioration taking the time from the decision to transfer to the actual time of transfer to the unit of higher care. Although relying on proven poor documentation, a higher level of awareness should prevail after the physician has requested the transfer leading to an increased level of documentation.

6.8.5 Further deterioration

For the pilot study, in 15 of the 36 transfers (41.67%) no further deterioration before transfer to a higher level of care occurred; labelling them stable. In the remaining 21 transfers had some form of deterioration in vital function before transfer; labelling them unstable.

Looking at the comparative study period data could be analysed for 31 of the 32 transfers (96.88%). No further deterioration occurred in the waiting time in 20 (64.52%) of the transfers; a massive increase contributed directly to outreach with quicker recognition. Deterioration occurred in 11 of the remaining cases (35.48%).

6.8.6 Bed preparation waiting times

For the pilot study period, looking at the waiting times to prepare the bed in the higher dependency units reveals that those termed stable (no further deterioration) showed a median time of 90 minutes and those termed unstable a median time of 65 minutes. This therefore confirms that waiting for the bed in the higher dependency unit did not contribute to further deterioration and other factors would have come into play.

A subset analysis confirmed that for the unstable patients a much higher percentage were form high care (47.62% vs. 26.60%) thereby explaining the high percentage of unstable patients (since those in high care would be per definition be physiologically more unstable) as well as the shorter waiting times for the bed in ICU.

For the comparative study period, the median waiting times reveals 80 minutes for the stable group (a significant decrease when compared to the pilot study) versus 55 minutes for the unstable group. The difference between the 2 study periods here is not so significant most probably showing to a minimum time required to prepare the bed in the high dependency unit. As in the pilot study period, the percentage of high care

patients in the unstable group when compared to the stable group is much higher (54.55 vs. 20%).

6.9   OUTCOME

In the following section, the data on stabilisation of patients in the higher level of care and mortality is provided.

6.9.5   Stabilisation after transfer

The information gathered for this section includes time to stabilisation (if any) after transfers as well as the morbidity and mortality outcomes of the transfers and patients to a higher level of care. A total of 36 transfers representing 29 patients were analysed with the following results:

In the pilot study period one patient died before stabilisation (within 39 minutes after a actual deterioration of 82 hours), 1 case could not be assessed due to incomplete documentation and a further 10 cases (8 patients) did not stabilise (27.78%). The following results were obtained for those that did no stabilise:

- Six so called "double transfers" (ward – high care – ICU) with a mortality rate of 50%. The stay in High Care ranged form 15 minutes to 2 days; signifying an inappropriate level of transfer (16.67%).
- Three further patients who were transfers form High Care did not stabilised before their deaths at 39 and 120 minutes and one with a continued gradual deterioration till day 34.

Of the remaining 24 transfers the distribution of time to stabilisation in the unit of higher level of care is depicted in figure 6.29.
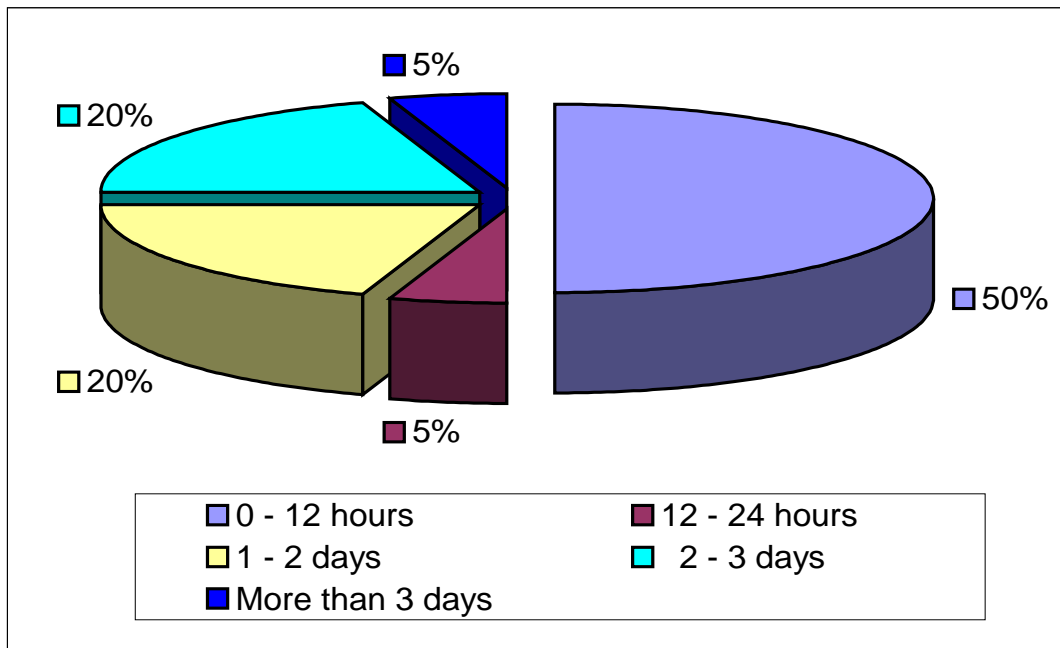
Figure 6.28   Distribution of time to stabilise May 2005 (n= 24)

Half of the patients stabilised within the next shift period after transfer with a bi-modal tendency of stabilisation within either 1 or 6 hours. When looking further at the data it becomes clear that if stabilisation is not achieved within 6 hours it will take more than 2 day to stabilise. Forty percent of transfers took between 2 to 3 days to stabilise and a further 5% longer than 3 days.

Looking at the comparative study period, from the 36 transfers the following results were obtained:

▪ Five transfers (13.89%) did not stabilise; this represented four "double transfers" with a 75% mortality rate. Compared to the 16.78% incidence of "double transfers" from May there seems to be a tendency for decrease attributable to outreach. The mortality rate however remains unacceptable high.

▪ A further six transfers (16.67%) where data was not available to interpret.

- In one case, the data was too difficult to re-interpret due to a multi-factorial problem in the management of the patient.

Of the remaining 24 transfers the following data is represented in Figure 6.30.
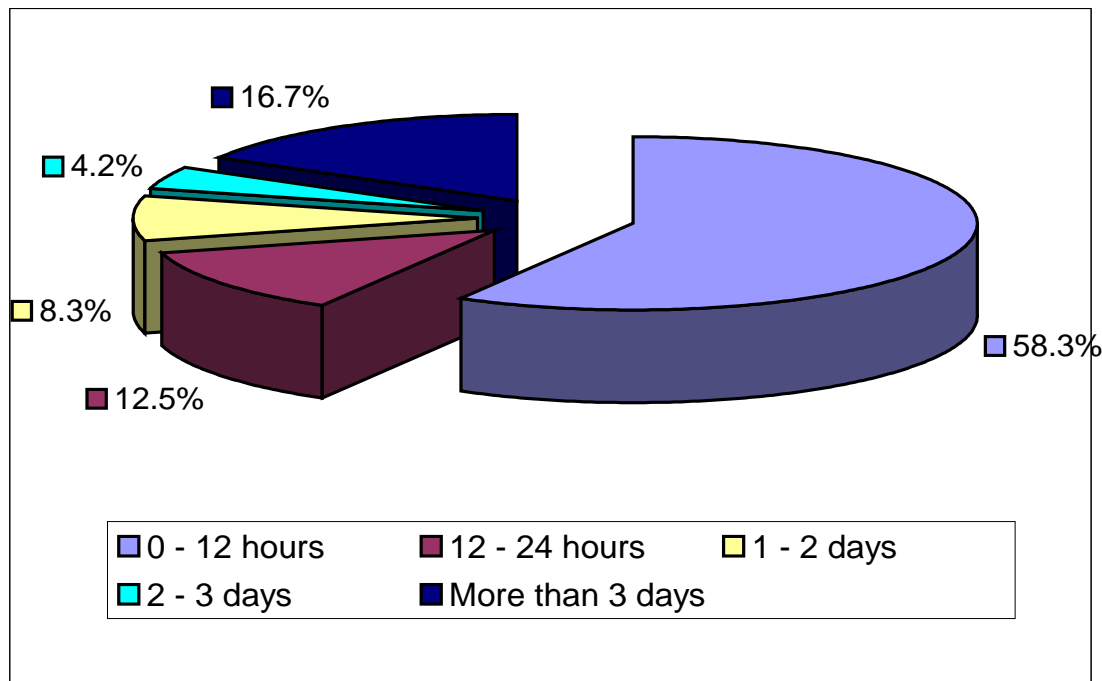

Figure 6.29 Distribution of time to stabilise October 2005 (n=24)

Overall 70.84% of patients now stabilised within 1 day; an improvement for 55% when compared with the study period. Of those, more than two-thirds again stabilised within the first 6 hours. The subgroup of patients that took longer than 3 days to stabilise has however significantly increased the reason for that being unclear.

Due to the high variance as well as sample size statistical analysis failed to show any difference pre- and post intervention with an F ratio of 0.0027 and a p value of 0.9592.

6.9.6   Mortality

Mortality was evaluated as part of the total admissions as well as of the study group itself. Due to the special category of double transfers; the circumstances of these as well

as the timeframe were evaluated. It needs to be kept in mind that the amount of patients is too small to draw definitive conclusions.

The overall mortality for the pilot and the comparative studies were 0.27 and 0.17% respectively. When looking at the mortality within the study group these were 38.71% and 36.00% respectively. The overall figure however remains high but due to limited published data in this field, it is difficult to comment. One can however comment that the hospital studied is a very large referral hospital managing complex cases and bed occupancy figures reflect he high demand on the higher dependency beds.

Figure 6.30 depicts the mortality of patients deteriorated and transferred to a higher level of care in the pilot study.

