Optimising stabilisation of the critically ill child in the medical emergency unit at the Red Cross War Memorial Children`s Hospital. An ethnographic study

by

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DECLARATION

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ABSTRACT

Care of the critically ill child is complex in the medical emergency room. Following their arrival in the emergency room, the early stabilization of the critically ill child is key to their safety and future outcomes, and these in turn are dependent on the co-ordination, cooperation and functioning of a myriad of factors. This study set out to describe the social processes at work in a busy paediatric emergency unit to understand factors that facilitate and hinder optimal stabilisation of the critically ill child in a tertiary children's hospital in Cape Town, South Africa.

The study methodology was ethnography, which guided a rigorous process of gathering rich data from various sources. Data gathering was organised around ten ill children (child pathways), who were observed from entry to exit from the unit. These included data from structured observations, informal interviews, retrospective clinical data of observed pathways, field notes, and a 7-month review of the Resuscitation Room Child Register.

Glaser's work guided the analysis of textual data and the demographic data were subjected to simple descriptive statistical analysis. The emic (inside) nature of the ethnographic approach yielded an understanding of day-to-day practices, and organisational and cultural norms which impacted on how the system worked, while statistical data contributed to a thick description of practices in the setting. Themes of *activities related to patient care* and *organisational patterns* were identified.

Organisational patterns determined the process of patient care and stabilisation and were fundamental to how a child moved from rapid identification through to treatment. The complex nature of paediatric emergency care, practice norms and both linear and non-linear interactions, influence how a child is stabilised.

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Chapter 1: Introduction

This purpose of this study was to explore factors that optimise stabilisation of the critically ill child in the medical emergency unit at the Red Cross War Memorial Children`s Hospital. This chapter provides an overview of the research problem and begins by positioning emergency care in the critical care continuum. The sections following describe the setting of the research, introduce the problem statement, iterate the research question, state the research aims, and discuss the significance of the study.

1.1. Introduction

A United Nation's Summit set the stage for a global fight against poverty by developing the Millennium Development Goals (MDGs) in 1990 (United Nations, 2008). Eight time-bound goals were established to address extreme poverty, which included a focus on child health. MDG 4 aims to reduce global under-five mortality by two-thirds by 2015 (United Nations, 2008). Considerable progress has been achieved, with a reduction in child deaths from 12 million in 1990 to 6.9 million in 2011. Despite this, 19 000 children under five years of age still died daily in 2011 (United Nations Children's Fund (UNICEF), 2012).

Causes of death are associated with poverty and inequity (Kinney et al., 2010). Poverty weakens child health by increasing the "risk of illness and under nutrition through insufficient diet, inadequate sanitation, and reduced care-seeking and access to health care services" (Kinney et al., 2010, p.4). Consequently, children become ill and die from well-recognised and treatable illnesses (Baker, 2009b). Under-nutrition is linked with more than one-third of global child deaths, while pneumonia (18%), preterm birth complications (14%), diarrhoea (11%), complications during birth (9%) and malaria (7%) are leading causes of mortality (UNICEF, 2012).

Since 1990 global under-five mortality dropped by 41%, from 87 deaths per 1000 live births in 1990 to 51 in 2011 (UNICEF, 2012). In one-third of the 49 developing countries, under-five mortality has been reduced by 40% (UNICEF, 2012). Furthermore, a notable 50% reduction was achieved in Eastern Asia, Northern Africa, Latin America and the Caribbean, South-Eastern Asia and Western Asia (UNICEF, 2012). Yet the highest mortality rates are reported in sub-Saharan Africa, where 1 in 9 children die before their fifth birthday. Twenty three of 24 countries in this region have an under-five mortality rate of more than 100 per 1000 live births (UNICEF, 2012). While South Africa's rate is 56 per 1000, the reduction has not been sufficient for the country to reach its millennium goal of 20 per 1000 by 2015.

1.1.1. Child mortality in South Africa

South Africa has a population of 50 million people, of whom 18.5 million are under the age of 18 years (Hall, Woolard, Lake & Smith, 2012). Labour migration to larger metropolitan centres means that children are often separated from their parents. Half of the national child population lives in the three rural provinces of KwaZulu-Natal (23%), Eastern Cape (14%) and Limpopo (12%), where services and infrastructure are often compromised (Hall et al., 2012). The recently published *South African Child Gauge 2012* states that "a child`s growth and development are dependent on the family`s living conditions and access to services and resources in the surrounding community" (Hall et al., 2012, p.91). Preventative and curative primary health care services are pivotal in the outcomes of morbidity and mortality, and are currently focused on reducing human immunodeficiency virus (HIV) infection and tuberculosis (TB), improving immunisation and vitamin A supplementation, promoting exclusive breastfeeding and introducing rotavirus and pneumococcal vaccines (Hall et al., 2012).

Health care delivery in the South African context varies across the nine provinces, since health care services, accessibility, resources and population differ considerably in each. In some parts of the country health care and service provision mimic those of developing countries, while in others (including some parts of the Western Cape) availability and accessibility compare to those in developed countries. It is therefore of particular interest that South Africa has made such disappointing progress, because it is relatively rich and has relatively high expenditure per capita on health. At Red Cross War Memorial Children's Hospital (RCWMCH) in the Western Cape the facilities and resources are equivalent to those expected in a developed country while serving a population which predominantly reflects that of a developing country.

In South Africa health care is not always available or accessible to the largest number of children living in remote areas, who carry the greatest burden of disease. It is estimated that seven million children travel for more than 30 minutes to reach their health care service provider (Hall et al., 2012). Poor roads and expensive public or private transport further hinder timely accessibility.

Hints of improvement in under-five mortality rate (U5MR) and infant mortality rate (IMR) are seen in recent South African statistics (Actuarial Society of South Africa, 2011). The IMR has decreased from 52 in 2000 to 33 in 2012. Less convincing is the U5MR, which only recently reflected a decrease after 2003, from 74 deaths per 1000 live births to approximately 48 in 2012 (Actuarial Society of South Africa, 2011). It seems unlikely that South Africa will achieve the set goal by 2015.

1.1.2. Strengthen all aspects of health care to improve outcomes

Global exposure of poor child health outcomes elicited a response with an emphasis on public health approaches. The World Health Organization (WHO) showed significant support of and contributed to improved hospital care for children in poorer countries by developing guidelines that provide current practice recommendations (WHO, 2005). Among these was the *Pocket Book of Hospital Care for Children* (WHO, 2005), which informed health care workers on clinical guidance in the treatment of major causes of childhood mortality, such as pneumonia, diarrhoea, measles and HIV infection.

These guidelines were an extension of the Integrated Management of Childhood Illness (IMCI) developed by the World Health Organization (WHO) and UNICEF in the mid-1990s. The purpose of the IMCI was to promote healthy growth among children under the age of five years, using preventative and curative approaches at primary care level (Gove, 1997; Tulloch, 1999). The IMCI includes evidence-based strategies which successfully enabled assessment and early management of sick children where they were needed most (Duke et al., 2006; Tulloch, 1999).

Despite improved primary level care, it is estimated that between 10% and 20% of children will require referral to secondary or tertiary care facilities (Campbell et al., 2008). Best outcomes for children are thus reliant on an entire health system (Razzak & Kellermann, 2002; Duke et al., 2006; Campbell et al., 2008; Baker, 2009b). While primary interventions are vital and implemented with success, children will still become ill and require hospitalisation. Baker (2009b) insists that care for the sickest child with the greatest risk of mortality should be a priority. He further believes that the intentional focus on improved emergency and critical care for children will have a significant effect on child mortality (Baker, 2009b).

While this may be a valid statement in some settings, the poorest countries with the least resources and possibly the highest burden of disease may never be able to provide sustainable intensive care for children. The challenge proposed by Baker is for each setting to optimise care for critically ill children using available resources.

1.1.3. Critical care

Critical care is defined by the World Federation of Paediatric Intensive and Critical Care Society (Kissoon et al., 2009) as “the treatment of children with life threatening illness or injury in its broader sense, without regard for location and including pre-hospital and emergency and intensive care” (Kissoon et al., 2009,p.597). Earlier thinking limited critical care to an intensive care environment; however, Kobusingye et al. (2005) widened this perspective by placing critical care on a continuum of care (Kobusingye et al., 2005). One component along this continuum is emergency care. The World Federation of Pediatric Intensive and Critical Care Societies (Kissoon et al., 2009) supports this view and maintain that care for the critically ill or injured is commenced before the patient arrives at the hospital (pre-hospital) and extends after the child is discharged from the intensive care unit (post-critical care), as shown in Figure.1 (Kissoon et al., 2009).

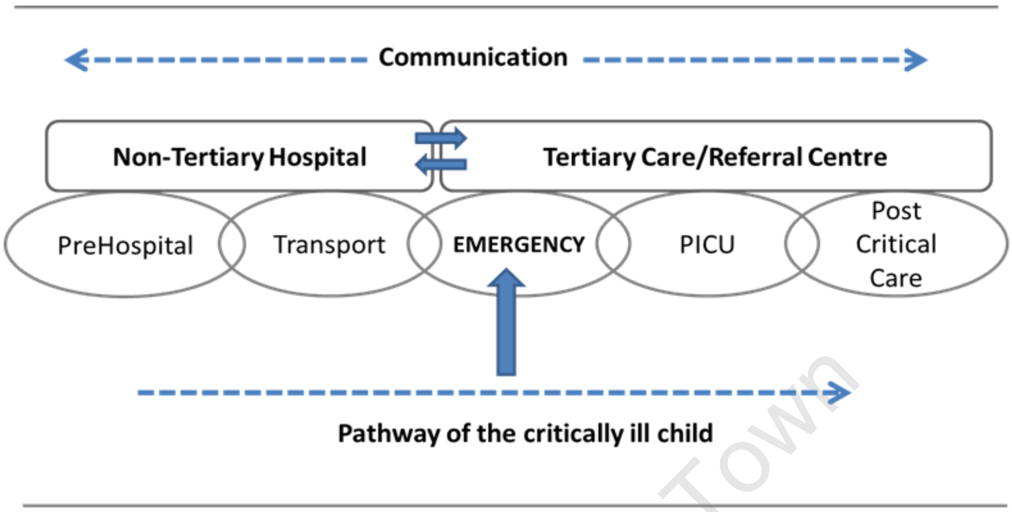


Figure 1.1: Continuum of critical care (Kissoon et al., 2009)

Kissoon et al. (2009) maintain that safety and best outcomes for the critically ill or injured child are dependent on many complex factors within and between various components of care, from pre-hospitalisation to post-critical care. These components consist of ambulance services, emergency and trauma teams, high-dependency or intensive care units and rehabilitation. For optimal health outcomes each component requires management of staffing, equipment, stock, cleaning and housekeeping. Each component is led and facilitated by different teams of providers, sometimes at different sites, who receive different training. These teams share responsibility for care across the continuum from pre- hospitalisation to post-critical care (Ghosh & Pepe, 2009).

When considering the continuum of care for the critically ill child, it is evident that emergency care is one component along this pathway. This study will focus on this complex component of care.

1.1.4. Emergency care

Emergency care has a purpose aligned with critical care along the continuum; it serves to provide “care to patients with sudden, serious reversible disease” (Baker, 2009b,p.24). Both emergency and critical care services are identified as under-prioritised components of the health system, specifically in developing countries (Baker, 2009a; Nolan et al., 2001; Razzak & Kellermann, 2002). However, emergency care may be among the most cost-effective and important aspects of critical care, particularly when intensive care is probably just too expensive in the setting of poorer countries.

Argent (2009, p.4) describes some of the critical care challenges experienced in least-developed countries as: “discrepancies between the load of critically ill patients and the resources available, huge differences between critical care in the rich and poor countries of the world, and extreme shortage of published research regarding the place and development of critical care in the poorer parts of the world”. Financial aid and resources are at the hub of challenges, especially when considering that the budget for health care is less than US$20 (approximately R200) per person per annum in some countries (WHO, 2008). The shortage of funds hinders the employment of nurses, doctors and other health care staff, and results in scarcity of much-needed laboratory and support services and equipment (Narasimhan et al., 2004; English et al., 2004). Deficiencies are further compounded by a shortage of trained, specialised paediatric critical nurses and doctors (Lipman & Lichtman, 1997). In spite of these challenges Argent (2009, p.5) is convinced that the “organization of emergency services may have a dramatic impact on the outcomes of critical illness or injury”.

Emergency services provide emergency care, which refers to “immediate and urgent medical intervention” (Razzak & Kellermann, 2002). This care can be rendered in different settings prior to admission to hospital, but this study will focus on emergency care provided to children on arrival at hospital where stabilisation is the primary objective.

This component is strategically positioned to assist in early identification and treatment of critical illness or injury. Emergency care is delivered within the first three components of critical care (Razzak & Kellermann, 2002) as described by Kissoon et al. (2009), and includes pre-hospital, transport and emergency. The first component is at the scene of an accident or the onset of illness, where paramedics or other health care providers initiate first steps towards stabilisation. Emergency care continues through transportation to the hospital, which in itself poses a range of complexities and challenges. Finally, emergency care is administered on arrival at the hospital emergency unit. A critically ill child can be stabilised throughout all three components, although many children arrive at the hospital without the benefits of early interventions outside of the hospital.

On arrival at hospital management of the critically ill child in the medical emergency unit (MEU) is directed at stabilisation. Stabilisation is the intervention aimed at minimising possible acute decompensation of vital functions in the child (Macmillan & McGraw-Hill, 2002). A critically ill child is described as "a patient who is physiologically unstable, requiring constant and minute-to-minute titration of therapy according to the evolution of the disease process" (Brilli et al., 2001). Optimal stabilisation is dependent on rapid identification of the child's illness, followed by prioritised assessment and appropriate treatment (Molyneux, Ahmad & Robertson, 2006). In practice these steps include sorting children by prioritising who needs to be seen first, followed by establishing a differential diagnosis and starting treatment according to the child's immediate physiological needs (Anderson et al., 2006).

A hospital emergency unit differs from an under-five community clinic in the services it provides. It is reasonable to expect that the majority of children arriving at the emergency unit would be sorted and prioritised according to their medical needs. Triage is an effective way of prioritising patients "to determine how urgently they require care" (Twomey et al., 2013). Various triage scales are used in different settings (Iserson & Moskop, 2007). In this environment time is a constant pressure, where actions and activities to optimise stabilisation are set against the clock (Razzak & Kellermann, 2002). The care rendered during this window of opportunity has a profound impact on worsening organ failure affecting morbidity and mortality (Rivers et al., 2002).Numerous studies highlight the positive impact of time-sensitive interventions on patient outcomes (Carcillo & Tasker, 2006; Funk, Sebat & Kumar, 2009; Rivers et al., 2002).

However, stabilising a critically ill child poses its own set of unique challenges. Children (and particularly young children and infants) differ from adults in many respects and many emergency departments may not be sufficiently prepared (Dart, 2011; Dickson et al., 2009) Not only do they present with a different spectrum of diseases, but their physiological and emotional response to illness makes treatment vastly different from that of adults (Athey et al., 2001). Children have lower physiological reserves, leading to a rapid deterioration. Furthermore, strong compensatory mechanisms allow them to increase their systemic vascular resistance and maintain blood pressure until a substantial amount of blood is lost (Gausche-Hill, Schmitz & Lewis, 2007). These are some of the challenges associated with stabilising critically ill children. Optimal time-sensitive outcomes are reliant on providers who are trained and experienced to recognise the warning signs and respond rapidly with appropriate treatment in a facility that is equipped for the specific needs of children (Athey et al., 2001).

Stabilisation is further affected by a number of other factors beyond the acuity or complexity of the child’s condition. A typical emergency unit is characterised by ringing telephones, unscheduled arrival of patients, overcrowding (Brixey, Robinson, Turley & Zhang, 2010; Henneman et al., 2010), staff shortages and limited inpatient beds, and factors that inhibit the struggle to meet the needs of large patient volumes (Kissoon & Goldman, 2007), and therefore influence the success of stabilising critically ill children.

The MEU can be viewed as a central cog in this continuum of care, linking the outside world to the hospital; it is the place where a child is assessed and stabilised before transfer to a ward for further management. As already indicated, best outcomes are dependent on the coordination, cooperation and functioning of multiple factors in the treatment and management of the critically ill child, from the onset of the illness in the pre-hospitalisation phase to post-critical care. Available medicines, equipment, treatment guidelines, support systems, physical facilities, human resources, patient-related data and current treatment guidelines will have an impact on the quality of care. The availability of all of these resources could be seen as adequate to provide optimal care for the critically ill child; however, delivery of care is also dependent on how care providers work together to manage these factors in activating care.

In considering the primary goal of emergency care and the environment in which it occurs, a key element contributing to stabilisation within this system is the human contribution. The human factor as defined by Kohn, Corrigan and Donaldson (2000, p.63) as the "interrelationship between humans, the tools they use, and the environment in which they live". What makes the emergency unit somewhat unique is that the core team is often complemented by members from other teams and other sites. These teams are expected to work toward the common goal of stabilising a critically ill child by amalgamating various skills (technical and non-technical), work cultures, work ethics, training and communication norms and practices (Flin et al., 2004; Mitchell, 2008). Providing emergency care is not a simple, linear process and is reliant on many inter-linking factors.

1.2. Setting of this research

The RCWMCH in Cape Town, South Africa was established in 1956. It is the only specialist referral children`s hospital in the sub-Saharan region and provides paediatric services with a full range of sub-specialities at quaternary, tertiary and secondary levels of care, including critical care (Coetzee, 2008). Critical care is offered through the MEU, trauma unit, specialist surgery unit and paediatric intensive care unit (PICU). Children are referred from all nine provinces and the rest of Africa (Western Cape Government, 2011). Many of the patients are from poorer communities, where unemployment and overcrowding contribute to inadequate nutrition, exposure to infectious diseases and high prevalence of TB and HIV infection. These factors add to the burden of disease and place considerable stress on the health care system.

Emergency care is provided to children presenting with life-threatening illness or injury who are admitted to the hospital through the MEU or trauma unit (Figure 1.2). Those who are injured are treated in the trauma unit, while medically ill children are seen in the MEU. In 2011, 140 150 children were treated in the outpatient department (OPD), while 22 544 were admitted to the various in-patient hospital wards (RCWMCH, 2012); of those, 32 837 children presented to the MEU. All children who present here are prioritised according to their acuity (triaged) and resources allocated to those who need it the most. There are some that could have been managed at lower levels of care and closer to their homes. This acuity mix results in an overcrowded emergency unit, which often complicates prioritisation of critically ill children.

Surgical patients are also triaged here but are referred to a separately operating 24 hour Surgical Department. However, in the case where a surgical patient requires resuscitation, stabilisation is performed in the resuscitation room after which the surgical team is contacted for further management.

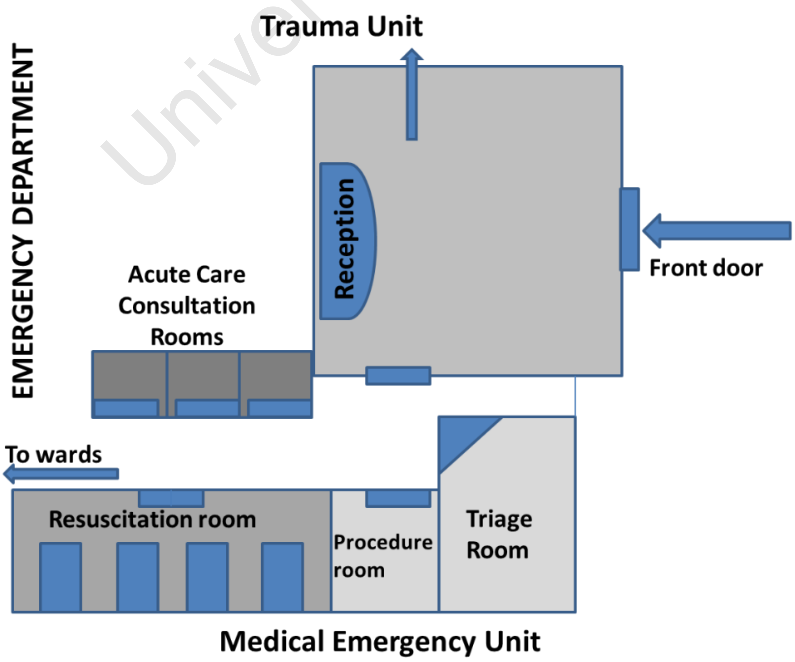


Figure 2.2: The Emergency Department

Hospital statistics reflect a range of children triaged monthly, with numbers fluctuating between 1800 and 4800 children, of whom between 67 and 150 respectively were classified as seriously ill (RCWMCH, 2012). These sizeable discrepancies relate to seasonal disease patterns as well as unexpected outbreaks of infectious diseases, such as a measles outbreak in 2010. Despite the ebb and flow of the number of children passing through the MEU, staffing and resources remain stable.

Staffing is sub-optimal compared to the number of children seen in this area; however, it could be far better than most settings providing emergency care to children in sub-Saharan Africa. Permanent medical and nursing staffing at the RCWMCH MEU comprises 18 nurses (nine professional nurses, four enrolled nurses and five enrolled nurse auxiliaries), one medical consultant, three medical officers and rotating registrars and senior house officers. Furthermore the team is complemented by administrative staff and support staff including security, porters and cleaners, radiologists and medical staff from other disciplines who are accessed on a needs basis. The MEU is resourced sufficiently and has access to radiology, laboratory and other diagnostic in-hospital services.

The Institute for Healthcare Improvement (IHI) states that optimal care is reliant on getting the right child in the right place with the right provider and the right information at the right time (IHI, 2003). Ultimately a combination of treatment streams, resource allocation and organisational practices are purposed to ensure that these five areas are addressed. However, the unique nature of the medical emergency environment poses its own set of challenges that complicate how critically ill children are stabilised. These challenges include high admission rates of children with a range of sometimes complex conditions, interruptions and crowding, which deflect and interfere with getting the right child in the right place with the right provider and the right information at the right time. The RCWMCH has the advantage of providing the critically ill child with care from the emergency unit to discharge from intensive care. In a hospital considered one of the best on the continent with regards to technology, facilities and resources; and with wards staffed by trained professionals, it cannot yet claim the seamless (and therefore safe) care of the critically ill child.

1.3. Problem statement

MDG 4 calls for a collaborative effort to decrease under-five mortality by two-thirds by the year 2015. Currently South African statistics show poor progress in this area. A strengthening of all components of care for children within the health system, including critical care, is required. Critical care is an under-prioritised component of the health system, specifically in developing countries (Nolan et al., 2001; Baker, 2009b; Razzak & Kellermann, 2002). Nolan et al. (2001) found that 90% of children admitted with common childhood illnesses can be treated with success, provided that they are promptly assessed and appropriately treated. Without prompt and appropriate intervention, 50% of children die within the first 24 hours after admission (Molyneux, 2001) which highlights the importance of this window period of stabilisation.