	Study Group	Double transfers	Total Admissions
%	38.71	57.14	0.27

Figure 6.30 Mortality May 2005 (n= 31)

Figure 6.31 depicts the mortality of patients deteriorated and transferred to a higher level of care in the comparative study.
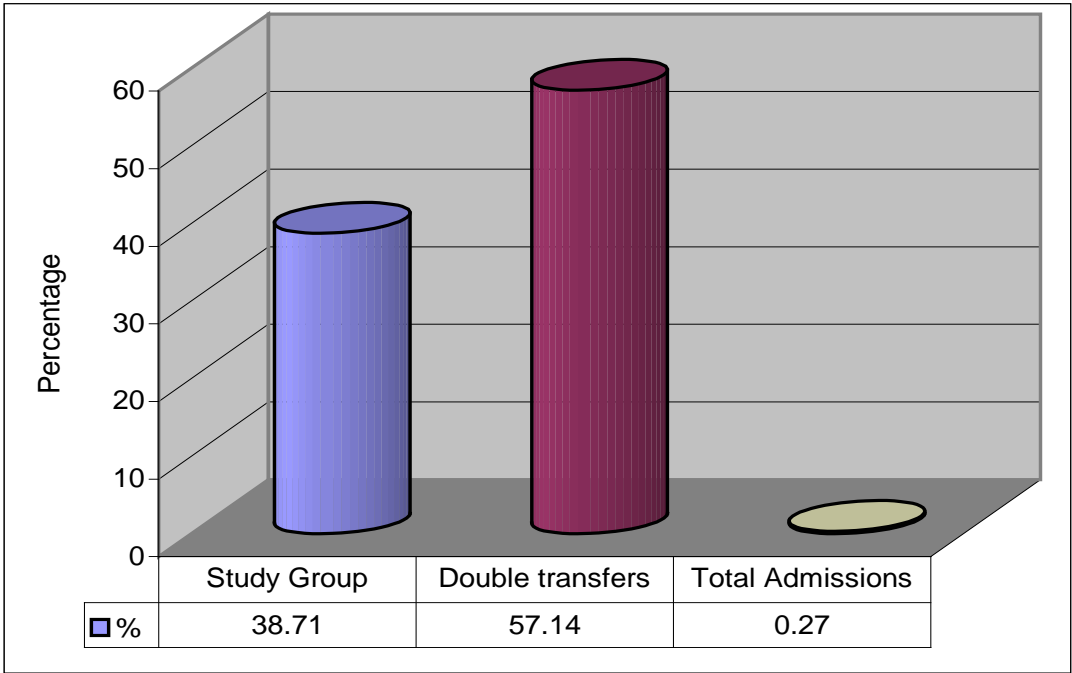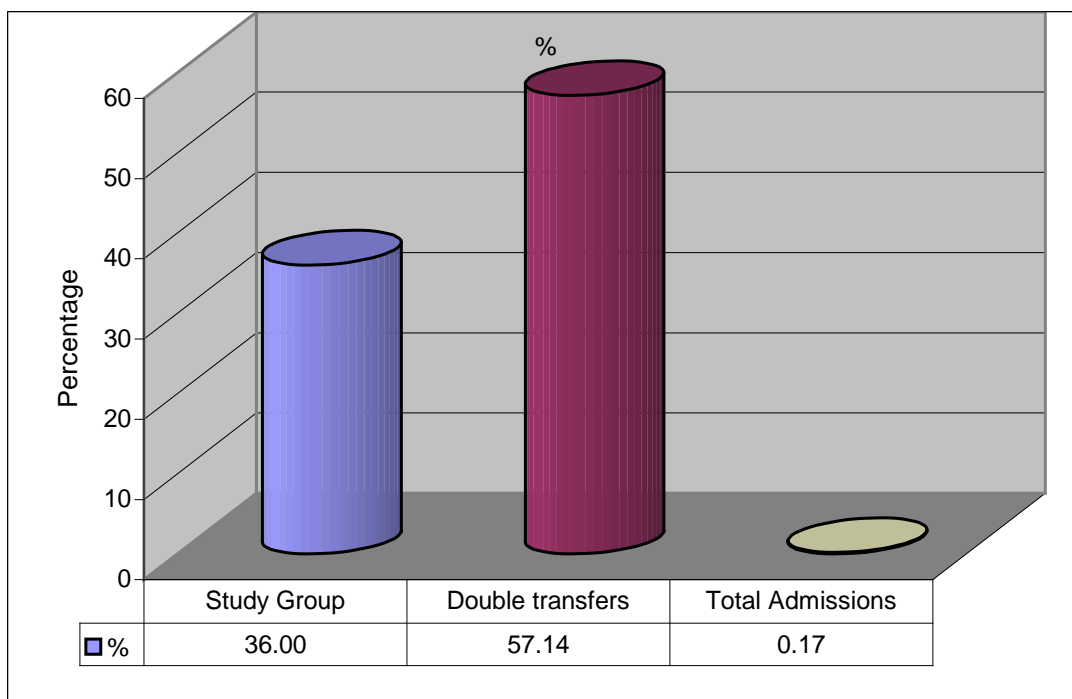
Figure 6.31   Mortality October 2005 (n= 29)

Figure 6.31 depicts the mortality of patients deteriorated and transferred to a higher level of care in the pilot and comparative study.
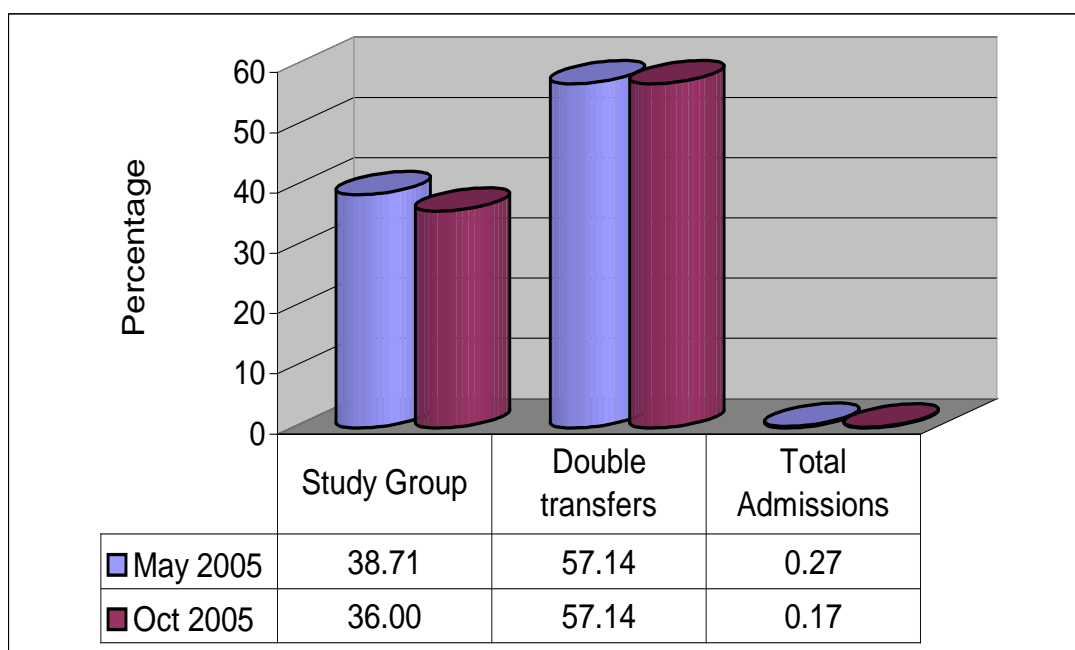

Figure 6.32   Comparative Mortality May 2005 (n=31) and October 2005 (n= 29)

However a subgroup of patients was identified that had so called "double transfers". This meant that the initial level of care was further upgraded to manage the unstable or deteriorating patient. In the pilot study period 22.58% of patients were further upgraded and in the comparative study 28%. This subgroup represents a fair percentage of the study group and in both time frames studied contributed significant to the mortality data obtained.

When these patients are taken out of the analysis the mortality rates for the study periods are 26.32 and 11.11% respectively. The mortality within this subgroup however remained the same at 57.14%. Statistical analysis again failed to show a difference due to small sample size. Although further analysis of the data on the double transfers was performed it will not be discussed here since the outreach did not have an effect on the high care patients being transferred.

Garcea et al (2004:1399) conclude that in the study there are many confounding factors in assessing the impact of Outreach in hospitals. This study tentatively concludes that outreach teams may have a favourable impact on mortality rate amongst readmissions to critical care, but more data is needed from multicentre trials.

6.10   CONCLUSION

In this chapter the results of the study was presented.

This section included the data analysis and findings. It included the demographic data and admissions. Furthermore, this section includes deterioration times and reporting of deterioration by nursing personnel, transfers times, duration of transfer process and type of transfer, actions taken and deterioration before transfer and outcome.
In the following chapter recommendations will be given.

CHAPTER 7

"When it is obvious that the goals cannot be reached, don't adjust the goals, adjust the action
steps."
Confucius (circa 551-479 BC).

Confucius was Kong Qiu a Chinese thinker and social philosopher.

CONCLUSIONS, LIMITATIONS AND RECOMMENDATIONS

7.1 INTRODUCTION

In this chapter the conclusions, with reference to the objectives, findings and limitations
of the study and recommendations for practice and further research will be presented.

The objectives and assumptions underlying the study in chapter 1 will be reviewed in
relation to the conclusions.

According to Polit and Beck (2006:57) the final major phase of a quantitative research is
the dissemination phase. This phase consists of the communicating of findings through
a research report and the utilizing of the evidence in practice.

7.2   OVERVIEW OF THE STUDY

Together with the change in nursing personnel composition, undetected and prolonged patient deterioration and an increase in patient transfers to a higher level of care created an increased demand on expensive and limited ICU an HC beds. This situation created premature discharges from ICU to general ward and therefore an increase in readmissions and cardio-pulmonary resuscitation.

Investigation by the researcher it was found that some nursing categories have difficulties in recognising and reporting deterioration to experts. Furthermore, nursing personnel lack the knowledge of clinical markers normal parameters that is essential to recognise abnormal vital data, and therefore the need for timely and active intervention.

Structures and processes such as Outreach and training programs contributed to the improvement in the management of patient deterioration in general wards and ultimately decreased unplanned transfers to higher level of care, in-hospital CPR and readmission to ICU.

7.3   CONCLUSIONS IN RELATION TO THE OBJECTIVES GUIDING THE STUDY

Upon completion of the data analysis the researcher made conclusions based on the following study objectives:

- Objective: To determine which interventions are required to decrease the number of in-hospital patients being transferred to a higher level of care.
   - o   To determine the deterioration time of the patient, as define from the time of first entry in the health record and ending with the time of actual transfer and the actual deterioration times of the first sign which herald deterioration

as determined by a chart review by a qualified intensivist (deterioration times; chapter 6 section 6.4).

- o To determine whether the nursing personnel reported patient deterioration to experts (deterioration times; chapter 6 section 6.5).

- Objective: To conduct a situation analysis of actual problems by identifying risk times and patient deterioration times.

  - o To identify risk times where nursing personnel were not able to recognize patient deterioration and patient were at greater risk to deteriorate and whether logistics' at certain times of the day made it more difficult for nursing personnel to transfer patients to a higher level of care (time of transfer; chapter 6 section 6.6).

- Objective: To determine if the interventions taken were timely.

  - o 'To establish course of time of reporting the problems to the doctor (actions taken; chapter 6 section 6.7)

- Objective: To develop a management strategy for the early intervention and treatment of deterioration in-hospital patients.

  - o To determine request to transfer to time of actual transfer and the signs and symptoms of deterioration taking the time form the decision to transfer to the actual time of transfer to the unit of higher care (deterioration before transfer; (chapter 6 section 6.8).

7.3.1   Objective 1

Research question: Which interventions are required to decrease the number of in-hospital patients being transferred to a higher level of care?

Objective: To determine which interventions are required to decrease the number of in-hospital patients being transferred to a higher level of care.

In order to answer the research question and research objective the following aspects were investigated:

- *Deterioration Time*; The deterioration time was defined as starting from the first entry of deterioration in the patient health record and ending with the time of decision to transfer (thus eliminating the time taken to prepare the bed in the unit of higher care) as determined by a health record review by a qualified intensivist and the researcher (chapter 6 section 6.4).
- To determine whether the nursing personnel *reported* patient deterioration to the doctor (deterioration times; chapter 6 section 6.5).

- **Deterioration time as recorded by nursing personnel (chapter 6 section 6.4.1 and 6.5).**

Recordation of deterioration by the nursing personnel decreased with 20% after intervention, thus hard to comment on the results due to poor recordation. The deterioration times as recorded by the nursing personnel do not necessarily represent the true time of deterioration; it only represents the recordation of abnormal values and or vital signs by the nursing personnel.

- **Deterioration times according to a health record review by researcher and qualified intensivist (Chapter 6 section 6.4.2)**

Looking at the charted deterioration times for the ward more patients (58% versus 75%) are being transferred within the 6-hour interval, which indicate a shorter deterioration time before transfer to a higher level of care. Interventions in this period included education of normal vital data values to those taking the observations and activation of the in-hospital Outreach which significantly improved percentage of patients being transferred (89% vs. 60%). It is also interesting to note that no patients are being

transferred past 12 hours most probably due to increased communication on both nursing and nurse-physician level.

No specific intervention during the time interval between the 2 observations was done in high care, therefore on change can be expected. Also, remember the small sample size of the high care transfers, which can influence the outcomes. The only difference is the shift towards longer deterioration times

- **Reporting of deterioration (Chapter 6 section 6.5.1)**

In May 2005, 25 (65.79%) of patient transfers, the doctor was informed by nursing personnel of the deterioration versus 10 (62.07%) of the transfers the doctor was informed in October 2005. A 3.72% fewer reporting of patient deterioration occurred. This result showed that Outreach did not make any difference to ward nursing personnel to report to the treating specialist on deterioration. The assumption is made that Outreach reported deterioration directly to the treating specialist and not through the ward staff. Few recorded entries could be found in the health records on reporting of deterioration by the night Outreach.

7.3.1.1   *Recommendations (Deterioration time)*

This section gives recommendations for the research objective, which interventions are required to decrease the number of in-hospital patients being transferred to a higher level of care?

- **Deterioration as recorded by nursing personnel**

    o Establish an organisational culture that fosters and promotes learning and develop.

- Map the competences and the development needs of nursing personnel and develop their knowledge, skills and attitudes.
- Continuous training program for permanent and agency nursing personnel to improve recognition and reporting of abnormal vital signs and biochemical parameter variations.
- Continuous training of nursing personnel on interpretation and understanding of physiological and biochemical parameter.

- **True deterioration time (Chapter 6 section 6.4.2)**

  - Extend the implementation of Outreach to the HCU to improve recognition and reporting of deterioration and decrease deterioration times.
  - Implementation of Quick Response Parameters in all the disciplines, to improve the recognition of patients at risk of deterioration into critical illness and the need for more active and early intervention.
  - Improve communication between all health care providers.
  - A physiological monitoring plan for all acute emergency admissions. Review of these patients within 24 hours by consultant physician.
  - To establish greater involvement in the assessment and treatment planning of new emergency admissions.

- **Reporting of deterioration (Chapter 6 section 6.5.1)**

  - Improve nursing personnel reporting structures to the treating specialist of patients deterioration
  - Improve recordation in the patients' health record by all health care providers.
  - Involvement of Outreach to assist with training of nursing personnel to improve documentation.
  - Implementation of a monthly health record audit.

- To establish scientifically based standards, criteria and guidelines on patient deterioration and communication in order to practice safe evidence-based care.

7.3.2 Objective 2

Research question: What information would a situation analysis of actual problems by identifying risk times and patient deterioration times yield?

Objective: To conduct a situation analysis of actual problems by identifying risk times and patient deterioration times

In order to answer the research question and research objective the following aspects were investigated:

- *Time of Transfer*; to identify risk times where nursing personnel were not able to recognise patient deterioration and patients were at greater risk to deteriorate and whether logistics at certain times of the day made it more difficult for nursing personnel to transfer patients to a higher level of care.

- **Time of request for a transfer (Chapter 6 section 6.6.1)**

During May 2005 there was a clear tendency of increased **requests** during early day (32.35%) and early night shifts (35.29%). In the comparative study increased requests to transfer occurred during early day (76.66%) and fewer requests (23.33%) during the early night occurred which can indicate the involvement of Outreach. The results shown an 50% increased requests from the treating doctor to transfer the patient to a higher level of care during early day (07:00 – 12:59 hours), which indicated that these patients were identified during the early morning shift (01:00-06:59 hours). It is clear that fewer patients 16.6% for transfer were identified on the night shift,.
.

The entered time for the request from the treating doctor to transfer the patient to a higher level of care was documented in the patients' health records. Remarkable improvements of 4.1% in **documentation** in the patient's health records were showed. The chart review indicated that the nursing personnel recognises and documented deterioration much quicker, which implicates the clinical markers training program and the implementation of Outreach made a significant difference in recognising and documentation of patient deterioration. This indicates the impact of Outreach training responsibility to improve on recordation.

- **Time of day of transfer (Chapter 6 section 6.6.2)**

More patients were **transferred** during the day shift than the night shift after the implementation of the Outreach programme. There were 5.27% more day transfers than night transfers during May 2005 compare to 62.16% more day transfers to night transfers in the comparative study, which indicate the influence of Outreach. The majority of transfers were between 07:00 and 18:59. This study revealed 56.91% more patients were transferred during the day shift compared to the night shift which was a significant improvement in the decreasing of **night transfers**. Golfrad and Rowan on the United Kingdom (2000:1138) showed a rising trend of night discharges from ICU in the UK over the past decade – a worrying trend because patients discharged at night fare significantly worse than those discharge during the day. This improvement could be the contribution of Outreach.

- **Time taken from request for bed till actual transfer (Chapter 6 section 6.6.3)**

The time from request for a bed in the higher level of care to the time of **actual transfer** shows an 18 minutes quicker response to the doctor's request until the actual transfer due to the involvement of Outreach and possibly the awareness of nursing personnel to react quicker to patients at risk. During May 2005, 37.14% of transfers were within 59 minutes of doctors' request till actual transfer comparing to 60% during October 2005

which shows a 22.86% improvement to transfer patients within 59 minutes. This means these patients can benefit from early intervention and treatment in an appropriate level of care.

- **Duration of transfer process (Chapter 5 section 5.6.4)**

The **duration of the transfer process** during early day shift improved with 74 minutes (from 129 minutes [2 hours 9 minutes] to 55 minutes). In the afternoon shift there was less difference in time duration and the night shift stayed the same. There is less involvement of Outreach during the night shift. This again indicates the influence and effect of Outreach.

- **Type of transfer (Chapter 5 section 5.6.5)**

Demographic data as to the type of transfer, Outreach had no influence on the decision to indicate the appropriate level of care. The **type of transfer** analysis confirmed that general wards seldom transfer patients in need of a higher level of care to ICU and that wards mostly transfer their patients to the high care unit. The possible explanations is that the ward or treating physician is underestimating the level of care needed or the fact that the ICU's are closed units as opposed to the open unit policy of the high care wards.

 Analysing the seven re-transfers, three of these patients were managed by doctors with admission rights to the ICU and four of the doctors do not have practising privileges to admit patient to ICU. Therefore, the reasons for re-transfer remain most probably the combination of facts stated above

7.3.2.1   Recommendations (Time of transfer)

This section gives recommendations for the research objective, to conduct a situation analysis of actual problems by identifying risk times and patient deterioration times.

- **Time of day of request (Chapter 6 section 6.6.1)**

    o Improve identification of patients deteriorating and patients at risk for early intervention and therefore decrease the request for night transfers to a higher level of care or a request for premature discharges form the higher level of care to the ward.

    o Improve Outreach involvement during night shifts to increase identification of patients deteriorating and patients at risk during early nights to decrease after midnight requests for transfers to a higher lever of care.