Features of quality and safety related to emergency and critical care are analysed through various positivist lenses. Several studies at this Hospital provided results mostly related to clinical management of critically ill children (Argent, 2012; Zar, 2013).Furthermore, a recent audit at the RCWMCH assessed the emergency management of septic shock admissions to the PICU compared to international guidelines (Rossouw & Argent, 2011). From a sample of 125 children, American College of Critical Care Medicine/Paediatric Advanced Life Support guidelines were not achieved for any child. The majority of these children were seen in the MEU prior to PICU admission. Indicators to measure quality of care are useful in analysing practice in order to ensure improvement; however, these measures are only able to give a partial picture.

These outcomes are extremely useful for clinical improvement of individual problems and usually result in revised policies or lead to an adaption in clinical interventions to address isolated problems. Porter (1996) explains that positivist outcomes focus on causal relationship, similarly, in the emergency setting, causal relationships fail to explain how the system works to facilitate care of the critically ill child. It seems feasible that identified problems could be better understood within the context of the whole system (Nugus, 2011). This includes thinking about who is in the system, what people do and how they work together. Furthermore, how things work are influenced by inherited cultures and traditional norms and practices that are part of how things happen (Hodgson, 2000).

A research methodology was required to answer the question by taking the complexities of the setting into account. An ethnographic approach was selected as it enabled an insider's perspective on stabilisation of the critically ill child, whilst regarding the cultural and social context of the setting (Mason, 2002). Hammersley and Atkinson (1995:1) describe it in the following way:

> *"[Ethnography is]…a particular method or set of methods. In its most characteristic form it involves the ethnographer participating, overtly or covertly, in people's daily lives for an extended period of time, watching what happens, listening to what is said, asking questions –in fact, collecting whatever data are available to throw light on the issues that are the focus of the research."*

1.4. The research question

What optimises stabilisation of the critically ill child in the MEU at the RCWMCH?

1.5. The research aim

The aim of the research is to develop a rich, detailed description (ethnographic record) of what happens to a critically ill child from entry to and exit from the MEU. The purpose is to provide insight into this complex setting and build an analytical framework from which to identify factors that optimise stabilising a critically ill child in the MEU at the RCWMCH.

The study has the following objectives:

- To gain trust and access to the unit by engaging the multidisciplinary teams who work there.
- To observe and describe what happens along the pathway of a critically ill child through the medical emergency room in order to understand the current norms and practices.
- To identify and describe factors that facilitate stabilisation of a critically ill child.
- To identify and describe factors that hinder stabilisation of a critically ill child.
- To give a descriptive account of system-wide patterns and extract key themes as they occur in this setting.

This exploration will provide a rich description of practice to serve as a platform for research-based practice improvement.

The central aim of ethnography is to study “social interactions, behaviours, and perceptions within groups, teams, organisations, and communities” (Reeves, Kuper & Hodges, 2008, p.337). Ethnography seemed the most appropriate methodology to add to the picture already sketched by positivist outcomes and offered a complementary perspective to explain and provide insight into poor or unexplained outcomes. Participant observations were aimed at understanding the beliefs, activities and practices highlighted in human interactions in this setting (Braithwaite, 2006). The way in which staff with different training and backgrounds communicated, related and worked together towards stabilising a sick child was noted. Thick descriptions combining data, from the line-by-line description of ten child pathways from entry to exit, field notes, informal interviews and retrospective reviews of clinical notes, were compiled into an ethnographic record. Data were combined to form an ethnographic record for each child pathway. Demographic data from the resuscitation room were added to describe the patient load and flow.

1.6. Significance of the study

With the understanding that every system is designed to produce the outcomes it produces, the challenge of optimising stabilisation for the critically ill child in the MEU requires that the whole system is considered. The underlying global challenge is to take an existing context with its existing resources and make the most effective system. However, in order to meet this challenge it is important to understand the local system and how it works. Currently data from the RCWMCH MEU reflect poor outcomes related to some aspects of care for the critically ill child (Rossouw, Morrow & Argent, 2011).To make sense of these outcomes, capturing the context and common organisational practices and norms using ethnography would assist in identifying factors which facilitate and hinder stabilisation of the critically ill child. Outcomes of this study could have relevance to the analysis of function of emergency units across the world, particularly those that function in contexts that are not dissimilar to that described here. Importantly, there must be many parts of the developing world with high patient load, high disease burden, and cultural and language complexity together with relatively limited human and other resources.

Chapter 2: Literature Review

2.1. Introduction

This chapter reviews the current literature on how stabilisation of the critically ill child can be optimised or hindered within the context of the MEU. The literature review was performed with the aim of widening the understanding of what could impact on the efficiency of stabilisation in the MEU at the RCWMCH, considering the setting, resources, patient population, burden of disease, teams and the core clinical goal of stabilisation. It was intentionally refocused away from evaluating technical aspects of clinical interventions such as recognition of shock or technical aspects of cardiopulmonary resuscitation.

Due to the location of this setting and the predominantly impoverished patient population, the initial focus was on literature from resource-poor countries. However, limited published data were sourced from these settings, including a dearth from a South African perspective. With this is mind, it was necessary to consider and include literature from resource-rich countries. Taking into consideration the vast data that could potentially pertain to this subject, literature suited to this context was selected. A broad search was conducted using the following key words: 'paediatric critical care' and 'emergency care'. 'Developing countries, triage, stabilisation, emergency care systems, interruptions, non-technical skills' were key words used to narrow the search. A vast amount of data that could potentially pertain to this subject was obtained, and only that which pertained to this context was selected.

The following databases and keywords were used:

DATABASES: PubMed, EBSCOHOST, ScienceDirect, Ovid and Google Scholar.

KEYWORDS: Paediatric critical care, emergency care, developing countries, triage, stabilisation, emergency care systems, interruptions, non-technical skills.

Chapter 1 laid a comprehensive foundation of the considerations that are important for this study. Child health is an urgent global priority and sub-Saharan Africa is struggling to improve child mortality to reach MDG 4 by 2015; recent trends show improvement in South African statistics; a collaborative effort to meet the MDG goals calls for all aspects of health care to be strengthened, including critical care. However, the reality of offering critical care holds different challenges for different countries due to a myriad of factors, predominantly determined by resources. In this vein, outcomes of critical illness are largely determined by how early management of the critically ill child takes place. Emergency care is a crucial part of the critical care continuum, and stabilisation offers a window of opportunity within this component. Optimal stabilisation is determined by rapid identification, prioritisation and early and appropriate management and treatment.

The literature review consists of the following sections: Stabilisation: A window of opportunity; Where stabilisation of the critically ill takes place; What contributes to the complexity of emergency care; and How people work in complex settings within emergency care.

2.2. Stabilisation: A window of opportunity

To emphasise this window of opportunity around stabilisation, Nolan et al. (2001) found that 90% of children presenting at hospitals with severe forms of common childhood illnesses could be treated successfully, provided that assessment and treatment were prompt and appropriate. Aqualitative study assessed the quality of care for seriously ill children in 13 district hospitals and eight teaching hospitals across the seven less-developed countries of Bangladesh, Dominican Republic, Ethiopia, Indonesia, Philippines, Tanzania and Uganda (Nolan et al., 2001). Experienced pediatricians' implemented a structured tool to assess initial triage, emergency and inpatient care, staff knowledge and practices as well as hospital support services. Findings showed that there was insufficient triage and inadequate initial assessment followed by inappropriate or delayed treatment, while inadequate ongoing monitoring was noted in 24% of inpatient children. Poor triage and emergency care were attributed to shortage of staff, poor training, inadequate medication and supplies, and lack of assessment and treatment guidelines. This study suggested a need to improve triage, assessment and emergency care of ill children.In another context at a similar time, Molyneux (2001) found that 50% of children died within the first 24 hours after admission. Both outcomes highlight the fragility of sick children while adequately emphasising the need for goal-directed and intentional early steps towards stabilisation to curb morbidity and mortality.

Internationally the ‘golden hour’ has become a recognised determinant of best outcomes in emergency care (Little, 2010). Time-sensitive interventions are intentional about decreasing delays that could result in harmful outcomes (Institute of Medicine, 2010). Accepting that time is a key determinant of a successful outcome, the process of stabilisation could appear straightforward. The most important principle is that sick children are identified soon after arrival and that treatment is commenced without delay. Triage is a structured process of sorting children to rapidly ensure that resources and time are allocated to those who need it most (Iserson & Moskop, 2007). Molyneux (2006) and Baker (2009 b) agree that steps include rapid identification, prioritisation, early assessment and appropriate management of mostly well recognised childhood diseases.

In one review Baker (2009b) positions the current state of paediatric emergency and critical care in low-income countries. The review draws attention to literature intended to evaluate where and how emergency and critical care takes place and reiterates that: few emergency departments exist; care is not prioritised; formal triage systems are lacking; and essential treatment is often unavailable or inappropriate. Despite identifying the shortcomings in these settings, Baker (2009b) crystallises that successful management of the critically ill child as dependent on rapid identification, prioritisation and urgent treatment. Although these steps cannot impact on the availability of emergency departments or resources, they can be used to guide and organise the actual process of stabilisation to address issues related to how sick children are identified, prioritised and treated.

Furthermore, Molyneux et al. (2006) successfully reduced inpatient child mortality from 10-18% to 6-8% in a government and teaching hospital in Blantyre, Malawi. The bedrock of this study was based on the understanding that "early assessment, prioritization for treatment and management of sick children attending are critical in achieving good outcomes" (Molyneux et al., 2006, p.314). These were identified as lacking in the study setting. Inappropriate admissions and high fatality rates were associated with delayed recognition of acuity and inadequate management. Intentional efforts to introduce a formal triage system, training in Emergency Triage Assessment and Treatment (ETAT) and restructured patient flow through the designated area resulted in reduced mortality (Molyneux et al., 2006).

Both the above sets of authors have made significant contributions to the arena of critical and emergency care in children, their studies concluded that good outcomes were reliant on early identification, prioritisation, early assessment and appropriate management. The authors identified these as the four pillars for stabilisation of acute or critically ill children.

2.3. Where stabilisation of the critically ill child happens

The outcomes of stabilisation can be impacted by where in the health system it takes place, where in the facility the child is stabilised, and whether there are trained health providers available in the place where it happens.Progress reports from MDG 4 show that the highest number of deaths in under-five-year-old children occur in sub-Saharan Africa. Poor outcomes reflect the overall situation of the health care systems from primary to tertiary care in these countries. Emergency paediatric care has since received priority in low- and middle-income countries (Simkiss, 2005). Kissoon believes that success is determined by a "comprehensive, seamless and integrated" system (2011, p.74). In the developed world this system is better resourced, whereas in poorer countries competing priorities and general lack of funds trip the system up (Kissoon, 2011). To illustrate these discrepancies, the government health expenditures in Nigeria, Uganda and Kenya are 20 times less than in South Africa – and that in the United States of America is 200 times more than in South Africa (Kissoon, 2011).

Resource-poor settings experience major challenges in delivering emergency care. Factors such as staffing, training, equipment and the work environment all contribute to the success of stabilisation (Molyneux & Robertson, 2002). Furthermore, studies have highlighted problems such as delayed recognition of acuity and the lack of a triage tool; late treatment; inadequate drug supplies; poor knowledge of treatment guidelines; and insufficient monitoring of sick children (Nolan et al., 2001; Gove, 1999; Tulloch, 1999). These diverse factors hint toward the complexity of stabilisation and the range of requirements (resources, and skills) necessary for good outcomes.

Sometimes frustration around poor outcomes and lack of resources can be a significant catalyst in finding innovative and cost-effective alternatives. Committed clinicians and health care professionals with innovative ideas have significantly improved and optimised care for children. In Guinea-Bissau mortality resulting from malaria was reduced by 50% after supervision and incentives encouraged health care workers to adhere to protocols (Baia et al., 2007). In Papua New Guinea mortality risk related to pneumonia was decreased by 35% after oxygen concentrators and pulse oximeters were introduced (Duke et al., 2008). In Sierra Leone inpatient mortality risk of children was reduced by 47% by improving five key aspects of emergency care, namely: training; layout; staff allocation; medical equipment and record-keeping (Clark et al., 2012). In spite of resource and skill constraints, innovation and commitment has successfully addressed some important aspects of emergency care in lower-resourced settings. At the RCWMCH available resources are enormous in comparison to most settings in low-income countries; however, some aspects of emergency care of critically ill children are sub-optimal (Rossouw, 2011). This study seeks to investigate factors beyond resource constraints that may impact on efficient stabilisation.

The process of stabilisation is reliant on rapid identification. Triage allows the rapid identification of those needing urgent and emergency attention from others presenting to emergency departments (Buys, 2013, p.161). Various triage tools are used in different setting determined by need (Twomey, 2013). However, a triage tool was developed for busy settings with staff and resource constraints (Molyneux et al., 2006). In response to Nolan et al.'s (2001) findings on hospital care for seriously ill children, the WHO developed the Emergency Triage Assessment and Treatment (ETAT) package (Gove et al., 1999). ETAT is designed to identify acuity, and uses clinical signs and a priority features approach to grade the care needs of all presenting children (Buys et al, 2012; Robertson & Molyneux, 2001; Tamburlini et al., 1999). In addition it provides clear guidelines on triage and recommendations guide airway management, intravenous insertion and fluid commencement as well as the administration of glucose and diazepam (Dieckmann, 1994), and enables rapid administration of initial prioritised treatment by the person present with the child, thus empowering different team members to intervene (Gove et al., 1999).

This tool was validated against the already recognized and validated Advanced Paediatric Life Support (APLS) in a similar setting in Brazil (Tamburlini et al., 1999). A sample size of 3837 infants and children aged from seven days to five years old was selected. All infants and children were triaged by a paediatrician trained in APLS and a nurse trained in ETAT using the ETAT assessment tool. Adequate and prompt treatment was administered by the nurse in 92.2% of children requiring emergency treatment using the ETAT tool. ETAT algorithm and treatment instructions were validated successfully against APLS and proved effective in identification of priority cases and treatment of emergency conditions (Tamburlini et al., 1999). This tool was further implemented with success in a central hospital in Blantyre, Malawi (Molyneux, 2006), and further abroad in Africa, South East Asia (WHO, 2005) and Brazil (Tamburlini et al., 1999). Clearly illustrated is the impact of a simplified triage system on stabilisation, where all members of the health care team are trained to recognise and treat acutely ill children with success. This method of triage and training has been implemented with success in developing countries where doctors are not always available to initiate treatment.

A recent debate has developed locally around the best triage tool for children. In South Africa, the South African Triage Score (SATS) has been used extensively on adults in emergency departments across the Western Cape (Twomey & Wallis, 2007; Twomey, Wallis, Thompson et al., 2012). It is an evidence-based triage tool which uses vital signs and clinical discriminators for accurate triage. In 2011, a revised paediatric version of SATS was validated. A cohort study was undertaken to validate the scale across six emergency centres in 2011. The RCWMCH was included in this study and the outcomes illustrated that the revised paediatric SATS was safe and robust with a sensitivity of 91% and a negative predictive value of 95.3% (Twomey et al., 2013). A further interesting finding was that where only clinical signs, or only vital signs were used, the under triage rates were 42.9% and 24.4%. Despite evidence based outcomes, there are still concerns regarding its use and relate the unco-operative nature of sick children or infants (Day & Oldroyd, 2010), but more relevantly, especially in the context of the research setting, is the time taken for triage. The American Nursing Association recommends that triage should take no longer than 5 minutes (Gilboy &Travers, 1999) while Keddington (1998) reports it taking up to five minutes. In this context time is a factor due to the large number of children presenting for triage.

2.4. What contributes to the complexity of emergency care?

The place where stabilisation takes place works differently to most other areas of the hospital. Not only are sick children with complex pathologies admitted to the area, but management may be compounded by factors such as ringing telephones, unscheduled arrival of patients, overcrowding, regular interruptions, and the steady flow of medical practitioners from different disciplines (Brixey et al., 2010; Henneman et al., 2010). The nature of the medical emergency makes this a challenging environment to work in, especially due to the unpredictability of crowding and interruptions. The following section elaborates on the literature on these factors.

2.4.1. Interruptions

The emergency department is a complex setting. Contributing to the complexity are the unscheduled and often unannounced arrivals of ill children, teams, unexpected conversations and ringing telephones and alarms (Brixey et al., 2007). These authors maintain that unpredictable and unavoidable factors can potentially interrupt the psycho-motor or cognitive workflow of team members (Brixey et al., 2007, p.109). They defined an interruption as a “break in performance of human activity initiated by a source internal or external to the recipient, with the occurrence situated within the context of a setting or location” (Brixey et al., 2007, p.109). In the same study they found that an interruption causes movement from the initial task to engage in the unplanned activity, with the assumption that the initial task will be recommenced. Medical teams working in dynamic areas are frequent recipients of interruptions (Brixey et al., 2007).

Kohn, Corrigan and Donaldson (1999) report that both the Joint Commission on Accreditation of Healthcare Organizations (JCAHO) (JCAHO, 2001) and the Institute of Medicine recognise the contribution of interruptions to preventable errors in health care. The literature was searched to identify whether interruptions could impact on the efficiency of stabilisation.

Studies in both medical and non-medical fields have concluded that interruptions have a negative impact on human performance. This included studies on doctors (Chisholm et al., 2000; Coiera & Tombs, 1998; Alvarez & Coiera, 2005), registered nurses (Paxton, Heaney, Howie & Porter, 1996), pharmacists (Flynn et al., 1999) and pilots (Dismukes, Young & Sumwalt, 1998), and all concluded that interruptions change workflow and therefore could impact on care.

The literature was searched to identify the relationship between interruptions and errors. Not all literature was sourced from studies conducted in emergency settings; however, data from high-risk settings such as intensive care units (ICUs) was considered and included.

In one review Grundgeiger et al. (2009) searched literature for evidence to understand the relationship between interruptions and errors in critical care and medication-dispensing settings. MEDLINE, CINAHL and EMBASE were among the databases included for the search. Published papers’ titles and abstracts were reviewed, from which subsets were defined. This process identified 26 descriptive studies investigating interruptions in critical care, eight papers on medication dispensing, as well as (only) nine studies addressing the causal relationship between interruptions and medical errors.

2.4.1.1. Interruptions and errors

Grundgeiger et al. (2009) criticised these descriptive studies for the absence of causal links between interruptions and medical errors. Secondly, they stated that different definitions used for interruptions in different settings made study comparisons challenging. It seemed that the studies lacked congruency and consistency. In the attempt to understand the causal relationship between interruption and error, Grundgeiger and Sanderson (2009) scrutinised the studies outlined below.

Drews (2007) conducted an exploratory field observation study in an ICU. Data were collected by shadowing nurses for 32.5 hours. An interruption was defined as an event which caused a shift in attention from the primary task to an external event. Of the 1138 nurses' activities observed, interruptions occurred in just under one-third or 29.4%. Of the 335 interruptions, only five resulted in adverse events. Drews (2007) concluded that interruptions were frequent (30%)in the ICU and could potentially have a negative effect on safety. This was not a convincing conclusion since the study in fact showed minimal errors related to interruptions.

In observing medication rounds, Hillsden and Fenton (2007) found that one out of every two errors in administering drugs was caused by an interruption (Hillsden & Fenton, 2006). Ginsburg (2004) conducted a randomised controlled study to investigate whether nurses were interrupted while operating a medication-control pump. The study was conducted at a Canadian community hospital where 14 nurses and three anesthetists participated. Although the study was aimed at informing a hospital decision on selecting infusion pumps, one of the outcomes of the study showed that errors were not related to interruptions (Ginsburg, 2005).

Liu et al. (2009) conducted a retrospective video analysis to investigate whether interruptions contributed to blood transfusion errors. This analysis was carried out at the Adelaide Hospital, where 12 anaesthesiologists participated in a simulation where they were intentionally interrupted while overseeing a blood transfusion. The anaesthesiologist was distracted while their assistant accepted the delivery of the blood. Transfusion was commenced without performing the standard patient cross-check. Ten of the 12immediately engaged with the interruption and failed to notice the omission; however, two rejected the interruption and successfully carried out the cross-check (P<_ 0.05).

In these studies the causal relationship between interruptions and errors is inconsistent. Grundgeiger et al. (2009) attribute this to unrealistic study methods used to obtain results.

Although not all of the studies were conducted in MEUs, patterns of frequent interruptions are recognized in the study context. Children are intermittently admitted to the resuscitation room where staffing is limited and therefore nurses and the registrar have to both maintain care of patients in the room as well as tend to stabilising new admissions. Interruptions are inevitable but may not necessarily lead to harm or error.

2.4.1.2. Interruptions in the health care system

The Institute of Medicine emphasises that most errors which occur in health care are related to systems (Kohn, Corringan & Donaldson, 2000). A system, as defined by these authors (2000, p.211) is a “set of interdependent elements interacting to achieve a common aim. These elements may be both human and nonhuman (equipment, technologies, etc.)”. Leape (1997) insists that errors are due to deficiencies with systems. Some of these deficiencies relate to the design of processes that facilitate care, or the conditions in which people work and how they are trained to carry out the work they are expected to do (Leape, 1998). Research in nursing is limited to understanding systems and how they relate to patient safety (McGillis Hall et al., 2010).

To address how interruptions produce errors in a system, Reason (2000) uses the 'Swiss cheese model' to explain this phenomenon. He works on the assumption that every system has defense layers positioned to prevent errors. Some of these could include procedures to guide processes, physical structures and attentive staff members. However, like layers of Swiss cheese, the defense layers may have shortcomings (holes). Reason (2000) believes that these shortcomings are caused by 'active failures' and 'latent conditions'. Active failures are acts exercised by team members which may have harmful effects on patient care. An example of this is when the wrong medication is administered to a patient. These active failures are impacted by latent conditions, which usually lie hidden in a medical system. An interruption is an example of a latent condition. These conditions contribute to errors, especially when working conditions become unfavourable. Error-prone working conditions can be as a result of overcrowding and understaffing (Reason, 2000). These conditions are common in the MEU.

Alvarez and Coiera (2006) argue that these latent conditions (with specific reference to interruptions) as referred to by Reason (2000) are not intentionally built into the systems and cannot realistically be eliminated. In the attempt to improve communication, it is impossible to eliminate interruptions. A further criticism by Grundgeiger et al. (2009) is that this Swiss cheese model was initially established in the aviation industry, where procedures and safety domains provide defence devices against error. To some degree this can apply in the health care industry, but mostly care and error are largely determined by the health care worker (Grundgeiger & Sanderson, 2009).

Hollnagel (2004) suggests a more appropriate model to understand the relationship between interruptions and adverse effects in health care system. According to this model, accidents are as a result of an amalgamation of events which could include failures in medical devices, latent conditions, inconsistent human performance, and the absence of barriers. Hollnagel (2004) understands that capturing the causes of error in the sequence of causal events in complex settings is difficult where small changes within the system can have great consequences.