- **Time of day of transfer (Chapter 6 section 6.6.2)**

    o Investigate work flow and logistics during the morning activities in the higher level of care.

    o Improve work flow processes in ICU and HC during high demand times to create available bed and manage bottle neck effect.

    o Implementation of a contingency plan in the units of higher level of care to be able to admit and manage patients at-risk and therefore prevent night discharges and premature discharges.

    o Improve the involvement of the Outreach during the night shifts to prevent night discharges from ICU or Highcare.

    o Outreach involvement to identify and manage patients at risk to decrease transfer to a higher level of care during night shift.

    o Discharged patients could wait in a comfortable waiting area for their families to make hospital beds available.

- **Time taken from request for bed till actual transfer (Chapter 6 section 6.6.3)**

    o Improve awareness of nursing personnel to respond quicker to patients at risk.

    o Improve awareness of nursing personnel the benefits from early intervention.

    o Implementation of Quick Response Parameter's in general wards.

    o Involve Outreach in the transfer process to improve waiting times.

- **Duration of transfer process (Chapter 6 section 6.6.4)**

    o Improve Outreach involvement in the transfer process to decrease a delay in preparing the bed in the unit of higher care and improve waiting times.

    o Improve involvement of Outreach during night shifts.

- **Type of transfers (Chapter 6 section 6.6.5)**

    o Improve communication between nursing personnel and the treating physician to ensure correct information of the patient's condition is conveyed.

    o Improve the lack of urgency of nursing personnel.

    o Improve the trust of private specialists in the Outreach system and their involvement in the transfer process.

    o Improve Outreach's influence on the treating physician to assist with the decision to indicate the appropriate level of care.

    o Revisit practicing privileges of specialists in the Intensive care units.

    o Improvements in processes such as triage and admission criteria, of the higher level of care units to ensure patients are admitted in the appropriate unit.

    o Correct placements of patients according to their needs.

7.3.3 Objective 3

Research question: Whether actions were taken before transfer to a higher level of care?

Objective: To determine whether actions were taken.

In order to answer the research question and research objective the following aspects were investigated:

- *Action taken before transfer*; to establish whether health professionals in general wards took actions before transfer to a higher level of care.

- **Actions taken before transfer (Chapter 6 section 6.7)**

The pilot study demonstrated that actions of treatment before transfer to a higher level of care were mainly taken by the treating specialist (85%). In two cases (5.41%) the registered nurse took the initiative to institute some form of treatment. In the comparative study nursing personnel were more involved in initiating treatment in 9.38% of cases in comparison to 5.14%. Although the treatment was not effective no harm was done to any patients.

At the time of the study the specialist still needed to get use to Outreach and its involvement as part of the health care team.

7.3.3.1   Recommendations for actions taken before transfer (Chapter 5 section 5.7.1)

- o   Improve critical thinking and decision-making of nursing personnel to ensure nursing personnel take initiative to institute the necessary actions and treatment.
- o   Involvement of Outreach to motivate and inspire nursing personnel to critical thinking and decision-making to be able to identify patients deteriorating and patients at risk in need of care.
- o   Improve nursing personnel technical skills, knowledge and interpersonal skills.
- o   Improvement of Outreach involvement during night shifts.

o   Encourage nursing personnel to activate Outreach who can assist nursing personnel with the treatment of patient deterioration. Outreach function is training of nursing personnel at the bedside to enhance best practice and improve patient outcome.

o   Encourage nursing personnel to initiate treatment when patient's health condition deteriorates.

o   Development and implementation of guidelines to initiate treatment in patient deterioration.

7.3.4   Objective 4

Research question: What management strategy for the early intervention and treatment of deterioration in-hospital patients can be taken?

Objective: To develop a management strategy for the early intervention and treatment of deterioration in-hospital patients.

In order to answer the research question and research objective the following aspects were investigated:

- *Deterioration before transfer*; further deterioration before transfer; to determine request to transfer to time of actual transfer and the signs and symptoms of deterioration taking the time from the decision to transfer to the actual time of transfer.

- **Further deterioration before transfer (Chapter 6 section 6.8.1)**

For the pilot study, in 15 of the 36 transfers (41.67%) no further deterioration before transfer to a higher level of care occurred; and in the comparative study (64.52%) which indicates a 22.85% improvement, contributed directly to Outreach with quicker recognition of deterioration.

In the pilot study the remaining 21 transfers (58.33%) had some form of deterioration in vital function before transfer; and in the comparative study deterioration occurred in 11 of the remaining cases (35.48%).

7.3.5 General recommendations

- A health record audit program to improve recordation in patient's health records in general.
- Hospital Management and the Physicians Advisory Board of the Hospital to revisit and discuss the following:

  o Review 'close' and 'open' ICU and HCU policy.
  o Hospital Management and the Physicians Advisory Board (PAB) of the Hospital to revisit and discuss the following:

    ▪ Review the logistics of doctors ward rounds and patient flow
    ▪ Admission and discharge criteria to improve correct placement of patients
    ▪ Introduction of a medical expert in a position of authority to decision-making in the level of higher care to:

      – standardize admission and discharge criteria
      – manage the admission and discharge criteria to ensure patients are admitted in the appropriate unit
      – enhance standardising of protocols, policies and standard operating procedures regarding processes

    ▪ To set standards for a new relationship of active participation in the provision of quality health care.
    ▪ To develop a model of partnership to enhance relationship between health care professionals.

- To establish good communication processes between health care professionals to enhance mutually conducive partnership and clinical effective care

- o To focus on clinical governance model to build quality into patient care
- o Introduce peer review discussion groups for example mortality and morbidity meetings to enhance quality care.

7.3.6 Clinical governance model

This section recommends a clinical governance model evolved from Donabedian- and NHS clinical governance model for the hospital under study.

7.3.6.1 Introduction

The hospital under study embodies the organisations quest to maintain a leadership role by continuously exploring new and creative, yet sensible concepts in healthcare delivery. A quest that is motivated by the group's determination to care for the lives of patients entrusted to its care in the best and most affordable way.

A new clinical governance model evolved from the Donabedians- and NHS clinical governance model in an effort to improve patient care. This combined model is an organisational framework, which addresses the quality of existing practice and patient outcomes.

Figure 7.1 illustrates the interdependency of the two preferred models.

7.3.6.2   *Implementation*

The Donabedian (1981:409) and NHS clinical governance model (Dondaldson & Gray 1998:37) illustrated organisations processes such as clinical effectiveness, clinical risks management, patient experience and professional development and training which will enhance clinical outcome and experience of health professionals, patients' and their families.

The recommendation is to combine these two models and the application of the models of Donaldson and Gray (1998:37) and Donabedian (1981:409) will strengthen leadership, structures, strategy, and planning based on the effective use of resources, processes namely clinical effectiveness, clinical audit, clinical risk management, nursing personnel training development and management. With the guidance and assistance of the two preferred models, the development of an effective quality improvement plan enhances clinical outcome and experience of health professionals, patients' and their families.

Effective leadership is however crucial to assure the implementation of the proposed model, which could lead to the desirable effect in the health care setting as well as the implementation of a well developed vision, values and methods of clinical governance.

7.3.6.3   *Standards*

In this section, a recommendation for a standard according to the combined clinical governance model will be demonstrated. Table 7.1 depicted the standard and criteria based on Donabedian- and NHS clinical governance model.

Table 7.1   Donabedian- and NHS clinical governance model based standard and criteria

Standard		
Care of patient should aim to recognise patient deterioration in general wards to reduce unplanned patient transfers to a higher level of care.		
Structure	**Process**	**Outcome**
• Nursing personnel to obtain and interpret vital data • Policy for management of vital data	Criterion: • Vital data obtained 4 hourly in general ward • Implementation of policies • Training program	• Improve patient care • Quality service • Positive patient experience
• Nursing personnel acquainted managing vital data beyond normal parameters • Reporting structure	• Assess patients' clinical markers and recognise deterioration • Activate Outreach • Documentation of actions	• Decrease transfers to a higher level of care • Improve outcome and mortality
• Equipment available to obtain vital data	• Correct use of equipment • Technical skills to obtain vital data	• Improve outcome and mortality
• Outreach	• Early intervention and treatment • Implementation of Quick response parameters	• Improve deterioration time • Improve outcome

Source: Donabedian (1981:409) and NHS clinical governance model (Dondaldson & Gray 1998:37).

Clinical governance standards that evolved from the two preferred models are recommended and portrayed in table 7.2.

Table 7.2   Clinical governance standards

Clinical Audit

- Doctors and nursing personnel (clinicians) participate in regular clinical audit and reviews of clinical services

- Clinicians are involved in prioritising, conducting, reporting and acting on clinical audits.

- Clinicians participate in reviewing the effectiveness of clinical services through evaluation, audit or research.

- Ensure that teams are working to the objectives

- Clinical audit programmes implemented place which meets the audit requirements of international accreditation program; continuous monitoring of:

  o Resuscitation and reanimation (Emergency department)

    ▪ Rhythm on arrest

    ▪ Drugs administered during resuscitation

    ▪ Airway management

    ▪ Review of outcome of resuscitation or reanimation

    ▪ Resuscitation team call out

    ▪ Waiting times

    ▪ Unscheduled return for same condition

    ▪ Death on arrival

  o Clinical services (General wards)

    ▪ Unplanned transfer to a higher level of care

    ▪ Transfer to step-down

    ▪ In hospital preventable and unpreventable deaths

    ▪ Cardio-pulmonary resuscitation

    ▪ Readmissions

    ▪ 'Do not resuscitate' orders (allow natural death)

  o Intensive care unit and High care unit

- Morbidity and mortality

- Readmissions

- Medication error

- In hospital preventable and unpreventable deaths

- Cancelled operations

- Encourage and support nursing personnel in the conduct of multi-disciplinary audit;

- Audit is effective and meaningful and that audit results lead organisation decisions;

- Audits are undertaken, where appropriate, as identified by complaints, serious incidents;

- Audits are user and carer focused and have user / carer input where appropriate;

- Effective and timely communication of audit activity, results and subsequent action plans;

Clinical Risk management

Patient Safety is enhanced by structures, the use of processes, working practices and systematic activities that prevent or reduce the risk of harm to patients.

- Increase understanding across all nursing personnel groups about how clinical risk is managed and the contribution expected from them

- Train appropriate nursing personnel in the assessment and management of risk

- Ensure that reporting, recording, managing and learning from incidents, adverse events and near misses

- Ensure learning from incidents is routinely shared with all nursing personnel

- Share information and learning about serious incidents with other health providers to minimise the potential of such incidents occurring or re-occurring

Clinical effectiveness

Providing information on treatment and medication to health care providers.

- Evidence-bases policies and procedures available to all health care providers

- Evidence-based practice

- Ensure nursing personnel have ready access to electronic evidence base database

- Work towards research governance requirements

- Promote training in research

- Encourage improvement of knowledge and technical skills

  o Clinical markers parameters

  o Quick response parameters

  o Pain management scale

  o Biochemical variables

- Continue to support the implementation of guidelines to ensure best practice

Staffing and nursing personnel management

Enhance patient care by adopting best practice in human resources management and continuously improving nursing personnel satisfaction;

- Recruitment and retaining strategy

- Poor performance management

- Skill mix management per shift to control costs

Education, training and development

Meet the changes of health needs of the population by:

- an appropriate constituted workforce with appropriate skill mix; and

- continuous improvement of services through better ways of working

  o Ensure teams working towards objectives outlined in the Training and Development strategy

- Ensure that nursing personnel receives training and support to assist them to work effectively.

  o Clinical markers

  o Quick response parameters

- - o Pain management scale

  - o Biochemical variables

  - o Policy knowledge program

- Promote personal and professional development of all nursing personnel

- Ensure nursing personnel have access to effective supervision

- Nursing personnel training and development prioritised towards the competencies required

Use of information

Use effective and integrated information technology and information systems which support and enhance the quality and safety of patient care

- Clinicians have access to information that enables them to evaluate their own performance

- Ensure clinicians have access to clinical systems that support them in their day-to-day practice

- Maintains a high level of record keeping standards across all professional groups

- Promote the sharing of information, with appropriate attention to confidentiality

- Work towards having one multi-disciplinary record for each patient

- Promote jointly agreed protocols for sharing information

- Standardisation of care

7.3.6.4   Criteria

In this section, a recommendation for criteria according to the combined clinical governance model will be demonstrated. Table 7.3 depicts the standard together with the criteria which were evolving from Donabedian- and NHS clinical governance model.

Table 7.3   Standard and criteria

Standard

- General ward nursing personnel obtaining vital data of patients should recognise patient deterioration and activate Outreach

- Immediate intervention of patients deteriorating to reduce patient transfers to a higher level of care

Structure criteria:

- Clinical Risk management

  o Equipment to obtain accurate vital data

  o Four hourly monitoring of patient clinical markers

  o Call systems to activate Outreach

  o Available Intensive care and high care beds

- Equipment to obtain accurate vital data

  o Staffing and nursing personnel management

  o Nursing personnel composition and skill mix to render quality nursing care sufficient

Process criteria:

- Clinical Risk management

  o Accurate obtaining of clinical markers by ward nursing personnel

- Clinical effectiveness

  o Clinical governance policy and standard operating procedures accessible

  o Clinical markers,

  o Quick Response Parameter,

  o Biochemical variable and

  o Pain management scale available to all nursing personnel

- Staffing and nursing personnel management

- Nursing personnel respond to;

- o clinical markers beyond normal parameters by implementing the Quick Response Parameter (QRP) and activate Outreach
- o biochemical variables by using the Quick Response Parameter (QRP) and activate Outreach
- Effective and immediate response and intervention by the Outreach
- Nursing personnel manage pain by using the analogue pain management scale
- Nursing personnel know policies and standard operating procedure
- Education, training and development of nursing personnel
- Improve clinical and technical skills of nursing personnel
- Improve documentation in health record
- Nursing personnel recognise deterioration of patients and high risk ward patients
- Outreach involvement in
  - o transfer process to enhance transfer time
  - o identifying a bed in the higher level of care
  - o early intervention of deteriorating patients

Outcome criteria:
- Nursing personnel recognised patient deterioration
- Immediate intervention by nursing personnel and Outreach
- Decreased number of patients transferred to a higher level of care
- Decreased number of resuscitation in general wards
- Decreased deterioration time to the set target
- Decrease readmissions to ICU and high care

7.3.6.5   *Indicators*

In this section, a recommendation of quality indicators will be given. Indicators are key concept in the context of quality assurance, to which the researcher specially selected measures or attributes that may indicate and point to good or poor quality.

Table 7.4 depicted the quality indicators based on Donabedian- and NHS clinical governance model.

Table7.4   Quality indicators

Indicator	Sub-indicator	Measure(s)
Nursing qualification	• Registered Nurses (RN) • Enrolled nurses (EN) • Enrolled nurse assistant (ENA	Structure
RN Education /certification		Structure
RN Satisfaction Survey	Job satisfaction survey	Process and outcome
Skill Mix	• Registered nurses • Sub categories • Nursing hours supplied by agency	Structure
Nurse vacancy rate		Structure
Clinical audit		Process
Pain assessment		Process
Clinical markers		Process and outcome
Quick response parameters		Process and outcome
Intervention		Process and outcome
Transfer process (waiting times)		Process
Deterioration time		Process and outcome
Reporting of deterioration		Process and outcome

The sets of indicators for health promotion provided practitioners with tools for systematically conducting monitoring and follow-up of assessment and treatment. It assisted to pinpoint and enunciate areas of development for projects and programmes, thereby increasing possibilities for goal attainment.

7.3.7   Clinical Governance model

This section recommends a clinical governance model which evolved from Donabedian- and NHS clinical governance model. As previously mentioned by Nicholls et al (2000:172) this framework is the vehicle used for continuous improving the quality of services and maintaining high standards of health care. This model contributes to

improvement by constructing an environment in which excellence in clinical care will prosper.

The recommended clinical governance model is depicted in figure 7.1.

CLINICAL GOVERNANCE MODEL
PROFESSIONAL AND PATIENT PARTNERSHIP
LEARNING, INNOVATION AND IMPROVEMENT

STRUCTURE (Environment)

PROCESS (Methods/Quality Indicators)

OUTCOME

Organisation strategy and Business plan (Characteristics of the organisation)
Resources (personnel, finances, facilities and equipment)
Management: practice, nursing personnel, patients and doctors
Director of ICU and HCU (Responsible doctor)
Doctors Infrastructure and involvement Training department (competencies, skills and knowledge)
Protocols, policies and standard operating procedures (SOP)
Patient characteristics and focus
Systems: Outreach- and Resuscitation strategy
ICU & HCU admission criteria
Closed /open ICU and HCU policy
Medical aid funds
Public liability

Clinical Effectiveness	Clinical Risk Management	Patient Experience	Professional Development & Training
Patient treatment plan & clinical guidelines	Incident and Complaint Management	Patient information	Training programs to all health professionals
Morbidity & Mortality peer review	Record keeping & Health Record Audit	Patient rights & confidentiality	Continuous professsio-nal development (Technical and interpersonal style)
Infection control	Do Not Resuscitate order	Patient complaints	
Wound & pressure care	Clinical investigation, & Root Cause analysis	Counselling & bereavement	Peer review
Control Self Assessment			Code of Ethics

Research, Development & Publication
Benchmarking
Surveillance
Clinical Audit
Quality improvement programs
Policies and Standard Operating Procedures
Resources
Accreditation
Change Management

Patient Outcome

Patient Experience

USE OF INFORMATION

SYSTEM AWARENESS	TEAMWORK	COMMUNICATION	OWNERSHIP	LEADERSHIP

Figure 7.1   Clinical governance model
Source: Model adapted from Donabedian's Model 1988:1746 and Clinical Governance Model CHI of NHS 2000:172

Quality improvement focuses on processes or systems within the organisation that significantly contribute to outcome. This requires focus from departmental issues to cross-departmental lines. Processes operate between departments and require multidisciplinary involvement. To continually improve, an organisation must realise that it is a system of interdependent parts all with the same mission of meeting the needs and expectations of the customer.

To develop best practice the aspect of care to assess is **structures** (nursing personnel, equipment, etc), **processes** (such as prescribing, investigations, interactions between professionals and patients (Campbell et all 2003:816) or **outcomes** (such as mortality, morbidity, or patient satisfaction).

Partnership between patients and the health professionals focus to move away from a paternalistic model of decision-making, towards a model of partnership. It is patients who can best tell it as it is. Patients' involvement and patient-centred care are associated with improved outcome, better emotional health and enhanced patient experience. Weston (2001:438) found that patients' involvement and patient-centred care are associated with improved outcome, better emotional health and enhanced patient experience.

The clinical governance model demonstrates its belief that effective integration of the structure, process, and outcome depends upon a culture of continuous **learning**, innovation, development and improving by the **use of information** gained through processes such as the clinical audit and risk assessments. Available Information systems enable the hospital to retrieve national and regional norms for comparative data and therefore evaluate the performance of the organisation or to benchmark.

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Clinical governance changes the way people work, demonstrating leadership and communication which are as important to high-quality care (clinical effectiveness) as risk management (clinical risk management) effectiveness.

Clinical Governance**Error! Bookmark not defined.** is supported by 4 concepts or pillars as seen figure 7.1 of this chapter. These concepts guide the way in developing any strategy on clinical governance. They are the essential themes that need to be taken into account to ensure a holistic approach is taken to any issue related to quality of patient care.

- **Pillar 1: Clinical Effectiveness**

This pillar is the starting point for most strategic concern in clinical governance. It ensures to development of vigorous, integrated clinical models to ensure safe, effective, quality care based on sound principles of evidence based medicine, best practice and cost effective care. Health professionals are involved in audits and improvement projects as an integral part of promoting good clinical practice. Clinical effectiveness is reliant on the wealth of expertise, knowledge and skill of those who work with patients and who have an insight and understanding as to how the service works and how it could be improved.