Hollnagel's model reflects some insights on the impact of interruptions, and highlights that not all interruptions are negative and lead to adverse events. His model recognises that interruptions contribute to complexity, but he believes that interruptions can be managed to minimise harmful effects on patient care outcomes (Hollnagel, 2004).

In contrast, more recently published studies highlight positive outcomes of interruptions on patient care. One such benefit is where previously unknown information given to the interrupted person may facilitate improved patient care (Potter et al., 2005). Another example is an alert received prior to the performance of an error (Henneman et al., 2006). Essentially, when evaluating interruptions both negative and positive consequences need to be understood.

The negative effects are usually caused when there is an interruption in the cognitive process, resulting in extended task time (Speier, Valacich &Vessey, 1999) or in longer periods in resuming the task that was interrupted (LeGoullon, 2006). Negative consequences of interruptions are factors such as stress (Speier et al., 2003) and frustration (Tucker & Spear, 2006).

McGillis Hall et al. (2010) are of the opinion that it is essential for nurses to understand interruptions within the context of the system within which they work. This understanding could assist nurses in reviewing their current work systems with the intention of improving the way in which interruptions happen and curbing their effects. McGillis and O'Brian-Pallas (2000) refer to this as a work redesign framework, which assists nurses in understanding the complex environments within which they work. This process also involves engagement by nurses to restructure and bring about possible changes aimed at improving patient safety (McGillis & O'Brian-Pallas, 2000).

McGillis Hall et al. (2010) conducted research to explore the nature of interruptions and systems issues related to interruptions within paediatric nurse work. The study took place at a teaching hospital in Toronto between November 2005 and November 2006. The exploratory research design utilised work sampling and focus groups as data collection methods. Nurses from four paediatric and acute care settings participated. A total of 384 hours were observed, achieving 5% accuracy and 95% confidence according to McGillis Hall et al. (2010) and O'Brien-Pallas, Cockerill and Leatt (1991). A total of 5325 interruptions were observed, with an average of 25% occurring in each unit. Sources of interruptions included the environment, staff members (nurses, doctors and other health care providers), family members, patients and self-interruptions. The types of interruptions were categorised as intrusions, distractions, discrepancies and breaks (McGillis Hall, 2010, p.172). More than half of the interruptions were intrusions, which are defined as "an unexpected encounter initiated by another person that interrupts the flow and continuity of an individual`s work and brings that work to a temporary halt" (Jett & George, 2003, p.72). Comments captured during the focus group were that nurses were used to interruptions as it is a part of their work day, and that they didn't mind being interrupted by a colleague who sought help.

Thirty five per cent of interruptions related to communications directed at patient care. Furthermore, 6.7% were caused by monitors and pumps, with 5.9% reflecting calls for assistance by colleagues. Socialising and telephone calls made up 4% and 2.7% respectively, while pagers and bells made up 2.5% and 1% of interruptions. Approximately one-third (32%) of interruptions occurred while nurses were engaged with patient care, while in 24 cases (2%) the nurse was documenting activities. The outcome of these observations reflected that interruptions had a negative effect on nurses' work in 88.9% of cases. These included delay in the work that the nurse was engaged in (60.4%). In 27.4% of interruptions the nurses lost concentration, and in 0.9% this resulted in incompletion of a task. However, positive outcomes of interruptions included a positive contribution to safety (4.9%) and improved patient outcomes in 0.4% (McGillis Hall et al., 2010).

This study highlights the effect of a complex environment on patient safety, with an overriding majority of negative effects, with the consequences of delay and loss of concentration. It is not surprising that peers cause the most interruptions; teams rely on one another for support and guidance. It can, however, be noted that the increased source of peer interruption may be as a result of failures in the system, such as technology, documentation, staffing, budget, unmet needs, and lack of access to relevant procedural documentation. Intrusion from pumps and monitors may not be something that can be adapted or changed, as these are required for monitoring and treatment. Lastly, the highest cause of self-interruption was caused by missing or misplaced supplies, which is certainly a systems challenge that requires addressing.

Realistically, interruptions are a normal part of any MEU. Interestingly the causal relationship between interruptions and errors is inconsistent, and literature confirms that interruptions can have a positive impact on patient outcomes. However, interruptions may have an adverse effect on both the time to complete the task and successful completion of it. It seems that the exact impact of the interruption depends on the nature of the interruption, the context of the interruption, and the nature of the task undertaken. Furthermore, interruptions occur within a system, and multiple factors contribute to how they impact on bedside care. All of these factors impact on how a critically ill child is stabilised, and therefore interruptions should be considered in the study.

At the RCWMCH emergency unit interruptions are frequent and include junior medical staff seeking advice from the registrar; telephone calls from outsiders seeking medical advice for children; and parents looking for children or family members (the MEU is situated in a passage en route to a busy OPD). However, most of the interruptions relate to seeking help to benefit another party. However justifiable, interruptions could lead to errors, and certainly distract or contribute towards less than optimal stabilisation.

2.4.2. Crowding

Crowding is a common challenge faced by emergency departments compromising the safety of patient care. Crowding occurs when the identified need for emergency services exceeds available resources for patient care in the emergency department, hospital, or both (American College of Emergency Physicians, 2006; Pines, 2007). From this definition it is evident that crowding is marked by the imbalance between demand and supply (Gordon, Billings, Asplin, & Rhodes, 2001). Although crowding is most often synonymous with patient volumes, it is further dependent on patient acuity, physical space and on-duty staff (Bernstein & Asplin, 2006) and so an emergency unit can be busy without being crowded (Bernstein & Asplin, 2006). Although crowding is often associated with emergency, it is a system wide challenge and crowding in one area of the hospital has an effect on the entire system (White et al., 2013).

Over the past decade emergency departments have seen a gradual increase in patient volumes, causing an overcrowding crisis (Derlet& Richards, 2000; Derlet, Richards & Kravitz, 2001; Henry 2001). In the period between 1992 and 2003 American emergency departments saw an increase from 90 to 114 million adult patients (Burt & McCraig, 2001) and 30 million children (American Academy of Pediatrics Committee on Pediatric Emergency Medicine, 2004). In 2001 crowding was reported by 91% of US Emergency Department Directors. Of these, 39% encountered crowding on a daily basis.

Some of the surge in patient volumes results from the overuse of emergency departments for minor illnesses; however, evidence points towards increased patients presenting with serious illness (Petrillo-Albarano & Little, 2010). Emergency departments worldwide, in both rich and poor countries, share the challenge of crowding posing a serious threat to patient safety. This could have a detrimental impact on the care of the critically ill patient (Cowan & Trzeciak, 2004; Etial et al., 2008).

The next section will discuss literature pertaining to the causes of crowding. This will be followed by a review of the consequences of crowding, and lastly the researcher will address how crowding can be recognised in the MEU.

2.4.2.1. Causes of crowding

2.4.2.1.1. Input and output

Cowan and Trzerciak (2005) reviewed the literature to make sense of the relationship between crowding and its impact on the critically ill. Initial findings pointed to multiple factors (Derlet & Richards, 2000; Trzeciak & Rivers, 2003). However, a key finding was that external factors (outside the MEU) were causing crowding, rather than the actual through-put of patients inside the unit (Shneider et al., 2001). These external factors were related to the numbers of patients requiring high-acuity care and shortages of inpatient bed availability (Shneider et al., 2001;Pines, 2007). Insufficient inpatient bed availability causes crowding (Gordon et al., 2001; Miro et al., 2003; Hoot et al., 2009). In the 1990s major financial cutbacks resulted in the reduction of inpatient beds by up to 39% (American Hospital Association, 1999), causing hospitals to run at 90% bed occupancy.

2.4.2.1.2. Throughput

The impact of input and output of patients to and from the emergency units has been described. Additional to these, Bernstein and Asplin (2006) suggest a third contributor to crowding, namely throughput. Throughput is caused by patients remaining (boarding) in the area for extensive periods of time and is measured predominantly by length of stay (White et al., 2013). Bernstein suggests that throughput predominantly contributes to crowding when inefficient operational processes fail to move patients through the system (Bernstein &Asplin, 2006, p.823).

Miró et al. (2003) evaluated the ‘internal factors’ (throughput) affecting patient flow in a busy MEU. Reduced flow through the unit was attributed to the following: factors relating to the MEU itself (waiting for doctor; being seen; waiting for test results; waiting for outcomes); factors relating to MEU-hospital interrelation (waiting for tests to be performed outside the unit; waiting for a specialist); factors relating to the hospital itself (waiting to find an in-hospital bed); and factors relating to neither the MEU nor the hospital (waiting for relatives; waiting for a social worker; waiting for an ambulance) (Miró, 2003). Measurement of patient flow across the MEU highlighted areas that could be addressed through structural and staff reorganisation. Before the changes, 31-48% of the time was considered as crowded in numerical and functional terms. These percentages were reduced to o 8% and 15% (Miro et al., 2003).

2.4.2.1.3. Triage category and day of week

In addition to waiting times, Arkun et al. (2010) suggest two more contributors to crowding: triage category and day of the week. A prospective observational study design was utilised to identify factors determining flow in an adult MEU, and a total of 1543 patients were observed and the MEU operated at 85% capacity. Results indicated that sicker patients were seen first and remained in the area for longer periods of time and that less acute patients awaited surgery and therefore occupied emergency beds. Furthermore, patients were often underscored and allocated a triage category that did not match their acuity highlighting a flaw in the triage system. Finally differences were noted in admissions according to the day of week. These findings were consistent with outcomes found by McCarthy et al. (2009).

2.4.2.2. Consequences of crowding

From this we can see that increased in-flow of patients to an emergency department with limited outflow can result in the unit functioning as a ‘‘holding area’’ (Cowan &Trzeciak, 2005, p.292). Patients board unnecessarily, with delayed referral for up to 24 hours (Gordon et al., 2001; Schneider et al., 2001; Henry, 2001). The following consequences result from crowding and have a serious impact on care delivered in the emergency department.

2.4.2.2.1. Prolonged admissions

Emergency departments have the specific goal of triage, stabilisation and initial treatment, and are not designed to cope with the extended care of critically ill patients beyond this (Cowan & Trzeciak,, 2005).However, emergency departments are expected to provide goal-directed and organised care for critically ill patients while waiting for ICU bed space (Derlet, Richards & Kravitz, 2001). Crowding which results in extended stays of patients in the emergency department puts a strain on resources and staffing. Nurses working in the emergency department tend to many patients with varying acuity, and thus may not always have capacity to include a critically ill child in this care. The nurse : patient ratio for critically ill patients in the ICU is 1:1 or 1:2, which is a highly unlikely expectation in the MEU, this resulting in the possibility of compromised patient care. Understanding that crowding is caused by factors internal and external to the MEU, the literature was explored further to identify the effects of crowding.

2.4.2.2.2. Delays in treatment

A strong association was confirmed between patient volume and mortality (Chalfin, Trzeciak, Likourezos, Baumann, & Dellinger, 2007; Fatovich, 2005; Gilligan et al., 2008; Richardson, 2006; Sprivulis, Da Silva, Jacobs, Frazer, & Jelinek, 2006).Increased morbidity and mortality can be caused by delays in the commencement of emergency treatment (Joint Commission International Centre for Patient Safety, 2006; Pines & McCarthy, 2011). Added to delays in treatment, further studies show that crowding impacts on the effectiveness of care rendered. This means that not only is treatment delayed, but patients are less likely to receive correct treatment as a result of crowding (Pines & McCarthy, 2011).

Crowding results in delayed diagnosis, treatment delays, reduced quality of care and poor patient outcomes (Derlet, 2002) In an environment where time- sensitive treatment and intervention are essential to provide optimal care, crowding has been seen to affect the system of emergency care, contributing to mortality and morbidity (Derlet & Richards, 2000).

Fee, Weber, Maak and Bacchetti (2007) researched the association between emergency department volume and the timing of antibiotic administration for patients with community-acquired pneumonia. A cross-sectional study was conducted at a university care hospital MEU between 1 January 2004 and 30 June 2005 and the medical records of486 patients were reviewed using the Joint Commission's antibiotic-timing regimen. Factors such as the number of patients in the emergency department at the time and the number of patients requiring admission were also considered in this study (Fee et al., 2007).

This study showed that 61% of patients received an antibiotic within 4 hours and 92.4% within 8 hours of admission. This study indicated that a larger number of delayed administrations were associated with high number of admissions. It also showed that treatment for high-acuity patients was affected by large numbers of patients in the emergency department (Fee et al., 2007).Data from studies in different settings showed treatment delays in asthmatic treatment (Pines, Prabhu, Hilton et al., 2010), analgesia (Pines, Shofer, Isserman et al., 2010) and receiving test results, and prolonged length of stay (McCarthy, Zeger, Ding et al., 2009).

Due to the multiple demands placed on emergency department staff, Gordon et al. (2001) found this environment conducive to medical error. Croskerry and Sinclair (2001) attribute this to the link between cognitive load and performance. Increased cognitive loads degrade performance, which is what commonly happens with crowding (Croskerry & Sinclair, 2001). Van Merrienboer and Sweller (2010) highlight the importance of training medical practitioners to make better decisions in high cognitive load situations. Furthermore, critically ill patients require specialized individual care to enable early recognition and response to changes. However, this is not always possible in an emergency department, and causes delays in critical interventions (Cowan et al., 2005). Prospective studies highlight the parallel between crowding and delays in diagnosis and treatment, resulting in poor patient outcomes (Derlet & Richards, 2000; Derlet et al., 2001).

2.4.2.2.3. Crowding and nosocomial infections

Lastly, the literature was searched to establish whether a relationship existed between crowding and nosocomial infections. The researcher attempted to find literature that would indicate whether nosocomial infections are acquired in emergency departments due to prolonged waiting times and exposure to infectious diseases of fellow patients all waiting to be seen. A single article addressing this issue of nosocomial infections was published by Jo et al. (2012), showing that crowding was associated with higher 28-day mortality rates in patients with community acquired pneumonia. However, once again these findings were attributed to similar issues identified earlier such as poor quality of care and shortage of in-patient hospital beds (Jo et al., 2012). No data were found addressing the spread of nosocomial or other infections in the emergency department as a result of crowding.

2.4.2.3. Recognising crowding

The literature was searched for validated measures to enable recognition of crowding. Various tools were explored, including work by Bernstein et al. (2003), Johnson and Nick (2004), and Bernstein and Asplin (2006).The most recently published validated tool is that of Hoot et al. (2009).

The ForecastED tool was validated at multiple sites over a 22-month period. Observations were sampled at consecutive 10-minute intervals (n=52560) for the first 12 months at four sites, and for 10 months (n=44,064) at a fifth site. Waiting count, occupancy level and boarding count were the outcome measures, and were forecast most reliably 2 hours into the future. This tool was intended to improve the efficiency of care by enabling prediction of short workload (Hoot et al., 2009); however, a limitation was that it was not a real-time validation, and therefore required further research to integrate the tool with information systems.

The most useful data relating to this subject were from a systematic review conducted by Hwang et al. (2011).Up until recently 71 unique crowding measures were identified, yet no criterion standard measure existed. The goal of the review was to compare and validate crowding measures. Four well-recognised medical data bases were searched and an initial 2660 articles were identified, of which only 46 met the criterion. The least used crowding measures relied on clinical opinion, while the majority relied on numerical counts of patients and process times relating to patient care. A substantial amount of measures had a good correlation with validation criteria. The review concluded that the number of patients and time intervals were emerging factors in the measurement of crowding (Hwang et al., 2011).

In summary, crowding is an administrative issue that can have a direct effect on early interventions and treatment for critically ill children in the MEU. While critically ill children require monitoring and assessment, crowding makes this challenging, and affects the care rendered to all children in the unit. Evidently crowding has an influence on and is influenced by factors within and beyond the actual MEU, and is therefore a system challenge. Recognising and validating crowding appears challenging, although isolated factors have been identified through numerous studies. Although crowding is well recognised among MEUs, it requires attention since strong correlations are seen in its effect on child morbidity and mortality and so is an important consideration in understanding factors that impact stabilisation in this setting.

2.5. How people work in complex settings within emergency care

This next section focuses on how people work within the complex system of emergency care. A lot of what is written about these factors relates to safety and quality data, sometimes from different settings. Even though the purpose of this study is not to measure quality of care, the purpose is to identify factors that could affect outcomes. The best outcomes reduce mortality and morbidity, and this is where stabilisation fits in.

The next section addresses elements within health systems that relate to safe care and could be applied to the critically ill child in MEUs. Not all literature pertains specifically to paediatrics, but will relate appropriately to the principles addressed.

Patient safety refers to ‘‘freedom from accidental injury’’ (Kohn, Corrigan & Donalson, 2000: 18). This is a broad term that can refer to the physical and psychological safety of a patient. It could also allude to the prevention of adverse events, and includes the timeous administration of appropriate therapy.

Unsafe medical care and practices in hospitals are the cause of harm or death to millions of patients worldwide (Reader, Flin & Cuthbertson, 2007; Smits, Wagner, Spreeuwenberg, van der Wal & Groenewegen, 2009; WHO, 2008). In the USA on average 195 000 people die annually due to potentially preventable hospital medical errors (Chordas, 2004). It is estimated that one in 10 patients are harmed in hospitals that are sufficiently resourced; however, little is known about parallel outcomes in developing countries or especially South Africa (Andermann et al., 2011). The obvious assumption is that the risk would be higher due to the dearth of human and technological resources and infrastructure in some settings.

Ironically, patient harm is increasing proportionately to the development and advancement of medical science (Frush & Hohenhaus,2006). Frush and Hohenhaus (2006) suggest that patient harm is not caused by negligence or incompetence in practice, but rather is a result of the complex systems within which people work. Wolff and Bourke (2000) and Kohn et al. (2000) agree that organisational complexity and technologically complicated equipment contribute to patient harm, but add the effects of poor systematic communication and teamwork (Wolff & Bourke, 2000; Kohn, Corrigan & Donalson, 2000). Reason (1999) is in agreement with the theory of organisational complexity and identifies scenarios that increase the predictability of errors. These scenarios include: when an individual is expected to perform multiple, complex cognitive tasks simultaneously; when errors result from frequent interruptions are made; and when pressure leads to decisions being made and complex tasks being performed without being able to double-check them (Reason & Reason, 1997).

However, before exploring the literature on these factors it is important to recognise that people make up teams and form a part of the system and is especially relevant to this study which often places more emphasis on technology and resources.The human factor refers to the ‘‘interrelationships between humans, the tools they use, and the environment in which they live’’ (Kohn et al., 2000, p.2010). Each person brings a unique contribution to the health care team and a set of skills that will affect health outcomes. A growing body of literature recognises the importance and contribution of these (technical and non-technical) skills.

2.5.1. Non-technical skills

The concept of non-technical skills was developed in the field of aviation around 1970, where a key finding showed a causal relationship between errors and non-technical skills (Air Accidents Investigation Branch, 1982). Non-technical skills topped technical flying abilities or aircraft malfunctions when causes of accidents were investigated (Eisen & Savel, 2009). These skills were identified as interpersonal skills (communication, teamwork and leadership) and cognitive skills (task management, situation awareness and decision making) (Flin, Fletcher, Glavin, Maran & Patey, 2003).

After aviation outcomes research a training programme known as Crew Resource Management was written and rolled out, its aim being to reduce errors and increase the performance of flight crews (Wiener, Kanki & Helmreich, 1993).

These courses were adopted in other high-risk settings, such as the military, shipping and nuclear power (Flin et al., 2008). Due to the success and ongoing, consistent positive outcomes on safety in these industries, this research and training infiltrated acute health care services such as anaesthesia (Fletcher et al., 2004), surgery (Yule, Flin, Paterson-Brown, &

Maran, 2006; Yule, Flin, Paterson-Brown, Maran, & Rowley, 2006), trauma and intensive care (Reader et al., 2006).

Safe and efficient practices in high-risk work settings such as the emergency department are dependent on both technical and non-technical skills (Mitchell, 2008). Both are necessary to facilitate task execution (Aggarwal, Grantcharov, & Darzi, 2007). Technical skills are the application of clinical technique, medical knowledge and expertise while non-technical skills consist of cognitive and social skills (Mitchell, 2008).In recent years efforts have been made to develop the research and training of non-technical skills in acute health care settings (Mitchell, 2008). This was strongly encouraged by the Institute of Medicine on recognising the extensive and consistent history in error prevention with aviation (Kohn et al., 2000).

Related investigations in health care highlighted human contributions to errors within a system. Helmreich (2000), Leonard (2004) and Flin (2004) recognised that communication failures were responsible for 70% of accidents, highlighting that the lack of technical skills or malfunctioning of aeroplanes were secondary causes (Helmreich, 2000; Leonard, Graham& Bonacum, 2004; Flin & Maran, 2004).Similarities are found within the critical care arena, where human error was defined as "a deviation from standard conduct, as well as addition or omission of actions relating to standard operational instructions or routines of the unit" (Donchin et al., 2003, p.143-144; Flin et al., 2003). Outcomes in health care were similar to those in aviation, indicating that more than 80% of errors were caused by poor communication and inadequate monitoring rather than technical knowledge or equipment failure (Flin et al., 2003). A review by Reader et al. (2006) found that 50% of critical incidents were related to the deficit of non-technical skills (task management, teamwork, situation analysis and decision making.

There is growing recognition that non-technical skills contribute to safety in high-risk settings (Reader et al., 2006; Reader et al., 2007).These skills were often undermined in the past and referred to as 'soft skills'. However, strong connections have been recognised between non-technical skills in patient safety and optimal outcomes. The following sections look at specific aspects of non-technical skills, with a focus on teamwork and communication.

2.5.1.1. Teamwork

Emergency units are staffed by groups of professions from a range of settings (and very different training cultures), who are required to function as a team in order to maximise effectiveness and efficiency. According to Brannick and Prince (1997) teams comprise two or more individuals who collaborate towards a specific, mutual goal. Each member, equipped with a specific role and competency, makes use of communication and shared resources to direct or adjust to change (Brannick & Prince, 1997).

When we talk about teams we are often thinking about sports teams, where groups of individuals play together under a common coach. In contrast, teams in the emergency setting have constantly variable tasks and challenges, are multidisciplinary, and vary in makeup from day to day and even from day to night or hour to hour (Sundstrom, De Meuse & Futrell, 1990).Teams at the MEU at the RCWMCH are not dissimilar.

2.5.1.1.1. Teamwork and safety

Patient safety is an overriding priority underpinning the success of patient outcomes, including stabilisation. Teamwork is essential for patient safety (Makary et al., 2006). The Institute of Medicine advocated the need for health care providers to facilitate effective team functioning, and prioritized this as one of five principles contributing to safe systems (Kohn et al., 2000). Many studies have been conducted to explore the value and impact of teamwork; this literature review will focus on some of the most relevant studies which look at teamwork and how it relates to patient safety.

Manser (2009) conducted a review to understand the relationship between teamwork and patient safety in the highly dynamic domain of health care, consulting PubMed, MEDLINE, ISI Web of Knowledge and PsychINFO and retrieving articles related to teamwork and patient safety in operating theatres, intensive care and emergency medicine published between 1998 and 2007 (Manser, 2009).