It is concerned with developing integrated clinical models of care supported by guidelines and protocols through consultation with doctors and experts in the various fields of medicine. It will rely on clinical outcomes and information from clinical risk management to ascertain the correct priority areas for clinical

governance and monitor the impact of implementation plans and new models of care.

- **Pillar 2: Clinical Risk Management**

The second pillar focus on identifying and minimising clinical risk and improving clinical safety. Clinical risk management is an approach to improve the quality and safe delivery of health care by

- placing special emphasis on identifying circumstances that put patients at risk of harm, and
- acting to prevent or control those risks

This is achieved through the identification of potential risks and examination of adverse events for causal and contributory factors. It will identify trends or potential risks across the business units. Utilising the techniques of clinical investigation, root cause analysis and clinical audit, the primary causal factors will be highlighted and action plans instituted to minimise further risk or future risks.

Clinical risk management aims to identify clinical 'near misses,' incidents, adverse and sentinel events through the incident reporting and the adverse event screening of medical records of the deceased patients or had a an unplanned transfer to the ICU. The reporting, monitoring, analyzing of incidents is best fostered within a 'fair blame' culture. The researcher found that there is very good evidence that blaming individuals for adverse events does little to improve

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safety. Errors occur within systems and management can utilise systems to reduce the opportunity for human error.

Such events are monitored and analyzed with the focus to examine the systems in which the event occurred to redesign processes or develop improvement strategies for reducing or removing the potential for a similar event in the future.

- **Pillar 3: Patient Experience**

This aspect revolves around ensuring high quality clinical care and service delivery to all patients as they journey through the organisation.

In involves liaising with customers to learn whether they are receiving the care they require, the information they need to make informed decisions about this care, that their rights for confidentiality are sustained and monitoring their satisfaction levels. It also involves that customers are respected and treated as individuals and involved in their own care.

This aspect revolves around directing and managing programmes of work to engage patients and carers to bring about changes in practice that improve the patient experience.

- **Pillar 4: Professional development, management and training**

The pillar supports the selection and recruitment of clinical nursing personnel, their ongoing professional development, and training, the maintenance of their professional standards and code of conduct and ethics.

The foundation in the clinical governance model as discussed from point I – ix supports each of the four pillars namely clinical effectiveness, clinical risk management patient experience and professional development and training.

The foundation of clinical governance is as set out in the clinical governance model are:

i. Research, development and publications;
   - research review and disseminate to inform best practice
   - research enhances the quality of care
   - nursing personnel undertake research and development with the support of the local clinical department
   - it is a feedback mechanisms for feedback of results to improve current practise
   - feedback of the outcome of research for development of nursing personnel and clinical practice.

ii. Benchmarking;
   - "Best practice benchmarking' which is the process used in management and strategic management in which the organization evaluate various aspects of the processes in relation to best practice. This allows the organisation to develop plans to adopt best practice with the aim of increasing performance
   - compare accomplishments with other services
   - benchmark information is used to demonstrate good performance and identify areas for improvement

- benchmarking in simple is the process where you compare your process with that of a better process and try to improve the standard of the process you follow to improve quality of the system, product and services

iii. Surveillance;

- systematic collection, analysis and interpretation of current work standard in practice to identify problem areas to improve and enhance quality of care

iv. Clinical audit;

- support clinical effective care
- the outcomes of audits will be disseminated throughout the organisation
- lessons learned as a result of audit will be shared and acted upon
- implementation of action plans to enhance the service

Quality improvement programs;

v. maintain improvement in the quality of patient care and best practice

vi. the outcome are the true indicators of the effectiveness of clinical care

vii. developing systems to ensure services are designed and produced to meet or exceed customer requirements

viii. quality Improvement is purposeful change of a process to improve the reliability of achieving an outcome

ix. quality control is the ongoing effort to maintain the integrity of a process to maintain the reliability of achieving an outcome

x. quality assessment is the planned or systematic actions necessary to provide enough confidence that a product or service will satisfy the given requirements for quality.

xi. Policy, procedures and standard operating procedures;

- the organisation develops or adopts guidelines, policies and standing operating procedures which are based on the best evidence and practise

xii. Resources;

- contains conditions of Employment Contract
- recruit and retain nursing personnel effectively
- effective induction programmes to all nursing personnel including locum and agency nursing personnel
- ensure that all nursing personnel receive annual appraisals and have agreed personal development plans
- ensure that measures are in place to improve performance and address poor performance
- improve cost effective use of resources in the organisation

xiii. Accreditation;

- improve and implement best practice
- set and implement international standards and criteria
- annual review of the service
- International Organization for standardisation (ISO) 9001 administered by accreditation and certification bodies standard requirements include a set of procedures that cover all key processes in the business; monitoring processes to ensure they are effective; keeping adequate records; checking output for defects, with appropriate and corrective action where necessary; regularly reviewing individual processes and the quality system itself for effectiveness; and facilitating continual improvement. Accreditation can be the single most important approach for improving the quality of health care structures. In an accreditation system, institutional resources are evaluated periodically to ensure quality of services on the basis of previously accepted standards.

Standards may be minimal, defining the bottom level or base, or more detailed and demanding. Accreditation is not an end in itself, but rather a means to improve quality. The accreditation movement is gaining prominence due to globalization and especially the global expansion of trade in health services. It will eventually become a tool for international categorization and recognition of hospitals. When implemented appropriately, accreditation can strengthen the fundamental leadership and steering role of national health authorities. (WHO 2004:[4]).

xiv. Change management;

- to utilise change management principles to instil a culture of learning within the organisation and allow the integration of clinical governance systems into mainstream practice for all Nursing personnel and Medical Personnel

- all nursing personnel has access to learning and development to allow them to maintain and develop the skills and competencies they need to meet the healthcare needs

- develop leadership skills

- learning and development opportunities will be available in variety of forms including external courses, study days workshops, development programmes, in service training, mentorship and access to library resources, intranet and internet

- educational and training needs must be identified and meet the needs both of the individual member of nursing personnel and the organisation

- place emphasis on learning culture rather than a blame culture.

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The hospital under study underpins the successful implementation of a clinical governance model by an awareness of a solid foundation to establish an enabling culture. The five culture component – system awareness, teamwork, communication, ownership and leadership represent the areas in which health care worker need to share 'beliefs, attitudes, values and norms of behaviour" in order to deliver sustainable quality improvement in health care.

The culture components are discussed in Chapter 2 section 2.2.2.1

7.4   CONCLUSIONS IN RELATION TO THE ASSUMPTIONS

The following assumptions guided this study:

The first assumption is recognising and reporting deteriorating vital signs and symptoms of the patient will lead to early intervention by senior nursing- and medical personnel;

- **Chart review deterioration times: chapter 6 section 6.4.2**

True deterioration times are 387.5 minutes [6 hours 45 minutes] (versus 0 minutes recorded by the nursing personnel) for the wards and 300 minutes [5 hours] (versus 35 minutes recorded by the nursing personnel) for high care.

These results indicated that the nursing personnel do not recognise patient deterioration.

- **Reporting: chapter 6 section 6.5.1**

In the Pilot study, 25 (65.79%) of the transfers the doctor was informed by nursing personnel of the deterioration and in 10 (26.32%) the doctor was not informed. Of these ten transfers, eight were from the wards. In the comparative study, 10 (62.07%) of the transfers the doctor was informed and for 11 (37.93%) not. Of these 11 transfers, seven (63.63%) were from the wards and 4 (36.36%) from high care. The lack of increasing reporting in the intervention period can be explained by the fact that the in-hospital Outreach personnel contacted the treating physician directly rather than through the ward nursing personnel. Few recorded entries could be found in the health records on reporting of deterioration by the night Outreach.

Due to the results of not recognising patient deterioration by nursing staff, the conclusion can be made that nursing personnel lack the knowledge and therefore not reporting deterioration for early intervention.

The second assumption was that training of nursing personnel would lead to early recognition of deteriorating vital signs and could subsequently improve the care of acutely ill in-hospital patients.

- When looking at the comparative interval following the interventions, median times are now 175 vs. 387.5 minutes for the wards and 465 vs. 300 minutes for high care. Since interventions were aimed at ward level, the decrease in the deterioration is a direct result of those efforts, improving deterioration times top well below that of published data. The chart review indicated that the nursing personnel recognises and documented

deterioration much quicker, which implicates the clinical markers training program and the implementation of Outreach made a significant difference in recognising and documentation of patient deterioration.

The third assumption was to develop concepts and systems with the basic presumption of early intervention to manage acutely ill patients in a lower level of care in order to minimize transfers to a higher level of care;

- Chapter 5 section 5.4.2 Figure 5.4 illustrates the decrease in number of transfer to a higher level of care from 2005 to 2007 after implementation of Outreach and the training program. The results give prove to what extent the patients and the health care facility benefit from Outreach and nursing personnel that recognise abnormal vital data.

7.5   LIMITATIONS

The following limitations, which could limit the generalisation of the research results, were identified:

- The study was conducted in one private hospital in the R.S.A.
- There is no control over the sample size. The sample size consisted of 67 patients.
- The focus of the study did not have ample literature on deterioration times, and the processes and problem encountered with transferring patients to a higher level of care.

7.6   RESEARCH RECOMMENDATIONS

The following research recommendations evolved from this study.

7.6.1   Study recommendations

- Investigate the relationship between the age, gender and type of admissions versus emergency and elective, to determine the potential high risk patients for transfer to a higher level of care.
- Investigate reasons for global poor documentation in patient's health records.
- Investigate reasons for nursing personnel's lack of urgency to report patient deterioration.
- Investigate the reasons for nursing personnel's lack of recognition of deterioration of patient.
- The effectiveness of Outreach in order to determine costs and outcome warrants further investigation.
- Quick Response Parameters (QRP) provides guidance for nursing personnel to involve clinical experts to the bedside to prevent and manage patient deterioration. The use of scoring systems by nursing personnel needs further investigation.
- The implementation of the Quick Response Parameter's in the hospital under study warrants further investigation to quantify evidence of the result in the outcome of patients to generalise the theory of Andrews and Waterman (improve communication between professionals).
- The researcher experienced and observed an unsatisfied usage of current QRP's. Therefore it is important to investigate parameters that provide a guideline to nursing personnel to respond to abnormal physiological

parameters and biochemical variables to activate Outreach. The effect of the use of the QRP indicator warrants further investigation.

- Correct placements of patients in higher care units' warrants further investigation.

- A widely held belief that the relatively recent changes in nursing personnel profile or composition are a result of fragmentation of the team structure, lack of knowledge of the Enrolled nurses and Auxiliary nursing personnel, poor reporting system, and ward management, loss of learning opportunities and de-skilling of registered nurses. The effect and influence of these changes need further investigation.

- Critical thinking and decision-making skills of enrolled nurses and auxiliary nursing personnel warrants further investigation.

- No literature could be found that analyse double transfers, thus meaning that a ward patient transferred to high care was re-transferred to ICU. Although in this study the double transfers were small in numbers, the mortality within this subgroup however remained at 57.14%. The mortality of these double transfers warrants further investigation.

- An audit was done to illustrate the tendency of transfers to a higher level of care after discharge to the ward (re-admissions). Chapter 5 section 5.4.2 figure 5.7 illustrates the risk times for readmission to higher level of care.

7.6.2   Relevant research recommendations

Other important relevant issues that have not been addressed needs research such as;

- the time span of patient transferred out of a higher level of care till readmission to a higher lever of care and subsequent application of 'Do Not Resuscitate' order,

- the effect of closed ICU in private sector regarding correct placement tailored to the patients needs and the loss of private practitioner income,

- on what bases nurses make decisions to call a doctor.

- In South Africa's private hospital sector, all health care providers, other than nursing personnel, are private practitioners, not employed by private hospitals and therefore the hospitals are in no authority to monitor and manage their performances. In the healthcare facility under study, a PAB monitors the doctors' performance. The PAB scrutinize medical errors and reviewed through peer discussion groups, an alternative practise for the benefit of the patient. Latter process warrants investigation.

7.6.3   South African health care setting research recommendations

The following research has not been done in the South African health care setting;
- Night- and premature discharges from ICU to general wards and
- ICU length of stay with a dedicated intensivist

7.6.4   South Africa's selection criteria for nursing training recommendations

Furthermore, one can rise the concern what impact the selection criteria for nursing personnel by the South African government authorities have on the quality of South Africa's nursing personnel in future. The selection criteria might contribute to establish the underlying reasons for nursing personnel not recognizing deterioration of patient's condition. This study demonstrated the lack

of basic knowledge and that basic alteration on vital data was not recognized by ward nursing personnel. An in-depth research is inevitable on the selection criteria for nurses and the curriculum of training institutions for nurses to establish the reasons for the lack of basic knowledge. The implementation of the components of clinical governance poses particular challenges in the clinical micro system due to the requirement of organisational culture changes and extensive training. The interrelationship of clinical governance components to provide quality care warrants further investigation to establish the real impact of the model in South Africa.

7.7   CONCLUSION

In this chapter, the processes and problems encountered with transferring patients from a lower to higher level of care were explored and identified. The conclusions, with reference to the objectives of this research as well as the limitations of this study, were described. In particular, this chapter contained the recommendations for future practice and further research.

 Ralph Waldo Emerson*1803 - 1882*
"The reward of a thing well done is to have done it."

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Annexure A

Application for Permission from Hospital Management to Conduct Research

University of South Africa
PO Box 392
Pretoria
0003

Cellular: 082 41 368 14
Enquiries: Estelle le Roux
E-mail :   estelle@worldonline.co.za

Hospital/Nursing Manager

REQUEST FOR PERMISSION TO CONDUCT RESEARCH IN THE FACILITY: RESEARCH TOPIC: Transfer to Higher Level of Care: A Retrospective Analysis of Patient Deterioration, Management as well as Processes Involved.

I am presently studying for a Masters degree at the University of South Africa.
Your approval is required to conduct research. A copy of the approval from the University of South Africa is included as annexure 6.

The purpose of this research is a retrospective analysis of the management of patients and the processes encounter when transferring patients from a lower level of care to a higher level of care.
The outcome of research, should improve the quality of care, prevent patients from deterioration in the ward, and avoid transfers and re-admission to a higher level of care.

If permission is granted I will ensure that:
- all information will be treated as confidential
- your facility will not be mentioned in the research without written consent from the Academic Board of the facility
- where name of the facility is mentioned, the results will not be published without written permission from the Academic Board of the facility

I will comply with the legal requirements regarding the patient's rights and confidentiality.

If you have any further questions, you are welcome to contact or approach me.
Yours sincerely

Annexure B

Declaration in Respect of Research

Annexure C

University of South Africa Ethical Committee Approval

Annexure D

Pro forma

Pro forma

TRANSFER TO HIGHER LEVEL OF CARE

SECTION A: DEMOGRAPHIC DATA

1. Patient Code:
2. Gender:
3. Age:
4. Admission date:
5. Admission time:

SECTION B: ADMISSION AND TRANSFER

6. Speciality
7. Diagnosis:
8. Type of admission:
   a. Elective
   b. Emergency
9. Transfer date:
10. Transfer time:
11. Transfer journey:

SECTION C: DETERIORATION

12. Deterioration time
13. First entry of patient deterioration in patient health record as recorded by nursing staff
14. Actual deterioration time

SECTION D: REPORTING AND ACTION TAKEN BEFORE TRANSFER

15. Time Specialist notified of deterioration
16. Time of request by specialist for transfer
17. Actions taken by nursing staff / specialist
18. Actions taken:
    a. Appropriate
    b. Inappropriate
19. Actions taken:
    a. Effective
    b. Ineffective

c.

SECTION E: DETERIORATION BEFORE AND AFTER TRANSFER

    20.   Further deterioration before transfer to higher level of care

    21.   Time of actual transfer

    22.   Actions taken after transfer

        a. Appropriate

        b. Inappropriate

SECTION F: OUTCOME

    23.   Time of stabilisation

    24.   Mortality

Annexure E

South African Nursing Council
Scope of practice

Scope of practice for registered nurses: Chapter 2

The scope of practice of a registered nurse shall entail the following acts or procedures, which may be performed by scientifically based physical, chemical, psychological, social, educational and technological means applicable to health care practice:

(a) The diagnosing of a health need and the prescribing, provision and execution of a nursing regimen to meet the needs of a patient or group of patients or, where necessary, by referral to a registered person;

(b) the execution of a program of treatment or medication prescribed by a registered person for a patient;

(c) the treatment and care of and the administration of medicine to a patient, including the monitoring of the patient's vital signs and of his reaction to disease conditions, trauma, stress, anxiety, medication and treatment;

(d) the prevention of disease and promotion of health and family planning by teaching to and counseling with individuals and groups of persons;

(e) the prescribing, promotion or maintenance of hygiene, physical comfort and re-assurance of the patient;

(f) the promotion of exercise, rest and sleep with a view to healing and rehabilitation of a patient;

(g)   the facilitation of body mechanics and the prevention of bodily deformities in a patient in the execution of the nursing regimen;

(h)   the supervision over and maintenance of a supply of oxygen to a patient;

(i)   the supervision over and maintenance of fluid, electrolyte and acid base balance of a patient;

(j)   the facilitation of the healing of wounds and fractures, the protection of the skin and the maintenance of sensory functions in a patient;

(k)   the facilitation of the maintenance of bodily regulatory mechanisms and functions in a patient;

(l)   the facilitation of the maintenance of nutrition of a patient;

(m) the supervision over and maintenance of elimination by a patient;

(n)   the facilitation of communication by and with a patient in the execution of the nursing regimen;

(o)   the facilitation of the attainment of optimum health for the individual, the family, groups and the community in the execution of the nursing regimen;

(p)   the establishment and maintenance, in the execution of the nursing regimen, of an environment in which the physical and mental health of a patient is promoted;

(q)   preparation for and assistance with operative, diagnostic and therapeutic acts for the patient;

(r) the co-ordination of the health care regimens provided for the patient by other categories of health personnel;

(s) the provision of effective patient advocacy to enable the patient to obtain the health care he needs;

(t) care of the dying patient and the care of a recently deceased patient within the execution of the nursing regimen.

Scope of practice for enrolled nurses: Chapter 5

The scope of practice of an enrolled nurse shall entail the following acts and procedures as part of the nursing regimen planned and initiated by a registered nurse or registered midwife and carried out under his direct or indirect supervision:

(a) The carrying out of nursing care to fulfill the health needs of a patient or a group of patients;

(b) caring for a patient, and executing a nursing care plan for a patient, including the monitoring of vital signs and the observation of reactions to medication and treatment;

(c) the prevention of disease and the promotion of health and family planning by means of information to individuals and groups;

(d) the promotion and maintenance of the hygiene, physical comfort and reassurance of a patient;

(e) the promotion and maintenance of exercise rest and sleep with a view to the healing and rehabilitation of a patient;

(f)   the prevention of physical deformity and other complications in a patient;

(g)   the supervision over and maintenance of a supply of oxygen to a patient;

(h)   the supervision over and maintenance of the fluid balance of a patient;

(i)   the promotion of the healing of wounds and fractures, the protection of the skin and the maintenance of sensory functions in a patient;

(j)   the promotion and maintenance of the body regulatory mechanisms and functions in a patient;

(k)   the feeding of a patient;

(l)   the promotion and maintenance of elimination in a patient;

(m)   the promotion of communication by and with a patient in the execution of nursing care;

(n)   the promotion of the attainment of optimal health in the individual, the family, groups and the community;

(o)   the promotion and maintenance of an environment in which the physical and mental health of a patient are promoted;

(p)   preparation for and assistance with diagnostic and therapeutic acts by a registered person;

(q)   preparation for and assistance with surgical procedures and anaesthetic;

(r)   care of a dying patient and a recently deceased patient.