The central finding from this review strongly supports the relationship between teamwork and safety. Firstly, studies found that failures in teamwork were a key contributor to critical incidents in either the cause (Sureshet al., 2004; Pronovost et al., 2006) or prevention of adverse events (Wiegmann et al., 2007; Cathpole, et al., 2007).

Furthermore, the review by Manser (2009) highlighted conclusions from studies which focused on health care providers' perceptions of teamwork. Positive perceptions specifically pertaining to the openness of communication and of leadership were shown in studies by Flin, Fletcher and McGeorge(2003) and Miller (2001). However, the majority of studies reflected a discrepancy in perceptions around teamwork between different members of the multidisciplinary group (Miller, 2001; Sexton et al., 2006). Furthermore, studies by Gittel et al., (2000) and Wheelan, Burchill and Tilin (2003) highlighted that staff's perceptions of teamwork were related to quality and the safety of patient care. Others found a strong correlation between teamwork and the team members' sense of well-being (Chiok Foong Loke, 2001; Davenport et al., 2007). This review also highlighted findings from observational studies which identified interesting patterns of communication that underpin successful teamwork (Manser, 2009).

This review reflects the extensive research conducted to understand the relationship between teamwork and patient safety and to prove that this relationship has a direct impact on the outcomes of patient care, including stabilisation.

Furthermore, studies were identified that confirmed and expanded on these findings. A study by Wauben et al. (2011) was conducted in five hospitals across the Netherlands to analyse surgical team members` perceptions around communication, teamwork and situation analysis. Surgical team members were asked to complete a questionnaire to reflect their opinions on these aspects in their operating theatre using a five-point Likert scale which was analysed statistically.

The participants were 66 surgeons, 18 anaesthetists, 97 theatre nurses and 40 nurse anesthetists, and the results reflected significant discrepancies in communication, teamwork and situational awareness.

With communication there was a significant difference in opinion on information exchange between team members, with surgeons rating this as adequate (P<0.001). However, inadequate pre-operative briefings and debriefings were expressed by 72-90% of nurse anaesthetists, theatre nurses and anaesthetist respondents. The differences expressed by team members within the category of teamwork were also significant (P <= 0.005): surgeons expressed higher ratings than nurse anaesthetists and theatre nurses, with 51% of theatre nurses not experiencing surgeons as team players. Dissatisfaction with teamwork and communication was expressed by 72% of theatre nurses.

Within the category of situation awareness, 78-94% of theatre nurses, nurse anaesthetists and anaesthetists expressed inadequacy in exchanging patient data before an operation. This differed from the surgeons, who only expressed a 35% inadequacy rating (Wauben et al., 2011).

This study clearly highlights the differences between team members on communication, teamwork and situation analysis. Surgeons rated most categories as adequate, which differed from their colleagues' opinions. This is consistent with other research findings on team perceptions related to communication, teamwork and situation analysis (Makary et al., 2006; Thomas, Sexton & Helmreich, 2003). In a similar study with similar outcomes, these discrepancies had a direct effect on conflict resolution and interpersonal skills (Thomas et al., 2003). Makary et al. (2006) recognised the importance of teamwork in relation to patient safety. Despite the correlations drawn between improved teamwork and patient safety, no tool had been developed to measure teamwork. Makary et al. (2006) set out to develop and validate a survey measuring teamwork in a surgical setting.

A questionnaire adapted from the original Cockpit Management Attitudes questionnaire was administered to 2135 theatre staff across 60 hospitals in the USA over a two-month period, from July to August 2004. Of the participants, 222 were surgeons, 170 were anaesthetists, 121 were certified registered nurse anaesthetists and 1058 were theatre nurses. Results were analysed statistically and clearly indicated discrepancies in the perceptions of teamwork from different members.

Physicians rated teamwork with others as good, while nurses perceived it as poor. Nurses were less satisfied with the nurse-physician collaboration, while a contrasting opinion was indicated by both surgeons and anaesthesiologists. Factors such as differences in status, authority and patient responsibility were revealed through the discussions to explain discrepancies. Nurses measured good collaboration by how much their input was respected, while physicians described it as having nurses follow instruction and anticipate their needs (Makary et al., 2006).

Teamwork is essential for the provision of patient safety, and is directly related to team performance, and therefore it is important to recognise different perceptions (Manser, 2009).

2.5.1.1.2. Leadership and teamwork

Cohesive teamwork is key to optimising patient care. However, teams are dependent on leadership for direction. Leadership in dynamic action teams has received some attention from the international arena; however, little is written about the South African perspective. Management of acute or critically ill patients in the emergency room is complex (Flin & Maran, 2004). This in turn is complicated by different teams from different sites with different work cultures (Ummenhofer, Amsler & Sulter, 2001), often formed hurriedly in order to meet the needs of the acute or critically ill patient. The uniqueness of this context shares the following characteristics with other high-risk industries: problems are not well defined; information may be contradictory or incomplete; situations are dynamic, where change is constant; goals may be contradictory; time burdens may be severe; and the consequences to error can be critical (Orasanu & Connolly, 1993). Members of these teams acquire knowledge and clinical skills with particular focus on clinical outcomes provided by courses such as Advanced Life Support (ALS) and Advanced Trauma Life Support (ATLS). While the importance of leadership and teamwork is recognised, they are however not included in this training (Flin & Maran, 2004).

Similarly, in the study setting young doctors are expected to lead teams with very little training in leadership skills. Cooper and Wakelam (1999) considered the relationship between leadership behaviour, team dynamics and task performance in a 16-month observational study conducted at Derrisford Hospital in Plymouth in the United Kingdom (UK) from June 1997 to October 1998. During this time 20 resuscitations were video recorded in medical and surgical wards as well as in the ICU. Results indicated that teams worked better and tasks were performed more effectively and quicker when leaders initiated structure during resuscitations. Interestingly, those trained in ALS did not show better leadership skills (Cooper & Wakelam, 1999).

To strengthen this argument Marsch, Muller and Marquardt (2004) demonstrated that poor leadership and the absence of 'explicit' task distribution led to poor outcomes in the management of cardiac arrests. Ironically, team members had adequate training and skills in this specific scope of practice (Marsch et al., 2004).

Literature confirms the reliance of teamwork on strong leadership. Furthermore, it is interesting to note that clinical skills and expertise will enhance an individual's clinical practice, but are not sufficient skills to lead a team in a collaborative process to ensure optimal outcomes for children in a complex setting with dynamic teams.

2.5.1.2. Communication

The literature has confirmed that individuals contribute skills to a team which requires leadership in the goal of optimising care. This section focuses on another non-technical skill, namely communication, and its potential influence on stabilisation within the MEU. An introduction to communication will be followed by perceptions of communication; communication patterns; communication loads; and barriers to communication.

Communication is “a process by which information (verbal, non-verbal or written) is exchanged between individuals through a common system of symbols, signs, or behaviours” (Merriam-webster.com, 2013). In the hospital environment this usually takes place among health care workers and their teams, and with their patients.Wauben et al.(2011) best describe communication and its importance to both teams and patient care as “skills for working in a team context to ensure that the team has an acceptable shared picture of the situation and can complete tasks effectively” (2011, p.161).They delineate components of successful communication, which are to ensure that information is given and received in a timely manner to ensure effective task completion; teams are given and understand the information received; and communication is used to co-ordinate team activities (Wauben et al., 2011).

Even though communication is something we all engage with frequently on a daily basis, it has been identified as a major contributor to poor health outcomes,with the deduction that poor communication causes adverse events in health care (Helmreich, 2000; Helmreich & Davies, 1994; Leape, Brennan & Laird, 1991).These trends are confirmed in high-intensity settings such as intensive care, trauma and emergency care, as well as operating theatres (Reader et al., 2007; Wright, Mackenzie & Buchan, 1991). Donchin et al. (1995) report that 2% of verbal communication accounts for 37% of reported errors in intensive care.

The clinical complexity of these units is compounded by the involvement of multidisciplinary teams, which increases the risk of error (Reader et al., 2007). Errors result in adverse events and have direct implications on unnecessary patient suffering, which in turn may extend hospital admissions and increase health costs (Vincent, 2006).

Effective communication in the MEU is challenged by the nature of this environment. While attempting to focus on rapid assessment and intervention for the critically ill child, the health worker is simultaneously expected to meet other patients’ needs by expressing compassion and comfort as well as taking time to explain important details. This is compounded by stressors such as interruptions, high patient loads and crowding (Cameron et al., 2010). All of these can add pressure on communication among health care workers as well as with their patients (Chisholm et al., 2000).

Safe patient care in the emergency department is dependent on regular and efficient communication among care providers (Fairbanks, Bisantz & Sunm, 2007).To date there is little evidence to define communication patterns within the emergency department. However, the value of good communication (Schenkel, 2000; Wears & Leape, 1999; Eisenberg, Murphy & Sutcliffe, 2005) as well as the potential effects of bad communication (Chrisholm, Collison & Nelson, 2000; Risser, Rice & Salisbury, 1999) within emergency departments have been well illustrated.

Since communication happens among people and in teams, this section addresses literature featuring perceptions of communication and impacts on patient safety.

Poor communication is a common contributor to critical incidents in the ICU. Reader et al. (2007) conducted a study across four hospitals in the UK to better understand the shared perceptions of interdisciplinary communication. A cross-sectional survey of 136 ICU nurses and 48 doctors was conducted, which exposed significant differences in the perception of interdisciplinary communication. Senior doctors reported the highest levels of communication openness (82%), while 60% of trainee doctors indicated this and37% of nurses. When considering doctor-nurse communications, senior doctors reported higher levels of openness ($P<0.01$). The study suggested that factors which contribute to these discrepancies are hierarchy, gender, differences of perceptions of communication standards, and differences in training methods.

The analysis also concluded that open communication predicted the degree to which staff members would verbalise their understanding around patient goals. To a large extent this determined a junior staff member’s questions and contributions towards patient goals. Unit leadership consistently contributed to communication openness. Flin and Yule (2004) echoed similar findings. Reader et al.(2007) concluded that team members had different perceptions of their communication with each other. However, communication openness was essential to ensure participation by team members in patient care.

2.5.1.2.1. Communication patterns

To address communication patterns within emergency departments, Fairbanks et al. (2007) conducted a prospective observational study in the emergency department of a North American hospital during April and May 2005. The purpose was to describe communication links and patterns between doctors and nurses using link analysis techniques (inter-professional communication).

This emergency department treated 93 350 patients annually, of which 30% were paediatric admissions. Fifteen participants were observed on day shift, while five were observed on night shifts. Participants consisted of emergency department staff including physicians, resident doctors, nurses and charge nurses. Each participant was observed for 2 hours.

A total of 1665 communication events, mostly face-to-face interactions, were documented in 39 hours and 12 minutes. Communication was illustrated using graphic representation of patterns, and results pointed towards shortfalls in communication between paramedics and emergency department staff. This was related to the handover process and the quality of and patterns of information conveyed to team members taking responsibility for a new admission. Significantly, results showed that the charge nurse was at the hub of communication and formed the link between emergency department staff and non-emergency department staff (Fairnbanks et al., 2007).

The study concluded that the load of communication in the emergency department was high. However, the patterns of frequency and modes of communication varied between care providers. The author was satisfied that the research produced consistent patterns of communication that could be used to assist improved practice strategies and reduction of errors (Fairnbanks et al., 2007).

An observational study by Lingard, Reznick, Espin, Regehr and DeVito (2002) identified common communication patterns and areas of communication tensions in an operating theatre. The research took place over four months in 1999 in a teaching hospital in Canada. Data were collected over 128 hours of observation, with direct observations, unstructured interviews and field notes on 35 procedures. The outcome showed that patterns of communication in the operating theatres were complex. Prominent themes grouped the content of communication and included: time; safety and sterility; resources; roles; and situation. Furthermore, communicative tensions were noted around these themes. An interesting observation was how novice surgical trainees would respond to these tensions, which included mimicry of the teacher's style or complete withdrawal from communication. The authors state that these behaviours may in fact intensify inter-professional conflict (Lingard et al., 2002).

Even though these data are taken from an operating theatre, communication themes and potential tensions are similar to those found in the MEU, where conversations are about time and are pressured by time.

Communication is complex is in the emergency department. The potential for error is increased by a number of challenges, mentioned previously. One such challenge which is common to this environment is communication overload (Coiera, Jayasuriya, Hardy, Bannan & Thorpe, 2002). Simply, communication load refers to the frequency of interactions, which is most often measured by interruptions (Coiera et al., 2002).These interruptions in turn have an effect on memory and lead to potential errors (Parker & Coiera, 2000). The human brain is only able to store a limited amount of information in memory, and therefore multiple concurrent tasks may overload memory (Reason, 1990). The MEU or emergency department is recognised for its frequent interruptions, which often result in unintentional changes of tasks (Coiera et al., 2002).

Coiera et al. (2002) conducted an observational study in two emergency departments in New South Wales, New Zealand, between June and July 1999. This was an extension of their earlier work carried out in the UK, where they conducted a similar study to identify patterns of communications among health care workers in a British district hospital (Coiera& Tombs 1998). Eight doctors and two nurses were shadowed for between two and four hours with a similar methodology as followed by Coiera et al. (2002). The results from this study indicated that complex communication patterns resulted in an interruptive workplace, which contributed to inefficiencies in practice. They proceeded to measure communication loads on staff in these departments as well as to describe patterns of formal and informal events (Coiera et al., 2002).

Study participants consisted of six nurses and six doctors who were shadowed for two-hour periods where all communications were observed and recorded. After 35 hours and 13 minutes of observation it was discovered that the communication load was significantly high, taking up to 80% of clinicians' time. The results showed that 1286 communication events were recorded, averaging 36.5 communication events per person per hour. Face-to-face communication (referred to as synchronous communication) was observed in 90% of interactions. One-third (30.6%) of all interactions were categorised as interruptions, pointing toward a rate of 11.15 interruptions per person per hour. Two or more concurrent conversations were recorded in 10% of communication events, while formal sources were accessed for information in 12.7% of events. The authors concluded that clinical errors were inevitable in the presence of interruptions and multiple tasking in this environment. These findings are supported by a similar study conducted by Chrisholm, Collison, Nelson and Cordell (2000).

These types of communication patterns are recognised within emergency departments, but unfortunately can be assumed to be the norm. This thus reduces the possibility of practice improvement around communication patterns, especially when considering the presence of interruptions and multiple tasks. We now continue by briefly addressing the management of communication flow within complex settings.

Woloshynowych, Davis, Brown and Vincent (2007) recognise that in the UK the charge nurse is responsible for the management of communication flow in the emergency department. With this as a foundational understanding, the need arose to study levels and patterns of communication within nurse groups, with a special focus on communication load.

2.5.1.2.2. Communication loads on nurses

Woloshynowych et al. (2007) conducted an observational, non-experimental study to describe the communication load of the charge nurse in an inner-city London hospital emergency department. Over a period of six months, between January and June, 2005, 11 charge nurses were observed over 18 observational study periods, varying between 30 and 90 minutes and resulting in 20 hours of observation. The analysis indicated that 59% of the 2019 communication events were initiated by the charge nurse. Face-to-face communication contributed to the majority of events (76%), while 48% of all communications was related to patient management. An important finding was that interruptions accounted for 30.6% of observed communications, raising questions around the implications of these distractions on the quality and completeness of the charge nurses' duties and communications (Woloshynowych et al., 2007).

2.5.1.2.3. Barriers to communication

Cameron, Engel, McCarthy and Buckley et al. (2011) conducted a qualitative study in an emergency department aimed at empowering team members to elicit barriers to communication and identify their own improvement strategies. A prospective, staff-based participatory research method was used for this study, which was conducted between April and May 2008 in an urban tertiary academic medical centre in the USA which assesses 85 000 patients per year. A multidisciplinary 3.5 hour workshop was run with 175 staff from various disciplines. The importance of communication was addressed in groups, followed by smaller group discussions directed at staff perceptions of communication barriers and possible solutions to these. Finally, a larger group was assembled to discuss emerging themes and refine strategies.

Four themes were coded from results using constant comparative analysis. Additional to the description of each theme, barriers and suggested interventions to combat these barriers on an individual level were explored within the groups. Interventions included an individual behavioural intervention as well as a system-based intervention. The outcome of this research on sustainable change indicated that 81% of staff members stated that their contribution to the process would ensure their participation in change within their contexts.

Optimal stabilisation of critically ill children requires application and practice of both technical and non-technical skill. Studies show how non-technical skills (communication and teamwork) impact on patient outcomes. In the emergency department different teams work together, and literature confirms that people work better together when they feel safe. A sense of safety results in openness in communication, which has better overall results on health outcomes. Success of these teams is also dependent on strong leaders who value all team members; however, it seems that members from the same team could have different perceptions of how the team is functioning as a whole.

How people communicate effects patient outcomes. Communication is purposed to share information among team members and their patients; however, the challenging environment of the emergency department can skew communication when it lacks intention. In this environment communication loads are high and patterns are complex due to patient loads, interruptions and crowding, which results in inefficient practice thus causing errors. Teamwork and communication and how they happen in the emergency department are important considerations when trying to understand what impacts on stabilising the critically ill child.

2.6. Summary

This literature review has addressed some of the critical issues that affect care of the sick child in the emergency department and highlighted critical concerns identified in the environment in which the study was conducted. Literature obtained from countries with poorer resources specifically highlights the gaps in emergency care for children. Furthermore evidence of innovative practice interventions leading to improved aspects of care in these settings highlights the effects of big improvements through small changes. However, most of the literature which addressed aspects contributing to the complexity (interruptions and crowding) and how people work together (non-technical skills) was gained from well- resourced and sophisticated settings. Evidence from these studies was not necessarily linked to children; however, the principle related well to environments and was thus considered relevant.

The combination of the literature highlights the complexity of emergency care for children. Although much of the data related to the unique setting of emergency and resources (what was needed, who was needed and whether people knew what to do), it was further interesting to learn the impact on patient outcomes related to how people talk and work together in an environment that has predictable challenges such as crowding and interruptions. All of these factors are recognised in the research setting.

Much of the data related to specific aspects of critical and or emergency care, highlighting important features that could impact on safety and quality outcomes of stabilisation. However, no literature was sourced evaluating system wide factors such as cultures and practice norms on stabilisation an emergency setting in both well and poorer resourced countries. This study provides a unique opportunity to contribute to the bank of knowledge which gains to understand insights into emergency care for the critically ill child.

CHAPTER 3: METHODOLOGY

This chapter presents the research methodology and rationale and is divided into five sections. It starts by describing how the methodology was selected to best answer the question and guide the research process. This is followed by the study design, methods of data collection, management and analysis; and concludes with measures implemented to uphold the ethical integrity of the research process.

This chapter describes how the research process developed through various stages. Initial preliminary data provided a timeline and events around a particular patient. However, a methodology was required that could produce a rich reflection of the complexity and what was happening beyond the simple timeline-related events. Ethnography provided a way of seeing and used participant observations, informal conversations and field notes to gather data. Furthermore, contextual data were necessary to expand on the patient load and flow through the system and was provided by demographic data.

In this study, the researcher became the primary instrument through which information was gathered. This is not unusual in qualitative studies (Murchison, 2010). For this reason, the researcher's voice is clearer and will be used in the first person in this chapter.

3.1. Selecting a research methodology

The study setting is not dissimilar to other emergency units across the world. Although varied admission patterns and degrees of acuity are predictable, the real challenges relate to the exact time of arrival and the severity of illness of each patient. Whoever comes at whatever time in whatever condition must be triaged, stabilised and treated. Best patient outcomes are linked to rapid stabilisation and effective interventions.

The literature review highlights hindrances to effective emergency care such as crowding, interruptions, poor teamwork and inadequate communication. At the outset of this study, I considered these factors as possible influences on stabilisation. Furthermore, a study conducted in this setting indicated challenges related to the emergency treatment of children with septic shock (Rossouw et al., 2011). These findings confirmed the need to further explore factors that contribute to poor outcomes in the sickest children.

The initial aim of the study was to conduct a non-interventional descriptive study to provide a snapshot of how “things worked” in this emergency setting. Early consensus clarified that the aim was not to measure any specific factors impacting on stabilisation as shown by the literature, but instead to work in participative ways with the unit staff to develop a comprehensive description of the multiple layers and factors that are at play in this complex environment. We started by conducting a practice audit with the expectation that it would help us to see how to look, and what to look for. Essentially the audit question was: “What happens when a child is coded red in this setting?” Rather than trying to work out and then describe all the systems and teams and circumstances that may answer this question, it seemed possible to describe some of this complex setting by following a particular child from entry to exit from this area and to observe as fully as possible what happened to and around each child. The practice audit was conducted in 2009 and laid the foundation for this research study.

3.1.1. Initial practice audit

In September 2009, eight children coded as red were observed from entry to exit from the medical emergency room. After a few trials it seemed most useful to record every activity and conversation that happened to and around the observed child, on a timeline. Time was used as a reference to relate events. This observation exercise quickly highlighted that no child could be observed in isolation and that other activities or circumstances in the room directly or indirectly influenced how the observed child was managed. Some of these included the acuity of illness of other children; the number of children, doctors, nurses present; people entering and leaving; and telephone calls. The observation tool that was developed to capture the rapidly changing environment and unpredictability of events included:

- All actions, activities and communications around a specific child, anchored by time, with a reference to who was doing what. We agreed to maintain confidentiality and anonymity of the team by not adding names but rather tracked the category and seniority of medical, nursing and additional staff with a set of symbols.
- A 15-minute count of the number of children, nurses and doctors in the room.

Confidence gained from the audit enabled the inquiry to shift from "What happens when a child is coded as red" to identifying factors that facilitate and hinder stabilisation of the critically ill child. The process of the audit enabled ways of seeing that would allow us to capture the environment in more complex ways. However, we realised that descriptions alone would be insufficient to address the research question and therefore additional data were required. From the audit it was noted that different children were seen in different parts of the unit at different times of the day. Similarly, staffing changed across time zones. These are only two factors among many that impacted on how children were managed, and pointed towards cultural and organisational practices within the system of this unit that would help us make sense of clinical outcomes.

A methodology was required that respected the complexity of the environment and would enable the understanding of factors that contributed to the process of stabilisation. A transition was made from the original audit focus of "What happens when a child is coded as red?" to "What optimises stabilising a critically ill child?" in this setting.

3.1.2. Paradigms: Different approaches to answer the research question

"Research is about asking questions and seeking information to answer the questions we pose" (Albon & Mukherji, 2009, p.10).This statement is true in essence, but may oversimplify the depth and complexity involved to accurately address the question. In this research I asked a simple initial question which related to how things work in this context. This simple question led me to discover that there was so much going on, prompting further questions to make sense of what I had seen. It seemed that good questions were key to guiding the research process.