Scope of practice for enrolled nursing assistants: Chapter 6

The scope of practice of an enrolled nursing assistant shall entail the following acts and procedures as part of the nursing regimen planned and initiated by a registered nurse or registered midwife and carried out under his direct or indirect supervision:

(a) The promotion and maintenance of the health of a patient, a family and a community;

(b)   the provision of health and family planning information to individuals and groups;

(c)   the care of a patient and the execution of a nursing care plan for a patient;

(d)   the promotion and maintenance of the hygiene of a patient, a family and a community;

(e)   the promotion and maintenance of the physical comfort, rest, sleep, exercise and reassurance of a patient;

(f)   the prevention of physical deformity and other complications in a patient;

(g)   the supervision over and maintenance of a supply of oxygen to a patient;

(h)   the taking of the blood pressure, temperature, pulse and respiration of a patient;

(i)   the promotion and maintenance of the body regulatory functions of a patient;

(j)   the promotion of the nutrition of a patient, a family and a community;

(k)   the maintenance of intake and elimination in a patient;

(l)   the promotion of communication with a patient during his care;

(m) the preparation of individuals and groups for the execution of diagnostic procedures and therapeutic acts by a registered person;

(n)   the preparation for and assistance during surgical procedures under anaesthetic;

(o)   the care of a dying patient and a recently deceased patient.

Annexure F

South African Society of Anaesthesiologist Intensive care categories

South African Society of Anaesthesiologist Intensive care

The categories in ICU are:

Category 3 (tertiary ICU facility)
This category ICU offers the highest degree of patient care and the type of patient admitted to this unit includes those:-
- with multiple organ failure;
- requiring multidisciplinary intervention;
- requiring ventilation with a second organ failure;
- hemodynamic unstable patients – e.g. Unstable myocardial infarct; immediate post-bypass surgery, etc.

Category 2
Patients admitted to this category of ICU require slightly less care than category 2 patients and include patients who:-
- require active system support e.g. I.P.P.V;
- have single organ failure e.g. stable myocardial infarct; diabetic coma; head injury; fail chest; severe asthma; acute pancreatitis; status epilepsy and eclampsia;
- airway problems;
- conditions requiring potent drug infusions, e.g. sodium nitroprusside and dopamine

Category 1
Patients who are admitted to this category of intensive care unit require intensive monitoring only and include those patients who have:-
- fluid, electrolyte or metabolic disturbances e.g. diabetic pre-coma, post operative monitoring;
- drug overdose not requiring IPPV;
- neuromuscular weakness not requiring IPPV;
- single organ dysfunction not requiring active support e.g. asthma, congestive cardiac failure and pneumonia

Annexure G

South African Society of Anaesthesiologist
Nursing personnel in Intensive care units

According to the South African Society of anaesthesiologists (SASA) (2001:1) staffing of Intensive care units is as follows:

Category 3 ICU
ICU nurse: patient ratio 1.5: 1 and 2: 1 depending on number of Category 3 patients. (This means that there is one registered nurse with each patient at all times).
Not less than 50% of nurses with intensive care nurse training.

Category 2 ICU
Nurse: patient ratio 1: 1
At least 25% of nurses should be intensive care trained.

Category 1 ICU
Nurse: patient ratio 1: 2
Control nurse should be intensive care trained.

Annexure H

Application for Permission from Clinicians to Conduct Research

1 Umbertina
236 Steger Street
Groenkloof
0181
082 413 6814

To whom it may concern

All specialists concern in the research of patients' transfer to a higher level of care during May 2005 and October 2005 gave consent.

The research protocol was discussed with all doctors who gave written consent to the research.

The research aim is to investigate in retrospect the period prior transfer to a higher level of care and investigate the processes and problems encountered with transferring patients from general wards to a higher level of care.

The purpose of this study is to determine areas for clinical improvement and to identify specific change that is needed in clinical practice to improve quality care as an integrated part of clinical governance.

The research method consists of the extraction of data from the relevant patient's health records.

Telephonic consent was obtained from all patients involved. The research protocol, aim, purpose and study method were discussed with relevant patients and families in non-professional terms. The patient and families were ensured that confidentiality is of high priority and therefore no names or diagnosis shall be revealed. The research outcome will be published in medical magazines for doctors and nursing personnel.

Sincerely yours,

Annexure I

Telephonic Consent from the Patient or Family

<div align="right">
Umbertina 1
Stegerstraat 236
Groenkloof
0181
082 41 368 14
</div>

RE: Investigation

Dear Patient or Family

The researcher and an intensivist, are investigating, patient management prior transfer.

The purpose of the study is to analyse in retrospect the deterioration; management and processes involved in transfer patients to a higher level of care.

The process to collect information is to extract data from the relevant patient's health record that have been transferred to a higher level of care during May and October 2005.

Your consent is needed for this research.

Permission for conducting this research has been granted by the hospital authorities and relevant specialists.

Your participation in this study is voluntary and you can refuse to participate or stop at any time without stating a reason.

Ethical considerations:
- all information will be treated as confidential
- names will not be mentioned in the research without written consent
- where names are mentioned, the results will not be published without written permission
- telephonic consent will be obtained from all patients
- patients may at any time refuse or withdraw participation
- as all information or data is anonymous, you will not be able to recall your consent, as your information will not be traceable

- data that may be reported in scientific journals will not include any information that identifies you as a participant of this study

If you have any further questions, you are welcome to contact or approach me.

Thank you for your willingness to participate in this research.

Kind regards

Annexure J

Specialties classified as level 3 services

Group 1 Specialties	Group 2 Specialties	Group 3 Specialties
	Cardiology	Cardiology
	Cardiothoracic Surgery	Cardiothoracic Surgery: Heart and lung transplant unit
Burns		
	Clinical Immunology	Clinical Pharmacology
Critical Care & ICU		
Dermatology	Craniofacial Surgery	
Diagnostic Radiology:	Diagnostic Radiology	Diagnostic Radiology
Ear Nose & Throat	Ear Nose & Throat	Ear Nose & Throat
	Endocrinology	
Gastroenterology	Geriatrics	General Surgery
General Medicine	Hematology	Hematology
General Surgery	Human Genetics	Hepatology
Infectious Diseases	Infectious Diseases	Infectious Diseases
	Medical & Radiation Oncology	Medical and Radiation Oncology
Mental Health		
	Neurology	
Neonatology		
	Neurosurgery	Nephrology
Nephrology	Nuclear Medicine	Nuclear Medicine
Obstetrics & Gynaecology	Obstetrics & Gynaecology	
Ophthalmology	Ophthalmology	Ophthalmology
Orthopedics	Orthopedics	
Pediatrics	Pediatrics	Pediatrics
Plastic & Reconstructive Surgery	Plastic & Reconstructive Surgery	
Rehabilitation Centre	Rehabilitation Centre	
Respiratory Medicine		Respiratory Medicine
	Rheumatology	
Trauma		
Urology	Urology	
Vascular Surgery	Vascular Surgery	

Source: Source: South Africa National Department of Health. Health facility

definitions (2006:12-13)

Annexure K

Facility requirement for level 3 Hospital

	PERSONNEL	EQUIPMENT / INSTRUMENT
1. Administrative Service 1.1. Personnel 1.2. Accounting 1.3. Budget and Finance 1.4. Medical Records 1.5. Property and Supply 1.6. Housekeeping 1.7. Laundry and Linen 1.8. Maintenance 1.9. Ambulance Service 1.10. Security 1.11. Dietary 1.12. Social Service	**1. Administrative Service** • Chief of Hospital • Administrative Officer • Clerk (pool) 1:50 beds • Bookkeeper • Billing Officer • Cashier • Medical Records Officer • Medical Records Clerk 1:75 beds • Supply Officer • Storekeeper • Laundry Worker 1:50 beds • Security Guard • Maintenance Personnel • Driver • Nutritionist / Dietitian • Cook 1:100 beds • Food Service Supervisor • Food Service Worker 1:50 beds • Medical Social Worker	**1. Administrative Service** • Computer / Typewriter • Fire Extinguisher • Standby Generator • Push Cart • Exhaust Fan • Food Scale • Garbage Receptacle with Cover • Osterizer / Blender Refrigerator / Freezer • Stove • Utility Cart • Ambulance

2. Clinical Service
 Specialty Clinical Care
• Department of Medicine
• Department of Pediatrics
• Department of Obstetrics and Gynecology
	2. Clinical Service
	• Chief of Clinics
	• Department Head 1/department
	• Physician 50 beds & below = 6
	  every additional 50 beds = additional 1
	• Dentist
		2. Clinical Service
		• Emergency Room
		• Ambu Bag
		  o Adult
		  o Pediatric
		• Defibrillator

• Department of Surgery and Anesthesia 2.2. **Critical Care** • Intensive Care • Post Anesthesia Care • Pathologic – Premature Nursery 2.3. **Emergency Service** 2.4. **Outpatient Service** 2.5. **General Dentistry**	• Dental Aide	• ECG Machine • ENT Diagnostic Set • Emergency Cart • Examining Table • Examining Light • Instrument Table • Laryngoscope with Blades • Medicine Cabinet • Minor Surgery Instrument Set • Nebulizer • Neurological Hammer • Oxygen Unit • Sphygmomanometer 2.1.16.1. Adult Cuff 2.1.16.2. Pediatric Cuff Set 2.1.17. Stethoscope 2.1.18. Suction Apparatus 2.1.19. Suturing Set 2.1.20. Tracheostomy Set 2.1.21. Vaginal Speculum Set 2.1.22. Wheelchair 2.1.23. Wheeled Stretcher
3. Nursing Service 3.1. Intensive Care and Management 3.2. Health Education and Counseling	**3. Nursing Service** 3.1. Chief Nurse 1 3.2. Supervising Nurse 50 beds & below = 1; 51 – 100 beds = 2 101 – 150 beds = 3	

	151 beds & above = 4 3.3. Head Nurse 1:15 staff nurses 3.4. Staff Nurse 1:12 beds at any time	
4. Ancillary Service 4.1. Tertiary Clinical Laboratory 4.2. Radiology 4.3. Pharmacy		