Extensive reading and supervisory guidance led to an understanding that there are different paradigms that guide how new knowledge is discovered and formulated. Understanding these paradigms provided a more structured framework and context for the study. It challenged my perceptions and I found myself having to ask: "How do I think about this research question? How do I understand it? Where do I stand in answering the questions?"

Addressing these questions disclosed that the research was not only influenced by my own beliefs but also by how I positioned myself within this setting. This was confirmed by writings from Smith and Hunt (1997). Furthermore, Guba and Lincoln (1994) and DeVos, Schurink and Strydom (1998) are of the opinion that questions would point towards a methodology which in turn would structure the exploration of what could be known about the reality.

A number of authors have described three recognised paradigms that influence the development of research, namely: positivist, interpretive and critical theory paradigms. Table 3.1 summarises these, as initially described by Newman (1992) and Guba (1990). This table provided a useful summary and was directly reproduced from Smith and Hunt (1997). Increasing exploration of these paradigms enabled me to place this study in the Interpretivist paradigm which in turn assisted in identifying the research method.

Table 3.1: Belief systems of the paradigm of positivist, interpretivist and critical theory (Sources: Newman 1992, after Guba (1990) and reproduced from Smith & Hunt, 1997)

Ontology **(researcher's perception of the nature of the reality and what is known about it)**	**Epistemology** (researcher's perception of where he stands in relation to this reality)	**Methodology** (researcher's perception of how he can explore this reality)
Positivist		
Reality is objective:	Inquirer adopts an objective, detached stance	Experimental
Exists independently of perception		Empirical
		Controlled
Driven by natural laws	True beliefs correspond with facts	Testing of hypothesis
Interpretivist		
Reality is mentally constructed and is socially and culturally based	Knowledge is constructed in social and historical context	Hermeneutic Dialectic
Multiple interpretations and multiple realities accepted	Findings represent a creation of the process between the researcher and the research subjects	
	Truth is based on pragmatic criteria	Focuses on uncovering the variety of constructions that exist among them
Critical social theory		
Reality is constructed and influenced by societal structures	Subjective	Dialogic
	Values mediate inquiry	Critique of ideology
	Constructed, communal, contextual	
Human beings are capable of rational self-critique	Goal is to free participants from the effects of ideology	Reveal hidden power imbalances
	Standards of truth	Facilitate social transformation
	Meaning and truth are interpreted within the context of history	

The research question asked for the identification of factors that affect stabilisation of the critically ill child in the complex environment of the emergency unit. To answer this question the totality of this setting including its cultural and traditional norms, together with day-to- day practices, needed consideration. The practice audit had already revealed that different people did things differently and different teams thought about problems in different ways. There was clearly a culture of practice that influenced how things were done. People's realities were constructed by their perspectives. Furthermore, I realised that the setting was complex owing to the unpredictable nature of emergency, and because of its position in the hospital, its function, and its history. I came to understand that the challenges were neither linear nor simple and that a paradigm that allowed for multiple interpretations of the same reality would be required. A methodology within the interpretivist paradigm seemed the most appropriate.

The interpretive paradigm was initially developed as a result of perceived confines in the positivist paradigm. The positivist takes the stance that there is an "objective reality that exists independent of the observer, where phenomena are driven by natural laws that are accessible to observation and measurement" (Smith & Hunt, 1997, p.25). Research in this paradigm has led to findings in health care that have significantly identified and measured problems impacting on morbidity and mortality. Although these evidence-based findings are extremely valuable, they do not necessarily provide or consider a contextual explanation to measured problems. Some rationalists believe that it is possible to develop an understanding of a subject without directly observing it (O'Cathain, 2009), but this was not the purpose. A good example is the study by Rossouw et al. (2011) who identified that children with septic shock were not treated according to international guidelines in this unit. These findings were extremely important, but did not attempt to identify a contextual explanation of the problem; it was not the aim of the study to do so. However, this presented the need for adjacent qualitative and quantitative research to comprehensively address measured problems.

An opportunity emerged to expand on previous contributions from a positivist perspective to this research setting (Rossouw et al., 2011). Research conducted from a positivist perspective is intentionally geared at predictability and outcomes accurately reflect specific aspects of care, but seldom take the whole system into account, including the context, culture and history. Sidney Dekker (2011, p.7) in his book *Drift into Failure* is of the opinion that "organisations and technology have become increasingly complex but our understanding of why things fail don't reflect that complexity". His opinion highlights that in complex systems things do not always happen in a simple and linear fashion. And so, in this study, an interpretive perspective aims to understand the complex study setting, making allowance for non-linear influences of social, cultural and historical contexts (Thompson, 1990). By uncovering objective realities and day-to-day practices, the research aimed at explaining and giving meaning to positivist outcomes. In this context, an interpretivist paradigm had not yet informed a research methodology, as all studies were informed by the positivist paradigm.

As indicated, the perspectives related to a paradigm influence the methodologies used in that paradigm (Table 3.1). Various interpretivist methodologies were explored to find which would best enable me to describe the multiple layers of truth and reality in this complex setting. The purpose was not to build a theory (grounded theory) or to focus on a group's experience of certain phenomena (phenomenology) but rather to use a methodology that would give rich insight into the views and actions surrounding stabilisation with a deep consideration of the culture and setting (Reeves, Kuper & Hodges, 2008). Ethnography was the best option.

An article by Malhotra, Jordan, Shortliffe and Patel (2007) was helpful and provided a clear example of how ethnography was used to "calibrate a view so that we are able to see what we need to see" in a busy and complex clinical environment. Malhotra et al. (2007) used ethnography to "puzzle out" the workflow in a busy ICU, which helped identify factors that threatened patient safety. The clear outcomes of the study promoted safety and successfully countered medical errors.

3.1.3. Interpretative methodology: Ethnography

Ethnography is a qualitative research methodology widely used in social anthropology to explore a culture or society (Atkinson & Hammersley, 1994; Fetterman, 2009; Murchison, 2010) with a predominant focus on studying social life in its naturally occurring setting (Savage, 2006).While it has been most cited in studies focused on understanding cultures in general, it has made a valuable contribution to understanding the culture or human factors in various health care settings, especially in answering questions that cannot be addressed by other methods or approaches (Goodson & Vassar, 2011).Ethnography offered the best way to address the research question in this complex setting.

The following points provide rationale for the use of ethnography and were accessed from various sources as referenced.

1. It primarily aims to study life outside of a controlled environment.
2. It gains the insider's perspective of a particular group or community.
3. It makes the links between bedside practices, and system-wide and cultural features.
4. It is useful to describe unexpected or unanticipated answers.
5. It incorporates quantitative methods to facilitate methodological triangulation.

Each of these points will be expanded on briefly.

1. It aims to study life outside of a controlled environment

The audit pointed out that what happened to and around a critically ill child involved multiple layers of activities, conversations and actions, which were further impacted by other events in the room at the same time. Although most of what happened was predictable, the specific timing and combination of events was unpredictable. Added to this was the complexity of human behaviour within this system: how people worked together and communicated. Reducing the current setting to a predictable or controlled environment was not possible, as hidden or obvious factors in the day-to-day events contributing to stabilisation could be overlooked. Ethnography was suitable as it takes into account the messiness of human lives and social interactions and "aims to study life outside of a controlled environment" (Murchison, 2010:4).

2. It gains the insider's perspective of a particular group or community

The beauty of ethnography is that it enables comprehensive insights into the culture or setting under study, in that the researcher gains an insider's (emic) perspective (Murchison, 2010; Savage, 2006). Fetterman describes the emic perspective as the "insider`s or native`s perspective" which is an instrument used to understand and accurately describe situations and behaviours (2010, p.20) . The researcher becomes the primary research instrument, which requires extended periods of time in the setting (Murchison, 2010).The benefits of extended periods of observation and relationship building with those in the setting allows for rich insights to the culture and day-to-day practices. As the primary research instrument I started as an outsider, but worked intentionally to engage people in the setting to the point where I gained insider status. By the end of the study I was trusted sufficiently to be asked my opinion, to be ombudsman and to give advice.

3. It makes the links between bedside practices, and system-wide and cultural features

The audit disclosed that stabilisation was dependent on a wide circle of factors. Events in the room (and hospital) impacted on stabilisation, and factors within the system of the unit, such a staffing and patient flow, affected how each child was managed. Savage (2006) calls these micro and macro features. Micro events happen in the immediate environment while macro events relate to the wider context. He suggests that ethnography is useful in making links between "everyday action or interaction and wider cultural formations…"(Savage, 2006, p.385).

What I was able to see during observations is that much happens at the same time on different levels. Experience taught me to document what was happening around a particular pathway. I learned to simultaneously notice and record other events in the room that could affect stabilisation. What I saw on that level evoked further questions on how the system worked.

Gellner and Hirsch (2001) give an apt description of what I experienced as a researcher in learning to look simultaneously at different levels. Ethnographic observation is "a curious kind of cross-eyed vision, one eye roving ceaselessly around the general context, any part of which may suddenly reveal itself to be relevant, the other focussing tightly, even obsessively, on the research topic" (Gellner & Hirsch, 2001, p.7).

4. It is useful to describe unexpected or unanticipated answers

Many studies are designed to identify and measure clinical outcomes which impact on morbidity and mortality in clinical settings such as emergency care. While these outcomes are extremely important, they do not offer a context that would consider the culture of the people working within this setting, how they go about their day-to-day work, and whether these factors could in fact contribute to positive outcomes. Ethnography offered an opportunity for the context to be viewed from a broader perspective where the routine and often-missed arbitrary practices and norms may be considered as significant contributors to the care of the critically ill child (Smith & Hunt, 1997). John Stotter writes that ethnography allows the opportunity for the reader to "get it" and see possibilities that were not noticed before (Cunliffe, 2010, p.229).

5. It incorporates quantitative methods to facilitate methodological triangulation

Ethnography commonly uses methodological triangulation. Taylor, Kermode and Roberts (2007) define it as using two or more research methods in one study at the level of data collection or design in order to improve the insight into and comprehension of a specific phenomenon, with which Reeves, Kuper and Hodges (2008) and Savage (2006) agree. Early on in the research process it became evident that multiple data sources would be required to fully describe the complex setting of this unit. A simple description of a set of pathways gathered through participant observations would not suffice. A set of data describing the number of children seen, as well as where they were seen in the unit, would add to the picture. This will be elaborated on in the Study design (section 3.2).

Ethnography has made a valuable contribution to health care. Earliest studies date back to 1961, when Goffman described patients' experience of mental institutions. Published studies include: tracking and understanding medication compliance (Campbell et al., 2003); understanding a hospital culture (Van der Geest & Finkler, 2004); and the impact of social and cultural backgrounds on the patient's expectation of care (Rice & Ezzy, 1999). Furthermore, it has been used in the critical care and emergency care environments to investigate: perception of maintaining quality of practice (Storesund & McMurray, 2009); critical care education (Cutler, 2002); communication (Conn et al., 2009; Miller, 2001; Burnard & Naiyapatana, 2004; Manias & Street, 2001); patient safety (Dixon-Woods, 2003) and identifying work pressure and flow management (Malhotra et al., 2007; Nugus & Forero, 2011; Nugus et al., 2011).

The MEU at the RCWMCH is an example of a complex setting where the stabilisation of a critically ill child is reliant on multiple interconnections of various role players within the system of emergency care. Efficient stabilisation is dependent on: different teams of professionals, often from different sites; high turnover of acutely ill children requiring urgent attention; the availability of resources; and communication norms. Within the paradigm of qualitative inquiry, ethnography with its openness to quantitative data and attention to context was best suited to tackling the complexity of this setting.

3.2. Study design

The study design, data collection and analysis were informed by the initial practice audit. Ethnography was selected as the most suitable methodology to provide a rich description for the multilayered, multifaceted complex environment with the aim to address the research question of identifying factors that facilitate or hinder stabilising a critically ill child in the unit. The research design considered the study population, sampling and data gathering that would be fitting for the study purpose. Qualitative and quantitative data collection techniques were used. Qualitative data included: participant observations, informal interviews, field notes, and retrospective review of clinical notes, while quantitative data consisted of six months of patient demographic data from the Resuscitation Room Child Register.

In the next few sections I will elaborate on the study population and how I sampled the study setting through child pathways to gather sufficient data to answer the research question. This is followed by a section on the methods of data collection.

3.2.1. Study population

A study population is the "total entity about which knowledge is sought" and is defined according to the concern and focus of the study (Bromley et al., 2003, p.26). The study concern was to identify factors that affect stabilising a critically ill child, with a particular interest in the culture and context of this emergency community. The outcomes from the audit assisted in seeing that the study population extended beyond those who worked at the bedside, and included the community and culture of everyone who, at the time of observation, could directly or indirectly affect the clinical outcomes of the observed child. These included: security officers, clerks, housekeeping staff, doctors, nurses, radiographers, and parents. However, the study population also included influences from outside the physical boundaries, such as hospital management, who contributed to the culture and influenced how things worked.

3.2.2. Sampling

Sampling is the process of selecting individuals, groups or texts for inclusion in a research project (Bromley et al., 2003). In this study, the pathways of a group of children were used to assist understanding what happened along the way. As in most qualitative studies, power could not be determined statistically as there were no previous research data in this context. Sampling was not seen to be about numbers but rather about the quality of information obtained. Too many data would not allow for the deep analysis that is required in qualitative studies, although too few would not provide sufficient information (Sandelowski, 1995). Furthermore, the study did not seek generalisation but required an in-depth understanding of the study site and setting (Brewer, 2000) Data were collected until saturation was reached.

Added to this, statistical data were collected from the Resuscitation Room Child Register between1 July 2010 and 31 January 2011. Data were gathered on the number of patients, diagnosis, length of stay, triage codes and referral sites, which enabled the description of the patient load to the resuscitation room and how children moved through the system. It included the second half of a winter season transitioning into full summer, reflecting the number of children presenting to this area and the severity of their illness.

To address the research question an event or activity was required that would enable the observation of how things worked in the unit. It seemed sensible to view the setting from the perspective of what happened around a critically ill child and therefore the child pathway of the critically ill child was used as the unit of analysis. Children, along their pathway through the unit, were used as a way to sample the environment.

3.2.3. Child pathway as the unit of analysis

For the purpose of the study, the child pathway was defined as the route or course a child takes from entry to and exit from the unit. It differs from what is often described as a "clinical pathway" in that it does not prescribe or predict the care that is planned for the patient, but merely serves as a vehicle to understand all activities, interventions, procedures and communications as they naturally occur around a specific child as he or she moves through the unit. An interesting result from this approach was that the complexities of the emergency unit are described from the immediacy of a particular child's bed space. While numbers from the statistical analysis may point towards a staff experience, child pathway data gives some indication on how a child may experience this environment.

The intention of the study was not to analyse technical clinical skills or measure the quality of care. The aim was to identify factors that affect stabilisation through a comprehensive description of the context and culture in which it happens.

3.2.4. Selecting the child to observe (child pathway)

The sampling approach utilised was purposive in that the study site and child pathways were selected by their ability to provide information that would inform the research questions (Hammersley & Atkinson, 1995; Silverman, 2001). Purposive sampling seeks out data on events, incidents and experiences, but not individuals as such. Data that could give information about the particular phenomenon under study was required (Sandelowski, 1996).The practice audit identified different scenarios around resourcing and practices that could affect sampling, and time of day seemed the most important consideration. Time of day showed variations in staffing and admission patterns. The majority of critically ill children were seen in the area during the day and staff were traditionally allocated to different parts of the unit across three time periods over 24 hours (08h00-16h00; 16h00-23h00; 23h00-08h00). These factors were useful in planning when observations would occur.

I recognised the evident seasonal disease patterns as described by staff and seen in hospital statistics. Respiratory conditions in the rainy winter months and diarrhoeal diseases in summer were some of the seasonal diseases which added to the load in the unit. However, sampling was purposed to identify context-rich descriptions and not to be representative of the year or seasons.

Child pathways were used to sample the setting during day and night shifts, with the majority observed during the day. Day shift observations occurred on Mondays and Wednesdays and night shift observations during selected week and weekend nights (Table 3.2).In ethnography careful planning of time and availability are key to success (Murchison, 2010). Enough time was needed to enable an observation of up to eight hours. To balance other research responsibilities and obligations with time for observations, specific slots were allocated weekly

Eight child pathways were observed between January 2011 and March 2011, while two confirmatory pathways were completed in August 2011. Data were analysed concurrently using constant comparative analysis (Glaser, 1978). By the end of the eighth pathway it was decided that data saturation had been reached. However, a choice was made to sample two more pathways to confirm findings.

Child pathways were selected purely on physical presentation on arrival at the MEU. The first child who appeared critically ill was selected. I made a rapid assessment of the child based on a range of indicators including: severe breathing difficulty, active seizures, severe dehydration, decreased level of consciousness, lethargy, acute muscle weakness or muscle tone. A child escorted by paramedics straight through to the resuscitation room was an obvious choice.). In total, 29 hours and 5 minutes were spent actively observing pathways while many additional hours were spent in the unit. Ethnography usually requires a significant commitment of time that enables the establishment of trust and further lays a foundation for the research (Murchison, 2010). The relationship was initiated at the end of 2009 with the practice audit. The findings from the practice audit generated an interest in further studies and thus the relationship continued throughout various stages of the research process until the middle of 2012.

Table 3.2: Observation times of child pathways

Pathway	Shift	Time observation commenced	Time observation terminated	Duration
1	Day	11h54	15h09	3 hours 15 minutes
2	Night	21h40	23h20	1 hour 40 minutes
3	Day	13h50	17h55	4 hours 5 minutes
4	Night	22h00	24h32	2 hours 32 minutes
5	Day	13h10	17h40	4 hours 30 minutes
6	Day	13h05	16h22	3 hours 17 minutes
7	Day	14h16	17h09	2 hours 53 minutes
8	Night	18h05	22h17	4 hours 12 minutes
9	Day	11h38	14h17	2 hours 39 minutes
10	Day	13h25	17h56	4 hours 31 minutes

3.3. Methods of data collection

A rich description required a design that enabled an integrated view of data collected using a variety of sources and methodologies. The purpose was to distil factors that affect stabilisation of the critically ill child.

The practice audit and numerous conversations with clinicians and the research team assisted with clarifying and focusing the observation and salient data collection.

The following data were collected: participant observations; field notes; informal interviews; retrospective review of clinical notes and demographic data from the Resuscitation Room Child Register (Table 3.3).Triangulation aims at increasing the validity and quality of the study through comparing the data from different sources (Fetterman, 2009). In this study, data were collected (using different methodologies) and then compared (triangulation) to see whether the different perspectives confirmed analysis and conclusions. Each of these methods will be discussed in detail together with a description of how they were applied as well as examples extracted from the data. Each data collection method was evaluated according to its strengths, weaknesses, contribution to the study and pointers to do differently. These reflections are seen in attachment Appendix K.

Table 3.3: Data sources

Data source
1. Participant observation
2. Field notes
3. Informal interviews
4. Retrospective review of clinical notes
5.Demographic data from the Resuscitation Room Child Register

3.3.1. Participant observation

Participant observation is a method of observing the way of life of a group of people in a particular setting and is synonymous with ethnography (Fetterman, 2009). Mason (2002) further clarifies that this method enables immersion in the research setting, which in turn aids a direct experience of the setting. Thus, insights are gathered by the researcher, who becomes the primary research instrument through looking at what happens, listening to what is said, and engaging those in the selected setting over a period of time (Becker & Geer, 1957; Fetterman, 2009; Murchison, 2010). Goffman (2002, p.149) provides an account of participant observation which encapsulates this experience:

> *"It's one of getting data, it seems to me, by subjecting yourself, your own body and your own personality, and your own social situation, to the set of contingencies that play upon a set of individuals, so that you can physically and ecologically penetrate their*

circle or response to their social situation, or their work situation, or their ethnic situation or whatever."

In this study, participant observations provided the main source of thick descriptive data. It provided a way of looking to see how things occurred in this complicated environment with the benefit of gaining an inside (emic) perspective of activities, actions, decisions, strategies, behaviours and interactions around the critically ill child. The emic perspective was valuable, but building trust and relationships with people in the setting required time and consistency.

3.3.1.1. How were data collected in the participant observations?

Participant observations included the systematic and detailed surveillance and tracking of events, behaviours (activities) and dialogue occurring around the child under observation (Bromley et al., 2003). At the selected time of observation, I waited in the reception area or in the triage room for the arrival of the first child who appeared to be critically ill. On seeing a child that could be identified as critically ill, I would immediately commence the observation by writing a detailed description of what I saw, always using a timeline to structure observations. The child's triage code and condition would usually be confirmed by the nurse in the triage room. Alternatively, critically ill children accompanied by paramedics would bypass the triage room and go directly to the resuscitation room. Some children appeared severely ill to me, but were coded as orange. The initial plan was to follow children who appeared critically ill, and so these children were followed along their pathways.

Observation started on identifying the child and stopped at the point of handover to the transfer ward. Where a stabilised child required prolonged admission due to the lack of bed availability in the allotted ward, I could make a decision whether to terminate the observation. This termination would be accompanied by a detailed explanation. Figure 3.1 demonstrates the observation path of the critically ill child through the unit.

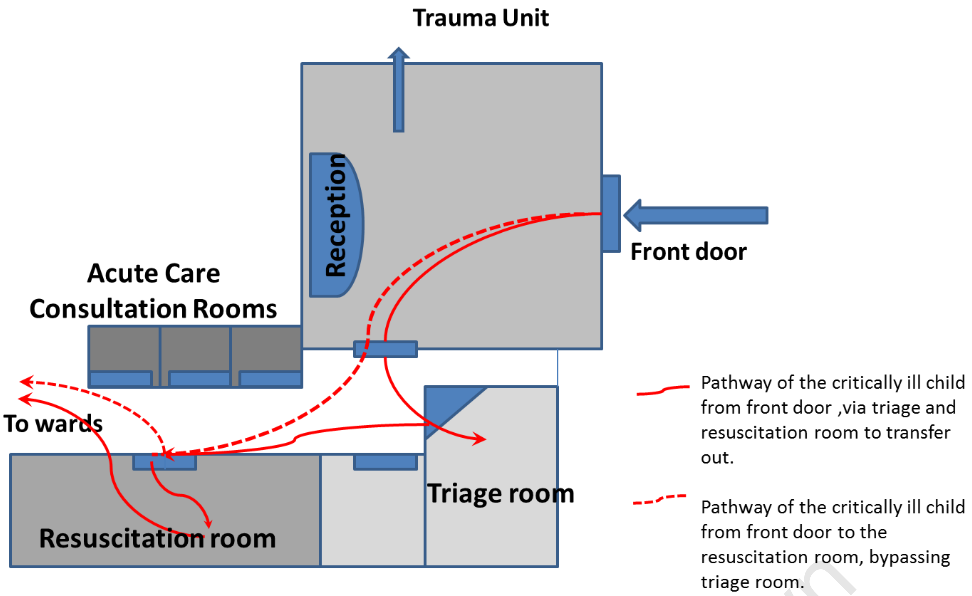


Figure 3.1: Observation pathway of the critically ill child through the unit

While observing, I would stand or sit behind the desk in the resuscitation room. The small room enabled me to see and hear what was happening at any place, unless the curtains around a bed space were drawn or people chose to whisper. This position seemed the best so as not to hinder staff member's access to bed spaces.

During active observations, I took on the position of a detached observer and did not talk to staff stabilising the observed child. A detached observer simply means that the researcher "does not influence the objects or subjects of study" (Murchison, 2010,p.85). I usually only asked clarifying questions related to the observation after the child had been discharged. However, when I saw a preventable activity which could incur patient harm, it was immediately verbalised to the nurse operational manager or senior nurse. This only happened three times. The first incident prevented a child from receiving the incorrect medication. A nurse picked up a medication chart that was lying at the bottom of the observed child's bed and took it to the area where intravenous medication was drawn up. Fortunately, I had noticed minutes before that a registrar had placed the medication chart (belonging to another child) on the observed child's bed. The nurse was drawing up the medication when I approached her. The other two incidents related to delayed medication and fluid administration. Both were prescribed early in the pathway but not given until the staff were notified.

3.3.1.2. What was observed and tracked?

A detailed description was documented of all activities and conversations around the bed space of the observed child. This included clinical activities, therapeutic interventions and communication. Communication-related descriptions noted conversations around the child, including who was addressing whom and the basic content of the communication. All descriptive details were accompanied by symbols indicating the category of staff involved. This was useful as it enabled me to track who was doing what (in keeping with anonymity). It showed what category of staff was involved with the care of the child and specified how they were involved. Furthermore, it showed which categories of staff were talking, and about what. It also assisted in seeing the links between how things were planned and executed by showing how different categories of staff were involved in various parts of this process.

Data were initially written on a pre-designed 15-minute data capturing sheet which allowed for notes to be written alongside a timeline (Figure 3.2). It was designed to capture data on the number of children, doctors and nurses in the room at the start and end of the 15 minutes through the pathway. New admissions and children leaving were added together with a brief description of their conditions. Furthermore, basic details were added of unrelated people entering the room to obtain information, direction or assistance, but who had no immediate business in the resuscitation room at the time.

These data were then transcribed onto an Excel spread sheet (Appendix E). However, with experience I learned to record (type) data directly onto the spread sheet at the time of observation.

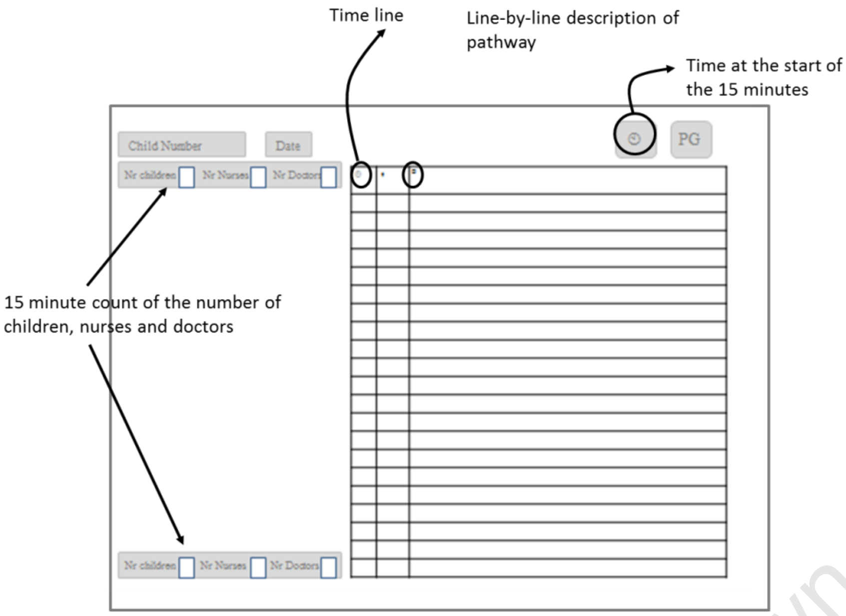


Figure 3.2: Pre-designed 15-minute observation sheet

3.3.1.3. Entry into the field

I was able to establish relationships and a different credibility with the team as I had worked clinically in a different area at the same hospital for a number of years. Furthermore, they knew me from the practice audit. When I came back the staff seemed accepting of me and the research intentions. Initially, time was spent in conversation with nurses, doctors, security guards and clerks before actual participant observations were recorded. The purpose was to re- familiarise myself with staff working in the area. Initial conversations helped clarify the research purpose, but also became a sounding board for perspectives, thoughts and experiences related to this work environment. Further, the relational base was helpful in collaboratively finding ways of observing that suited the setting without disrupting the delivery of care in this already high- pressure environment.

At first I struggled with the concept of being in an environment and trying to be a part of it without actively contributing, especially with my nursing background. I realised that participant observation does not mean that the researcher must do what those under observation are doing. Delamont (2004) believes that it is reasonable for there to be some interaction in the study setting with those who are under study, while those included in the study are doing what is under study.It took time to practise the discipline of keeping to my brief. My instinct was to help, but I could not help with nursing functions, which initially left me feeling guilty about not participating clinically.

Furthermore, the way in which the participants reacted to the study is referred to as reactivity (Onwuebuzie, 2003). The earlier audit acted as a buffer for this study. I had met most participants, but additional meetings with both medical and nursing staff assisted in clarifying the purpose. This message was further consolidated when I asked the participants for written permission. However, this process was focussed on the team allocated to the Unit. Changing teams and ad-hoc assistance from clinicians called in to for specific cases sometimes resulted in awkwardness. On entry they would notice me watching a bed –space intently and writing or typing, invariably it would be the bed space where they were called to. I noticed them looking at me as my actions were out of place in this environment where everyone else was doing something for a child. Most often I was unable to cease the observation to explain my position and seldom any other person in the room would offer an explanation. If at all possible, I would grab a moment to explain my position and offer to discontinue observations if they were involved in the pathway, but in other times I was unable.

This also raises the point of reflexivity which signifies the researchers part in the social world under investigation (Hodgson, 2000). I became the primary data collection tool which meant that my response to the setting and the settings response to me were valuable data. Early in the research I had to place myself in the context of the medical emergency unit as a researcher and realise the value of the close interface with the research setting and the people in it. The risk of bias and subjectivity were concerns, however Hodgson (2000) is of the opinion that it produces rich data.

3.3.2. Field notes

Field notes are described as written accounts of observational data (Montgomery & Bailey, 2007). This strategy is often used by ethnographers to describe social interactions and other significant activities and the context in which they occur (Roper & Shapira, 1999). In this study field notes were initially used to record various aspects of what was happening in the unit before the start of participant observations. Field notes captured the people, the place, who was involved, and my own initial thoughts and feelings on entering the research setting. These notes became essential in familiarising myself with the place and people as well as planning the way forward.

As the study progressed and participant observations commenced around pathways, field notes were logged to capture additional occurrences and perceptions from the research setting. Mostly these were recorded during a specific child observation. However, additional descriptive field notes were captured while waiting for a critically ill child to arrive. The information included aspects about the environment, non-verbal cues and how things worked. Most of the field notes were recorded while I was waiting for a critically ill child to arrive.

3.3.3. Informal or unstructured interviews

The purpose of an interview is to generate narrative knowledge or information specific to events (Bromley et al., 2003). Interviews are central to data gathering in ethnography as the acquired information puts into perspective that which the researcher "sees and experiences" (Fetterman, 2009:40)

In this study, informal interviews were intended to clarify data from observations. These interviews gave me an opportunity to ask specific questions in informal conversation to bring context or explain something I had observed and not understood. Clarifying assumptions prevented drawing early and incorrect conclusions, as well as exposing and overcoming my own bias. Areas that required clarity ranged from aspects of care noted at the bedside to clarifying system-wide issues. A third aspect was confirming research findings with those working in the field. Interviews were generally aimed at three groups: those directly involved in the care of a child during observation, key informants, and team members.

3.3.3.1. Informal interviews with care givers from specific pathways

Informal conversations usually took place in the resuscitation room or triage rooms after a child was observed. The time was dependent on availability of the involved staff member to prevent interruptions. The content of these conversations was recorded on the pathway observation sheet in the place where an aspect of the observation was unclear.

3.3.3.2. Informal interviews with key informants

Key informants are frequently relied on in ethnography to provide deeper levels of information (Murchison, 2010). They are usually identified by the researcher as people who are willing to engage and to have many clarifying conversations (Murchinson, 2010). The acting nurse operational manager and senior Paediatrician became invaluable in bringing clarity and understanding to both practical and contextual questions and both quickly became valuable key informants. They were approachable at all times and provided rich insights.

3.3.3.3. Informal interviews with team members

A third set of informal interview was conducted with team members during data analysis. This assisted in bringing clarity to aspects that were not well understood from the analysed data. I selected times when the unit was quiet and asked staff members and key informants to look through parts of the data with me. Initially these meetings were very difficult and dialogue was strained. I probed into the reasons for this and was told that there had been an expectation that feedback would point out errors and predominantly be bad news. Furthermore, there had been some areas of disagreement around the results from the statistical analysis of the Resuscitation Room Child Register. Staff working in the area were surprised at the high numbers of triage code greens and oranges. However, these led to useful conversations about triage and its challenges. Member checks were very helpful in recognising and confirming findings. Member checks are a way of "gaining feedback from the respondents on the researcher's findings" (Schwandt, 2001, p.155).

3.3.4. Retrospective review of clinical notes

After observing the first child pathway, I realised that observational data only presented a single dimension of what was happening around a child pathway. The success of stabilisation is very much dependent on what medical intervention is planned and how quickly it is administered. A second dimension was required, not to measure time, but to complete the picture that would help me see the parallels between what was planned and what was done. The rationale was that insight into factors contributing to this gap may help to identify factors that impact on stabilisation.

A supervisor suggested the inclusion of clinical notes to contribute to explanatory data. A retrospective review of clinical notes from each child pathway was conducted. The documents listed in Table 3.4 were extracted and copied from the child's folder.

These notes were first transcribed onto a standardized Excel spreadsheet allocated to a specific child pathway and later details were added to a compilation of all the qualitative data sources per child pathway.

Table 3.4: Documents extracted from observed child's hospital clinical notes

- METRO Emergency Medical Services: Patient care report form
- Red Cross Children`s Hospital Medical Emergency Unit Coding Sheet
- Letters from referring institutions or medical practices
- S12 Medical Emergency Unit: Admission and Resuscitation Nursing Record

And finally, data sources from each child pathway were gathered and collated onto an Excel spreadsheet to compile an ethnographic record per pathway as seen in Figure 3.3 (Murchison, 2010). The ethnographic record was a compilation of participative observations, field and clinical notes as well as transcripts from the informal interviews. Where possible I withheld the value of time and added the details when they happened along the child pathway. This collation process prepared the data for analysis. Each pathway was numbered and so reference to specific pathways ethnographic records in the thesis will be indicated using the following symbols. Pathway 1 is referred to as ❶ and the rest follow, ❷❸❹❺❻❼❽❾❿.

Appendix E provides an example of an ethnographic record with an additional pencil sketch in Appendix C of the pathway (❿).

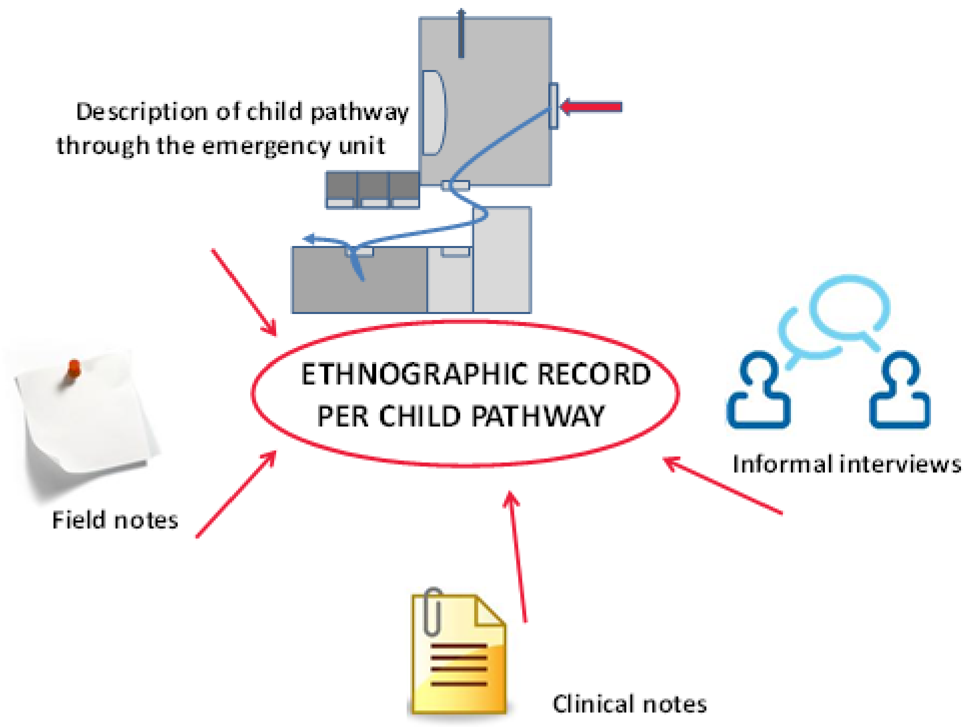


Figure 3.3: Ethnographic record from child pathways

3.3.5. Data from the Resuscitation Room Child Register

The collection of quantitative data was aimed at supporting and enhancing the ethnographic description of this complex environment. A graphic representation of who (triage codes, diagnosis) was seen in the resuscitation room and when (time of day), would help to identify the load on the resuscitation room as well as patterns of flow through the unit.

As indicated previously, data were collected between July 2010 and January 2011. It included the second half of a winter season transitioning into full summer season and reflected the load and acuity of children presenting to this area. The initial intention was to capture data from the child register for a 1-year period, but this 7-month period was deemed sufficient by the research team and clinicians as it captured one seasonal transition. Hospital statistics provided data on the number of children triaged over a twelve month period (RCWMCH, 2012). The months of July to September had similar, yet slightly less numbers than February to April. Trends were comparable and therefore the selected data was sufficient.

Data were collected (with permission from the unit managers) from the Resuscitation Room Child Register. This was a register found in the resuscitation room and its purpose was to keep a record of every child that was treated in this room. Data were gathered by two second-year medical students who were on a research placement at the hospital**.** Information gathered from the Resuscitation Room Child Register on each child treated in this 7-month period included: folder number; triage code; gender; referral; diagnosis; time of entry to, and time of exit from, the resuscitation room; and referral destination. These data were compiled into an Excel spread sheet (Appendix G). However, while collecting data some inconsistencies in how certain details were filled out were noticed. For example, under the heading of diagnosis some people entered a presenting symptom while others entered a category of diagnosis and still others entered a specific diagnosis. Also, disparities were noted in the times of entry to and exit from the resuscitation room. In some cases either one or the other, or both, were not filled out.

These inconsistencies caused me to look further into the purpose of the register and the process of how details were logged. The main purpose of the register was to keep a record of every child who was treated in the resuscitation room with a specific emphasis on the number of children seen in the area. Details collected on every child included: name and surname, date of birth, folder number, date of entry, time of entry to the area, time of exit from the area, referral status (whether or not the child was referred by a medical institution or practitioner), diagnosis, triage code, date of referral out, and referral destination. The nurse operational manager recorded daily counts of the number of children treated in the resuscitation room. These were logged onto a data capturing sheet and were collated by the consultant. As the purpose was to track the number of children seen none of the other information such as triage codes, diagnosis or time of entry or exit were utilised.

Patient details were entered by the professional nurse. Data entry took place at different times in the pathway and identifying a pattern of when it happened was difficult. It seemed dependent on who was doing it and how busy the room was at the time. It appeared that some information, such as the child's name, time and date of entry were logged soon after arrival, while data such as diagnosis and other details were entered later. Sometimes, all details were added after the patient had been discharged.

It seems that there was lack of clarity about why certain details were collected if they were not going to be used, which in part explains the discrepancies in the process. Considering all of this, data from the Resuscitation Room Child Register was considered valuable as it was the only information we had that would help us to understand the admission load and flow to the resuscitation room. A decision was made to continue data collection from the Register. However, in analysis, explicit reference was made to data that were unknown or not documented and, furthermore, due to the aforementioned inconsistencies, diagnosis data were excluded.

The hospital kept statistics on the number of children seen and the triage codes allocated in the triage room. The purpose was to keep track of the patient load presenting to the unit.

This became a useful source of comparison with data from the Resuscitation Room Child Register, and so a set was accessed from the hospital management for triangulation.

The method of collecting these data was evaluated. On arrival to the triage room, a child was allocated a triage code by the triage nurse. At the same time, the nurse would log the triage code onto a manually operated triage counter. This manually operated dial consisted of three colours: red, orange and green. At the beginning of the day, all three dials were zeroed in preparation for the day. These numbers were tallied by the nurse operational manager at the end of every day, and monthly statistics providing the number of green, orange and red triage codes were handed to hospital management for statistical analysis.

These provided useful insights into the number of children triaged and were especially valued by the hospital management. Patient load and resource allocation were weighted according to the triage codes. It was assumed that triage code red required the most resources, while triage code green required the least.

However, when comparing the two sources some discrepancies were noted in the number of children triaged as code red. It was discovered that totals from the hospital statistics did not include children who bypassed the weighing room (brought in by paramedics), neither were triage codes changed on the system when a child was reassigned to another code (usually an up-code) after another assessment. A comparison across two sources was useful for triangulation and highlighted some important correlations and discrepancies which will be elaborated on in Chapter 4.

3.4. Management of data

The data collected, which included pathway descriptions from participative observations, field notes, informal interviews, retrospective clinical notes and child demographic data were extensive. It helped to collate and condense all of these into two main sets, namely the ethnographic record (Excel spread sheet per child pathway) and demographic data (Excel spread sheet). A third additional set consisted of field notes and interviews as well as my own reflective notes. A system was necessary to enable access and manipulation. The names of children were not added, but folder numbers were tracked on a list separate from the observation notes and accessible only to the researcher. During the research process, all raw data were kept in a locked drawer. Ethnographic records and child demographic data were transcribed onto an Excel 2007 spread sheet, while extra field notes and interviews were transcribed onto Microsoft Word 2007. All were electronically stored and locked using a password. Electronic data were backed up on a memory stick used only for this purpose and safely locked away in a separate drawer. A hard copy was made of the ethnographic records and was filed and also kept locked away in a third drawer.

All data remained confidential. The information was only accessible to myself and the supervisors. The raw data will be destroyed after completion of the research.

3.4.1. Assessing validity

In qualitative research, a set of criteria has been developed to assess its validity and methodological rigour. Validity is defined as “truth: interpreted as the extent to which an account accurately represents the social phenomena to which it refers” (Hammersley, 1992:57). Sandelowski (1986) and Altheide and Johnson (1998) are of the opinion that a well-defined explanation of the data collection process, analysis and conclusion could improve validity. They have argued that a clear description giving details of the process used to collect data, the processes used to code and categorise data and develop conclusions, can enhance validity. Despite a lack of consensus in the use of a number of approaches (Hammersley, 1992; Sandelowski, 1986), Lincoln and Guba (1985) eventually distilled a set of evaluation criteria. These criteria aimed at judging the “quality or goodness of the qualitative inquiry” and were referred to as the “trustworthiness criterion” (Bromley et al., 2003, p.28). There were four components: credibility, transferability, dependability, and conformability.The following section describe how data were managed to assess trustworthiness in this study using the suggested criteria.

3.4.1.1. Credibility

“Credibility assesses whether the study findings make sense” (Bromley et al., 2003, p.9).This is extremely important, especially in qualitative studies, where the researcher is considered the research instrument. Smith and Hunt (1997) suggest that credibility is confirmed when those involved recognise it as being closely related to the reality of their context.

There are various ways to ensure credibility through triangulation. Triangulation provides in-depth data from different sources, increases the confidence in the research results and enables different dimensions of the phenomenon to be considered (Barbour, 2001; Jones & Bugge, 2006). Combining methods improves both the consistency and accuracy of data by providing a more complete picture of the phenomenon (Roberts & Taylor, 2002; Halcomb & Andrew, 2005). Two types of triangulation were applied: data triangulation and methodological triangulation.

Data triangulation is the use of multiple sources of data to obtain differing perspectives about a situation in a single study (Roberts & Taylor, 2002). In this study data collection methods included direct participant observations, informal interviews, field notes and retrospective review of clinical notes. These multiple sources helped validate findings from different perspectives including what was seen at the bedside and how this matched what was planned and written, what people thought and understood about their workplace, and finally what the researcher saw and perceived.

Methodological triangulation uses two or more research methods in one study at the level of data collection or design (Taylor et al., 2007) combining quantitative and qualitative methods. For example, in this study, data from the Resuscitation Room Child Register was used to clarify the patient load in the resuscitation room. Further, it provided a quantitation of flow that enabled the identification of flow issues through the unit. These data sets provided additional data.

Furthermore, to enhance credibility, regular meetings were scheduled with different groups throughout the data collection and analysis phases to communicate and confirm key findings with informants and others working in the area. Data were fed back to participants with the question of whether they felt that the interpreted data provided an accurate description of what they thought had happened.

Table 3.5 illustrates the formal meetings. However, frequent informal clarifying conversations were held in the resuscitation room.

Table 3.5: Formal meetings to clarify and validate findings

Formal meetings held	Purpose
Nurses: Three sets of feedback sessions were conducted during and after the completion of the study for nurses working in the unit	Nurses were gathered in small groups where the researcher communicated preliminary findings. The purpose was (a) to assess whether the findings made sense, and (b) to assess whether the interpretation accurately reflected the reality of the setting in their opinion.
Medical doctors: Three sets of meetings were held with the Consultants and Registrars from the unit and other areas	Similarly, consultants and registrars were gathered in small groups where the researcher communicated preliminary findings. The purpose was (a) to assess whether the findings made sense, and (b) to assess whether the interpretation accurately reflected the reality of the setting in their opinion.
Hospital Management Board	The researcher was invited to communicate findings from the study to the Hospital Management Board. At this point, the findings had been validated by those in the setting. Therefore, the purpose was to bring a different perspective on the nature of the emergency unit and current challenges as highlighted by the study.
University of Cape Town, School of Child and Adolescent Health Research Day	The researcher presented a paper communicating the findings of the study. The purpose was to receive feedback on the validity of the methodology and interpretation of results.

3.4.1.2. Transferability

Transferability deals with the" issue of generalisation in terms of case-to-case transfer" (Schwandt, 2001, p.258) and can best be described as how well the findings can be applied to another context or group. This study is clearly done in a very particular setting. A rich description of the setting and context will enable the reader to assess transferability. However, the outcome of this study is more likely to offer ways of seeing and understanding the complex settings of emergency care rather than the findings being applicable to other settings.

3.4.1.3. Dependability

Dependability is measured by the “extent that the findings of the study would be repeated if the same or similar participants were in the same or similar context” (Bromley et al., 2003, p.10). It is dependent on how the researcher is able to give a clear account of the research process and decisions that informed the process. Tracking the process practically included a research journal; minuted meetings with individuals or groups, including supervisors; a decision trail which included what data and additional data to track; and on-going notes recording and guiding the analysis process. A “decision trail” assisted the researcher in achieving dependability (Smith & Hunt, 1997). Tracking the research process was supervised by the supervisors.

3.4.1.4. Confirmability

Confirmability contributes to the trustworthiness of the research process. It ensures that the researcher’s biases and motivations have not overshadowed the findings of the study and the contribution of the participants and their context (Bromley et al., 2003).The practice audit carried out in the MEU contributed to confirmability. Member checks were conducted throughout the process. An example of this is how the clinical notes of child pathways were used to confirm observation data. Furthermore, interviews allowed the researcher to clarify what was observed and thus to override the possibilities of assumptions or bias.

3.4.2. Data analysis

This section starts by describing how and why we chose the specific analysis method and is followed by a description of the qualitative and quantitative data analysis methods and how they assisted the findings.

3.4.2.1. Qualitative data analysis method: Selection and rationale

There are a number of ways in which qualitative data can be analysed. Selecting a suitable method that would give the data the best chance to demonstrate findings relevant to the question is essential. Dey (1993) concisely describes the analysis process, saying that "we break down data in order to classify it, and the concepts we create or employ in classifying the data, and the connections we make between these concepts, provide the basis of a fresh description" (Dey, 1993, p.30). Analysis means that small portions of information are explored to find similarities and differences and results in the identification of codes (Padgett, 1998; Patton, 2002; Tutty et al., 1996). Coding organises data from which themes and descriptions generate explanations to answer the research question (Reeves, Kuper & Hodges, 2008). Corbin and Strauss (1990, p.12) describe coding as the "fundamental analytic process used by the researcher".

In this study the ethnographic records were explored to find similarities, differences and patterns according to which to organise the data. Emerging themes and patterns assisted building a description or an ethnograph of the context in which infants and children are stabilised. The rich textual data provided by the compiled ethnographic records were therefore subjected to initial broad thematic analysis.

Thematic analysis is a useful method to analyse qualitative data and provides rich, detailed, and complex accounts of data (Cassell et al., 2005; Fereday & Muir-Cochrane, 2006; Braun & Clarke, 2006). This initial analysis of the first pathways assisted me in refining what needed inclusion in observation.

It became clear that there were many complex factors hidden in different layers of data which could impact on stabilisation. These were not only related to what happened around the bed space but also what was happening in the room, and further, how the system of the MEU functioned to provide emergency care for children. It became evident that additional data would require different methods of analysis that would allow for multiple interpretations of the same or combined data.

Extensive reading led me to critically review two data analysis methods used in grounded theory. Grounded theory emerged in the 1960s when Glaser and Strauss conducted a sociological research study on the dying in hospital (Corbin & Strauss, 1990). It was acknowledged as a meticulous qualitative method that "combined the depth and richness of qualitative interpretive traditions with logic, rigor and systematic analysis inherent in quantitative research" (Walker & Myrick, 2006, p.548). At the core of its success was the rigorous data analysis process developed by Glaser and Strauss, who later parted ways predominantly due to their different perspectives on data analysis (Walker & Myrick, 2006). Corbin and Strauss (1990) further developed the analysis method. Both methods used coding, constant comparison, questions, and memos in generating theory. Furthermore, they adhered to very similar processes by gathering data, coding, constant comparison, categorising and theoretical sampling. However, the fundamental difference is that Glaser's method allowed for codes to emerge, whereas Corbin and Strauss chose to apply a theoretical model and describe ways of subjecting the data to fit this model. Furthermore, Glaser's method allowed for multiple analyses of the same data and especially appealing was the way in which analysis incorporated integration of quantitative data. Glaser's method was suited to the needs of this study.

Data consisted of two sets, namely: ethnographic records and demographic data, which required different approaches to analysis. Demographic data were statistically treated and produced descriptive data while qualitative data were analysed using Glaser's technique (Glaser, 1978, p.1992).

The following section describes and illustrates the process of Glaser`s analysis method. The diagram was drawn using the concept suggested by Glaser (1978). Furthermore, descriptive and pattern codes seen in Figure 3.4 were codes specifically yielded through open coding in this study. They were added to give the reader context

Glasers Analysis Technique (1978)

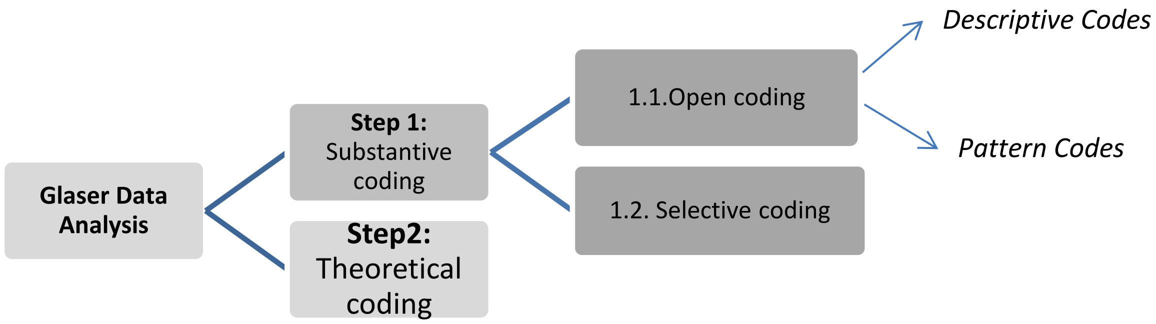


Figure 3.4: Glaser's analysis technique (Glaser, 1978)

Glaser describes two steps to data analysis which include substantive and theoretical coding (Figure 3.4).

<u>Step 1: Substantive coding</u>

Substantive coding aimed at producing categories of codes which captured the substance of the data and yielded open and selective coding.

***Open coding**: This was the first step of data analysis and Glaser describes open coding as "coding the data in every possible way running the data open" (Glaser, 1978, p.56). This deliberate process opened up the data and led to constantly comparing incidents and concepts as they emerged to then produce a set of codes (Glaser, 1992). (In this study, open coding yielded two sets of codes, namely descriptive and pattern codes).*

***Selective coding:** Selective coding followed open coding and involved a second layer of analysis. Selected codes pertaining to the research question were organised in to a set of core categories. As the data is subjected to the research question throughout, the researcher expected that these categories would begin to give hints of what facilitates and what hinders stabilisation.*

<u>Step 2: Theoretical coding</u>

Finally theoretical codes were applied to the coded data to make sense of the relationship between the substantive codes and how they relate. "Cues in the data" gave rise to themes or theories, which in turn "weave the story back together again" (Glaser, 1978). This was also the point of integration, where outcomes from quantitative data were combined and *interwoven with qualitative codes. I anticipated that these themes would assist compiling an ethnograph which would address and answer the research question.*

The next section will describe analysis of demographic data and ethnographic records. The first section describes the management of demographic data in a quantitative way followed by the analysis of ethnographic records using a qualitative method. The order is intentional to demonstrate the integration of the two aspects of data analysis in writing up this ethnographic study. Hammersley and Atkinson (1989) confirm that this iterative process between data and data analysis guides subsequent data collection is similar to Glaser's methods, but in ethnographic studies these are directed towards other research products such as descriptions and explanations rather than formulating theory.

3.4.2.2. Process of analysis

3.4.2.2.1. Analysis of demographic data

The Resuscitation Room Child Register provided a rich source of data. Initial observations had prompted questions related to where children with varying degrees of severity of illness (triage codes) were seen and at which time of day. During informal interviews staff working in the area gave a very structured account of when and where children were seen, but observation data reflected that these typical paths of flow were not always followed. Quantitative data provided an opportunity to (a) identify the load in the resuscitation room and (b) identify patterns of flow. Questions to ask of the data were carefully considered. Data were captured on an Excel spreadsheet providing numerical data and statistical treatment of the data reflected descriptive analysis. This yielded data that described the following:

- Monthly admissions to the resuscitation room
- Triage codes of children seen in the resuscitation room
- Distribution of triage codes per month – range of severity of illness
- Distribution of triage codes over 24 hours

- Percentage of children referred to the hospital from other medical facilities
- Location transferred to from the resuscitation room
- Triage code by length of stay in the resuscitation room

These demographic data helped answer the queries and the main theme identified from the quantitative data was that of practice norms of flow.

3.4.2.2.2. Analysis of ethnographic records

Data from ten child pathways were analysed using Glaser's method of analysis. This section describes how I applied this analysis method to the data through the steps of substantive and theoretical coding (Figure 3.4).

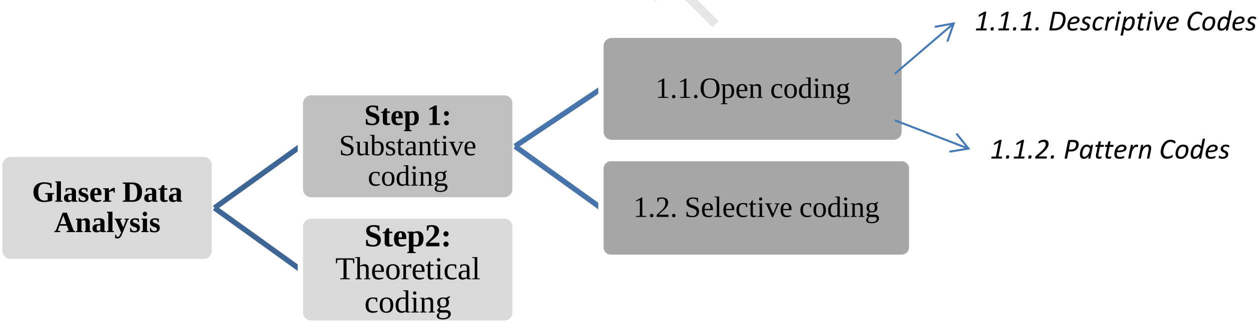


Figure 3.4: Glaser's analysis technique (1978)

Ethnographic records were subjected to line-by- line analysis and constant comparison from incident to incident soon after the compilation of the first ethnographic record, as recommended by Glaser (1978, 1992). Starting off this process meant that I was to familiarise myself with the text by reading it through line by line. At first the thick descriptions anchored by a timeline were overwhelming and it was only after reading through the first ethnographic record a number of times that I realised that an essential step was needed to help me make sense of the data. It seemed logical to organise the data into a standard format that would make incidents more comparable and could facilitate further analysis.

Glaser's analysis method (1992) helped to guide this logical process by suggesting that the data should be opened up to produce a set of codes (open coding). Thereafter, open codes would be selected and organised into core categories (selective coding) that should point towards answering the research question. The following section will describe how substantive codes were produced.

Step 1: Substantive coding

Substantive coding aimed at producing categories of codes by subjecting data to open coding and selective coding. Opening the data yielded two sets of codes namely descriptive and pattern codes.

Open coding yielded descriptive codes

To initiate open coding, the raw data from each ethnographic record was subjected to the question: "What is happening?" What I found from constant comparison from incident to incident and across pathways was that similar activities, actions and communications were described using different words. In going through the data a number of times I assigned codes to activities, , actions and conversations by allocating a descriptive code to portions of text – these were descriptive codes.

This inductive analysis yielded 66 descriptive codes across the ten child pathways. Codes consisted of verbs used to describe the essence of what was happening in portions of text. The verb was followed by a short description of what was done and by whom. While building descriptive codes, each code was given a definition to assist the standardisation of data across the pathways (Appendix F).

The allocation of descriptive codes helped to group processes, actions, communications and procedures within the text, but allowed for the flexibility of individual details so as not to lose important information unique to pathways. Anonymity of the team members was protected through the use of symbols allocated to the category of staff. Figure 3.5 illustrates how descriptive codes were allocated to text and Appendix F shows code allocation to raw data from pathway 10.

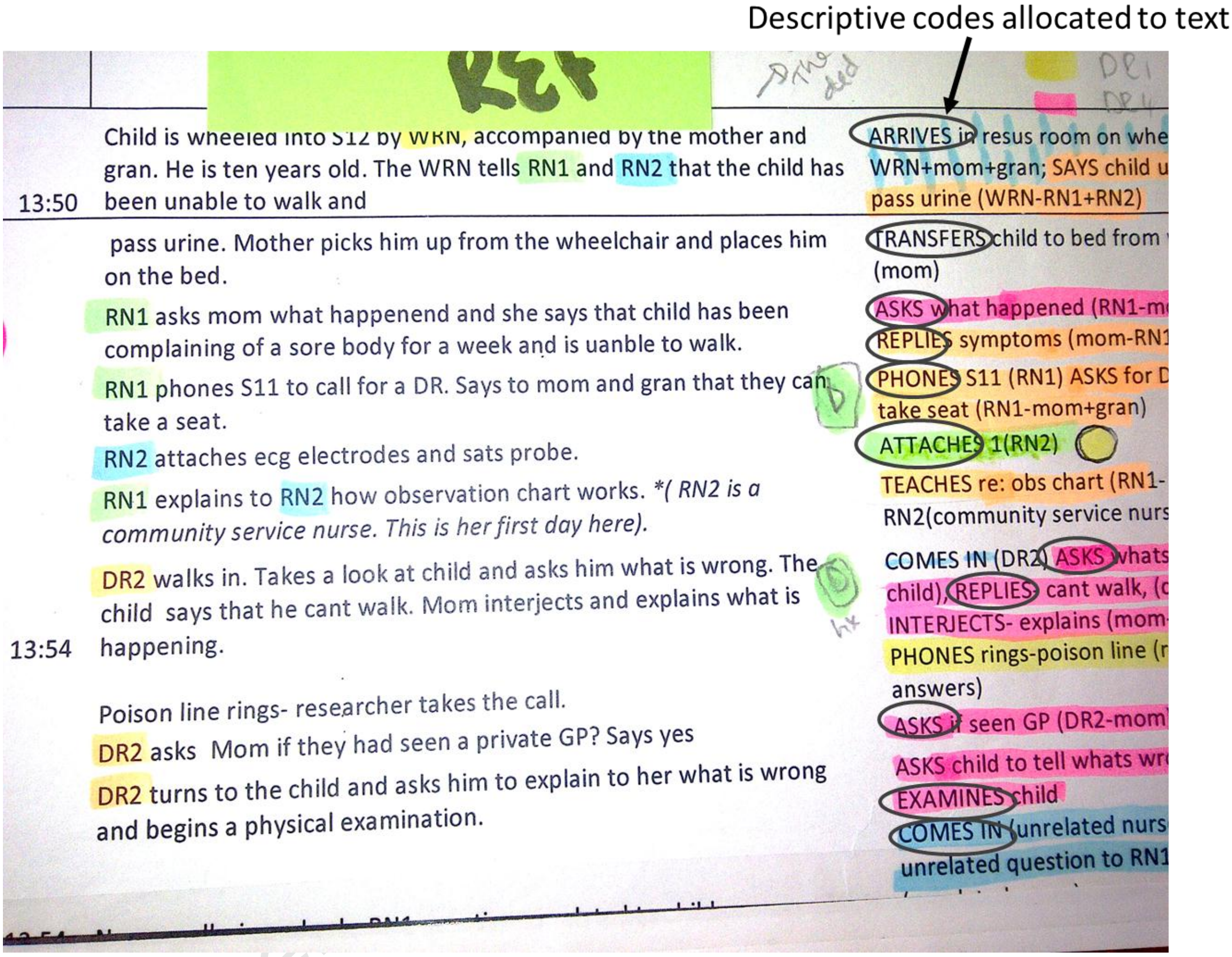


Figure 3.5: Example of descriptive codes to observation text from pathway❸

All data from the ten ethnographic records were transcribed into this format. Further analysis used the descriptive codes as a base from which to work. Appendix H illustrates the 66 descriptive codes.

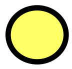
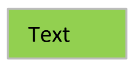
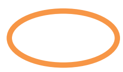
Descriptive codes helped me to see what was similar across the pathways, but they fragmented the data. These codes still gave no indication of factors that facilitate or hinder stabilisation. Another layer of analysis was required to confirm the similarities of actions and activities. Therefore data were subjected to question: “Is there a pattern of stabilisation?”

Open coding yielded pattern codes

Descriptive codes had revealed similarities within and across pathways. Most of the activities, actions and conversations were similar with obvious detail differences, and patterns became noticeable. As could be expected, activities were directly related to numerous aspects of stabilisation and included the other children and people in the room. Pattern codes identify emergent themes within the text by collating material into units of meaning and summarise the descriptive codes into pattern codes (Miles & Huberman, 1994). This seemed the best way to establish whether or not there were patterns of stabilisation or other patterns that were noteworthy, so each segment of descriptive data were analysed to see what was happening relative to stabilisation. Immersion, constant comparison and time guided this process. Recurrent patterns of activities and conversations were identified to which codes were assigned. Instead of using words, colours and symbols were allocated to portions of the text to group activities into pattern codes.

Ten pattern codes were identified: history taking and physical assessments; monitoring and routine checks; diagnostic tests to confirm diagnosis; practice of inserting invasive devices; practices related to the administration of symptom-specific interventions; practices related to other children in the room; communications; movement through the room; and interruptions (Table 3.6).

Table 3.6: Open pattern codes

1.Physical assessment and history taking	Text relating to physical assessments or part of assessment and/or questions relating to history taking	
2. Routine checks and monitoring	Text related to procedures purposed to monitor the child's condition such as vital signs (temp, resp, pulse, saturation), BP, HGT, AVPU and urine dipstix	
	a) Actions indicating steps taken to initiate these procedures, e.g. attaching urine bag, attaching saturation probe etc.	
	b) Text indicating the completion of the check or monitoring procedure	
3.Tests to confirm diagnosis and assist in planning treatment and management	Text indicating the process and procedures relating to diagnostic tests. These include: all types of tests requiring laboratory testing (haematology/ urine/ LP?); radiology (x-rays, MRI, CT scans)	
	a) Actions indicating steps taken to initiate these tests, e.g. arranging a scan (booking, preparing child, asking porter for assistance, etc.)	
	b) Text indicating that the activity of a diagnostic test was completed.	
4. Insert invasive devices	To Insert an "invasive" device through which treatment can be administered (intravenous line, nasogastric tube), or used to extract fluid to test, measure or monitor (urine catheter).	
	a) Actions indicating steps prepare for insertion of the device.	
	b) Text indicating the insertion and completion of the device.	
5. Symptom Specific Intervention	Text indicating the administration of treatment specific to the child`s symptom	
	a) Text relating to the preparation of the treatment.	
	b) Indicates the administration of the treatment ?is completed.	
6. Communication	All text relating to verbal communication in the room.	
	Text relating to written communication.	

7. Movement in and out the room	Text relating to movement of people through the room.	
	a) Text indicating staff movement (allocated to working in the resuscitation room and including triage nurses)	
	b) Text indicating other staff (not allocated to work in the room, but associated with children in the room)	Text
	c) Text indicating movement of "other" (not directly associated with children in room, e.g. porter)	Text
	d) Movement of other children (not observed child)	
8. Interruptions and distractions	Text relating to an interruption that causes a practitioner to be distracted from the observed child.	
9. Telephone Calls	Text indicating incoming telephone calls	Text
10. Other children	Text relating to the admission, discharge or acuity of other children in the room.	~~Text~~

In this study, the analysis confirmed the complexity of this setting by demonstrating: the many activities associated with stabilisation; the unpredictability of when patients arrive and how sick they are; the numbers of people moving in and out of the room; and frequent distractions. Furthermore, analysis demonstrated a typical sequence of events or patterns of stabilisation from arrival to discharge in all the pathways (described in Section 5.2 of Chapter 5).There are recognisable stages in stabilisation that are described in the literature (Molyneux, 2006; Baker, 2009). These were a useful guide in identifying the four pillars namely: rapid identification, prioritisation, early assessment and appropriate management.

However, while these recognisable patterns were helpful, data also showed that steps taken between the pillars differed considerably across the pathways. These data were particularly useful in highlighting the impact of the *context* on the stabilisation of an individual child. A typical example of this is time lapses between prescription and the administration of medication or treatment as a result of there being sometimes four very sick children in a relatively small room, with one registered nurse and varying numbers of doctors and other people. So it emerged that while there was this recognisable pattern of moving between four pillars of activity there were differences across the pathways in how activities were planned and implemented. Patterns codes highlighted many important factors related to how stabilisation takes place, but the researcher still did not have a clear sense of factors that facilitate and hinder stabilisation.

Selective coding

Open coding had assisted in organising data by allocating descriptive codes, followed by identifying patterns of activities related to stabilisation through four pillars. Further analysis was required to see whether data could specifically point out these factors. Now the data could be subjected to the question: "What helps and what hinders stabilisation in this context?" This was possible using the processes of selective coding. The previous layers of analysis had opened the data up, yielding open codes. Descriptive and pattern coding assisted with a richer description and finding patterns in the process of stabilisation. This phase enabled the researcher to select and organise the open codes into a set of core categories to identify factors that facilitate or hinder stabilisation in this context using selective coding.

Taking a cue from the literature, time is a relevant consideration in optimising stabilisation. Internationally, the "golden hour" has become a recognised determinant of best outcomes in emergency care (Little, 2010). Time-sensitive interventions are intentional about decreasing delays that could result in harmful outcomes. Using this standard of time, the next level of analysis subjected the descriptive data to the question: "What speeds up or slows down the process of stabilisation?"

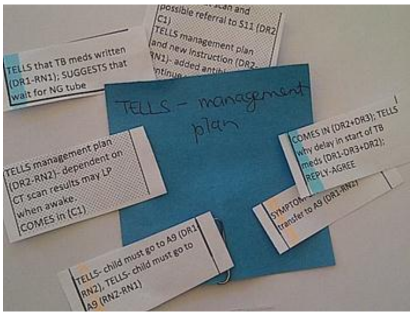


Figure 3.6: Open codes arranged into units of meaning

Data (open codes) from all pathways were printed and cut up. Each piece was assessed to see whether what was happening would speed up or slow down stabilisation. Two groups were formed. Thereafter these were grouped into units of meaning to describing the predominant event (Figure 3.6).

Figure 3.7: Similar units of meaning clustered into categories

Each group was then further clustered into similar categories, as seen in Figure 3.7

It made the most sense to then re-organise these findings into the four pillars of stabilisation (Figures 3.8 and 3.9).The pillars were used to structure the findings rather than control them. Not all categories corresponded neatly with the four pillars, as they did not necessarily relate to specific steps incorporated in stabilisation, but were influential in how stabilisation happened, and some included aspects such as roles and resources.

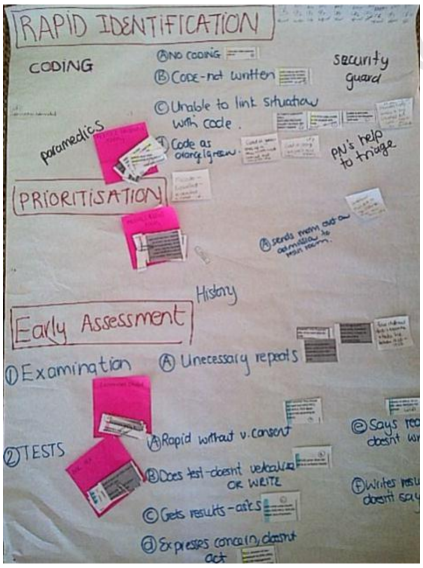


Figure 3.8: Categories organised into Pillars

The next step incorporated transcribing all the categories into the four pillars and adding the extra categories. Clearly, both factors that speed up and slow down stabilisation became evident in this dense set of categories. This yielded 30 codes related to speeding up stabilisation and 36 that would slow it down. In this process these would be the selective codes that facilitated categories to be formed.

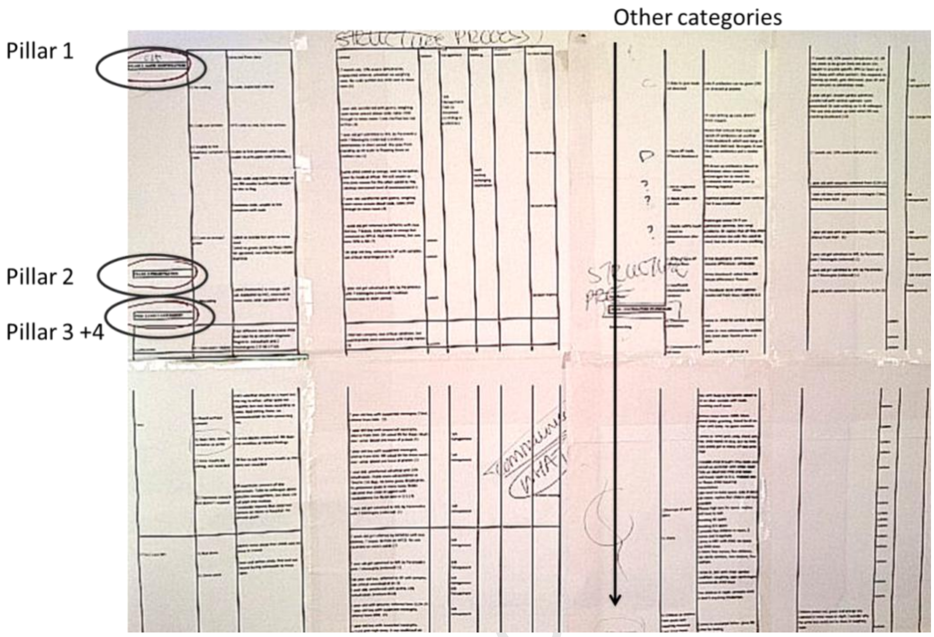


Figure 3.9: Categories were organised into Pillars of stabilisation and "Other"

These findings were then discussed with a fellow researcher – including further member checks to what was usually done with unit staff. This enabled another layer of analysis and refinement and yielded 12 codes and 16 sub-codes. These findings were confirmed by my supervisor. It was not surprising that these codes primarily related to what was done, what was said, what was needed, who was available and how it was all organised. Selective codes and sub-codes as arranged in the four pillars and can be seen in Table 3.7.

Table 3.7: Selective codes

Pillar 1: Rapid identification	
Practice norms of access	Direct flow
	Paramedic escort
	Work sharing
Triage	Assign codes
	Confirm discrepant codes
Pillar 2: Prioritisation	
Outside referrals	
Monitoring devices	
Initial emergency treatment	An initiator to direct
	Direct communication
Pillar 3 + 4: Early assessment and appropriate management and treatment	
Communication (all)	
Assessment and history	Patterns of assessment
	Accessing information
Maintained monitoring	Initial monitoring
	Setting variance
	Regularity and repeats
	Reporting and recording
Treatment	Initiate the plan
	Action the plan
Others categories	
Roles and leadership	
Resources	
Communication and teamwork	

Step 2: Theoretical coding

Finally, theoretical coding was necessary to gather and make sense of substantive codes. This was also the stage in the research process where qualitative and quantitative data were integrated (Figure 3.10).

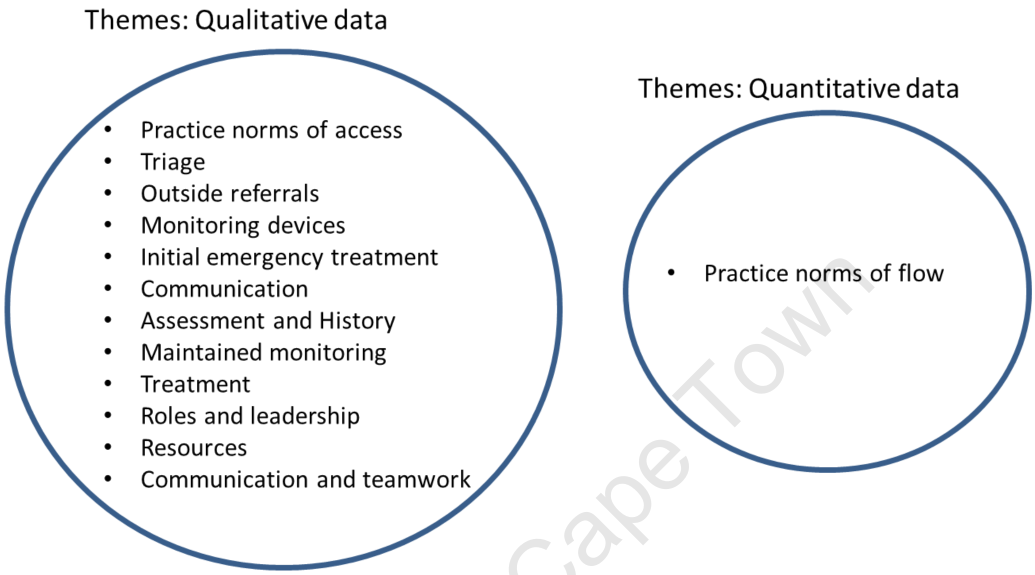


Figure 3.10: Code categories from qualitative and quantitative data

Glaser (2004) confirms that theoretical codes theorise how the substantive codes may relate to each other. These codes provide an "integrative scope, broad pictures and a new perspective" and assist the researcher to find how concepts relate (Glaser & Holton, 2004, p.12).This meant that the code categories were gathered and then worked out to see how they related to one another in this context. An integration of the two sets of codes yielded 12 theoretical codes and 15 sub-codes, which were then arranged as themes under the four pillars of stabilisation. At that point the themes that had arisen from the quantitative data of demographics, patient numbers, called "practice norms of flow", had not yet found an easy fit, and so were placed in the category of "others" (Table 3.8).

Table 3.8: Thematic coding: Themes and sub-themes organised into the Pillars of Stabilisation

Thematic Codes	Thematic Sub-codes
Pillar 1: Rapid Identification	
Practice norms of Access	Direct flow Paramedic Escort Work sharing
Triage	Assign codes Confirm discrepant codes
Pillar 2: Prioritisation	
Outside referrals	
Monitoring devices	
Initial emergency treatment	An initiator to direct Direct communication
Pillar 3+ 4: Early assessment and appropriate management and treatment	
Communication (all)	
Assessment and history	Patterns of assessment Accessing information
Maintained monitoring	Initial monitoring Setting variance Regularity and repeats Reporting and recording
Treatment	Initiate the plan Action the plan
Others	
Practice norms of flow	
Roles and leadership	
Resources	
Communication and teamwork	
Roles and leadership	

This process enabled the researcher to easily place extracted codes that were linked directly to patient care in the sequence of the four pillars. The remaining themes of practice norms of flow, communication and teamwork, resources, roles and leadership remained. However, on further reflection, it appeared that while the first set was related to patient care, the remainder could all be linked to how the organisational structures impact on efficient stabilisation (Table 3.9).

Table 3.9: Themes of activities related to patient care and organisational patterns

THEME 1		THEME 2
Activities related to patient care		Organisational patterns
Codes	**Sub-codes**	**Codes**
Pillar 1: Rapid identification		Practice norms of flow Roles and leadership Resources Communication and teamwork
Practice norms of access	Direct flow Paramedic escort Work sharing	
Triage	Assign codes Confirm discrepant codes	
Pillar 2: Prioritisation		
Outside referrals		
Monitoring devices		
Initial emergency treatment	An initiator to direct Direct communication	
Pillar 3+ 4: Early assessment and appropriate management and treatment		
Communication (all)		
Assessment and History	Patterns of assessment Accessing information	
Maintained monitoring	Initial monitoring Setting variance Regularity and repeats Reporting and recording	
Treatment	Initiate the plan Action the plan	

Therefore it became clear that in this context stabilisation was dependent on what we do and what is in place. The two main themes that had arisen from the data analysis were organisational patterns and activities related to patient care.

3.5. Ethical considerations

The University of Cape Town's Health Sciences Human Research Ethics Committee approved the proposal (Appendix A). Informed consent was obtained from all categories of staff involved in the care of critically ill children in the MEU during observation (Appendix B). Staff and not the children were considered participants who would give consent as it was their practice which was being observed. As we attempted to develop rich descriptions of activities related to patient care all staff involved in the care of the critically ill child were included.

3.5.1. Gaining consent

As indicated earlier, this study was not done in isolation but as a part of ongoing practice development initiative at the hospital.

The design of the study was compellingly participative and included lengthy engagement with staff including the hospital medical superintendent, assistant director of nursing responsible for the area, paediatric consultant, and critical care intensivist, senior registrars rotating through the area, operational manager, and professional nurses in area, administration staff and housekeeping. This team considered the research as a complex description of current practice and concurred that the observation of the practice around the child would not require explicit consent from the parent. Anguish surrounding the critically ill child did not leave the parent in the ideal position to be confronted with a decision that will have no direct effect on the care of the child.

Due to the nature of data gathering, explicit consent was not obtained from the parent/ caregiver, but the researcher used her discretion to inform the parent/caregiver at an opportune time on the purpose of the research. The pressured environment of the unit, intensified by the parents' emotional state, was considered and interaction with the parents was intentionally non-participant until, and if, the time became more suitable and the stress was somewhat contained. If the parent/caregiver expressed discomfort at the researcher's presence, the researcher would terminate the observation. This did not happen in any of the observations.

Informed consent was obtained from staff members involved in the care of children in the medical emergency unit prior to the onset of the observations where possible. Staff working in the area were familiar with the researcher and were approached individually and in small groups to discuss the purpose of the study and possible benefits to the unit. The verbal description was accompanied by an information sheet explaining the purpose of the study. But due to the nature of the unit and the multiple contributors to the care of a child, some team members from different specialties entered the unit for brief periods of time. Because the researcher was observing and writing a line-by-line description of everything happening around a particular child, it was sometimes difficult to stop observations to get consent from a practitioner with brief and limited input. In these instances, I would take short periods to get verbal consent. Voluntary participation was stressed and confidentiality was assured through the use of codes known only to myself. Staff members were given the opportunity to refuse participation. However, this never happened.

3.5.2. Confidentiality

Confidentiality and anonymity of all health care workers and others involved in the pathway of the critically ill child was maintained. Their identities remained anonymous as they were classified by profession in symbols on the data collection sheet. The names of children were not added, but folder numbers were tracked on a list separate from the observation notes and accessible only to the researcher. This facilitated the collection of additional information needed to support and clarify observational findings. All data remained confidential. This information is accessible to the researcher and supervisors. The raw data will be destroyed after completion of the research.

3.6. Summary

Data were subjected to Glaser's (1978) qualitative analysis method. Analysis of data confirmed that an established process of stabilisation does exist. The work of Molyneux (2006) and Baker (2009) was used to organise the process as it became evident in this setting. They are: rapid identification, prioritisation, early assessment, and prioritised management and treatment.

Analysis showed that stabilisation consistently took place through four established pillars, namely rapid identification, prioritisation, early assessment and appropriate management and treatment. However, analysis highlighted that the time taken to propel stabilisation in and between these pillars varied across the observed pathways. It was concluded that every clinical action, activity and conversation could potentially speed up or slow down stabilisation.

Lastly, theoretical codes were woven from the substantive codes to bring clarity to factors that facilitate and hinder stabilisation of a critically ill child in the emergency unit. Theoretical codes highlighted that stabilisation was dependent on: what was done to a child (activities related to patient care) and factors in the system to ensure that it was conducted in a safe and appropriate way (organisational patterns) (Figure 3.11).

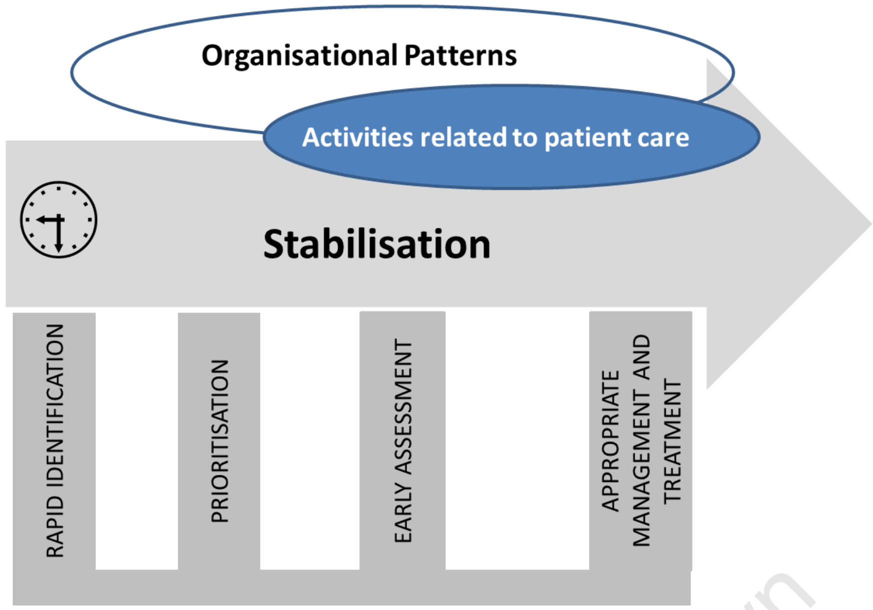


Figure 3.11: Data analysis yielded themes of organisational patterns and activities related to patient care as factors that facilitate and hinder stabilising the critically ill child.

Chapter 4: FINDINGS

This chapter presents the findings from the analysis of multiple data sources to describe factors that facilitate and hinder stabilising the critically ill child in the emergency unit. It is divided into four sections. A comprehensive description of practice in the study site as well as a "typical pathway of a child from entry to and exit from the unit" introduces the reader to this complex setting. This is followed by the two main themes conceptualised from the data, namely activities related to patient care and organisational patterns (Figure 4.1).

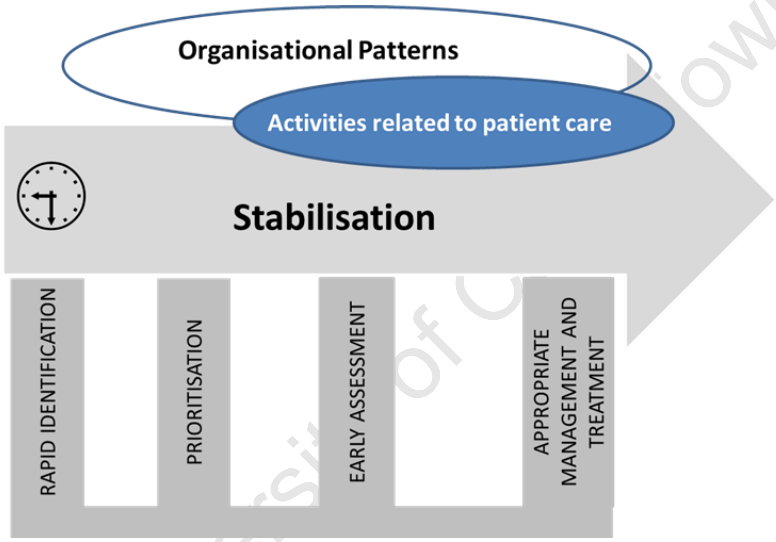


Figure 4.1: Organisational patterns and activities related to patient care impact on stabilisation.

4.1. The MEU: Description of the setting

A description of the MEU was constructed from various data and serves to introduce the reader to the broader aspects of the setting, including its position in the hospital and layout, child demographics, staffing, policies, resources and equipment. Sources included data from direct observations, informal conversations, field notes, retrospective review of clinical notes, and quantitative data.

The emergency department at the RCWMCH consists of two areas that provide emergency care for children, namely the MEU and the Trauma Unit. Injured children are triaged and managed in the Trauma Unit, while medically ill children are triaged and treated separately in the MEU (Figure 4.2).The focus of this study was the MEU (also referred to as the unit).

4.1.1. Position and layout of the unit in the emergency department

There are three entrances to the hospital, namely the main entrance, OPD entrance and the emergency department entrance. The main entrance is positioned closest to the wards and the outpatients' entrance leads directly to the OPD from a large parking area. The entrance to the emergency department lies between these two and provides access to both the hospital wards and the OPD. It is also the most obvious entrance into the hospital as it opens directly onto a path leading from the main bus stop and taxi drop-off area. Most patients use public transport and enter the hospital premises along this path. This results in large numbers of people who are not accompanying children who require emergency care entering the hospital through this emergency department entrance.

The entrance to the emergency department leads into a shared reception area for trauma and medical emergencies; and children are seated on separate sides of the main entrance. The MEU consists of four main areas: the reception area, triage room (traditionally known as the weighing room), the four-bed resuscitation room and three acute care consultation rooms (Figure 4.2). Adjacent to the unit is S11, a 42 bedded short-stay ward, where most children are sent for observation and short-term management. Other hospital wards are significantly further from the unit and include: medical wards (B1 and B2); PICU (C1); surgical wards (D1 and D2) and specialist wards (E1 and E2). The medical, surgical and specialist's wards offer high dependency care (High Care) to ill children who require close monitoring

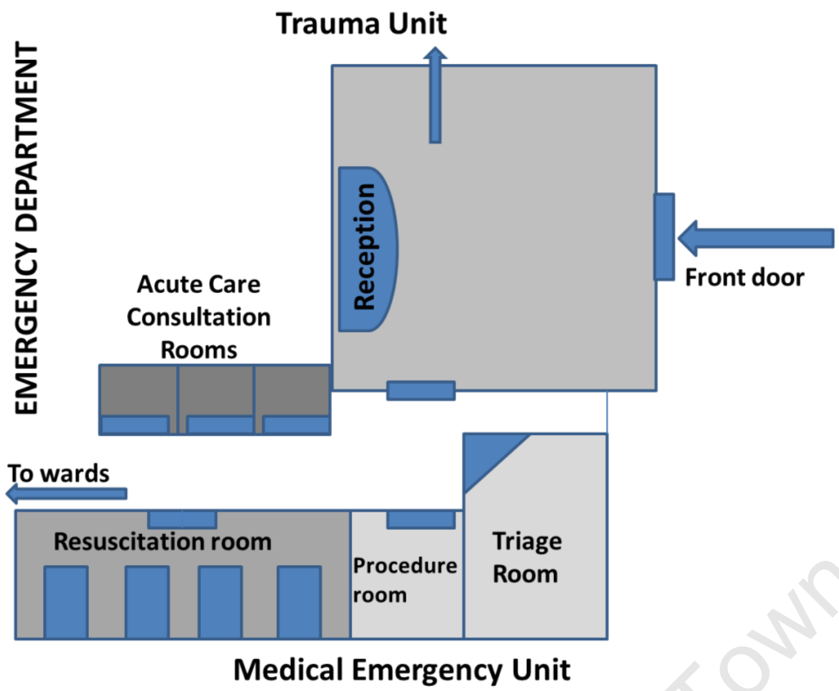


Figure 4.2: Layout of MEU at the hospital

4.1.2. Child demographics in the MEU and its resuscitation room

Between January 2010 and January 2011, 38 253 children were triaged and seen in the unit (RCWMCH, 2012).All children were assessed on arrival and were allocated a triage code using a tool based on the ETAT system (Gove et al., 1999). ETAT is a validated triage tool developed by the World Health Organization to improve triage (Gove et al., 1999; Molyneux, 2001; Tamburlini, Di Mario, Maggi et al. 1999). ETAT teaches staff to recognise life-threatening problems using a systematic A-B-C-D approach based on clinical signs and priority features (A and B indicate airway and breathing; C refers to circulation, coma and convulsions; and D denotes severe dehydration)(Molyneux, 2001; Tamburlini et al., 1999).These features are grouped into three categories and facilitate the triage code allocations of red, orange and green. Red indicates the need for immediate care, while orange implies urgent problems that require priority care. Green is assigned to a child who requires non-urgent care (Buys et al., 2013; Dickson et al., 2009).

Table 4.1 depicts the number of children triaged in the Unit between January 2010 and January 2011. Variability in patient loads were mostly affected by weather changes leading to recognised seasonal disease patterns. Furthermore, unexpected epidemics altered the usual admission patterns (seen in Table 4.1).

Table 4.1: Number of children triaged in the MEU from January 2010 to January 2011 (RCWMCH Statistics, 2012)

Triage code	**Number of children triaged in the unit**												
	Jan (2010)	Feb	March	Apr	May	June	Jul	Aug	Sep	Oct	Nov	Dec	Jan (2011)
Green	1563	2031	1608	1386	1233	1358	1282	1367	1387	1395	1518	1091	1405
Orange	1849	2096	1811	1979	1532	1154	1066	1179	1136	1158	1120	1062	989
Red	191	184	132	150	147	95	79	87	67	101	98	67	101
Total	3603*	4311*	3551*	3515*	2912	2607	2427	2633	2590	2654	2736	2220	2495
Monthly admissions (average)	3 188 (* Measles epidemic causing an adjustment to the usual admission pattern)												
Annual admissions (total)	38 254												

These statistics were obtained from the hospital management and used to assess the workload of the MEU based on patient numbers weighted by triage codes (RCWMCH, 2012). It seemed that workload assessment was linked to triage codes: a green code indicated a need for less or less urgent intervention than a red code and therefore a child coded green required the least resources of time, manpower and equipment, while the most were needed for children triaged as red. Interestingly, a senior clinician working in a different setting, but also along the critical care continuum, was of the understanding that green "refers to the need for immediate intervention, not the seriousness of the intervention. The child might have a problem that requires sub-specialist intensive therapy but is triaged green because the therapy does not have to happen now. The business of ensuring that the appropriate treatment plan is instigated for a child may take as long for a green child as it does for a red child."

In the MEU the resuscitation room was typically the place where severely or critically ill children were stabilised and therefore the child demographics in this area were significant. Data from the resuscitation room included only children who were actually seen in this area and differed from data gathered on the number of children triaged on arrival to the unit. The demographic data collected over seven months from the Resuscitation Room Child Register yielded a snapshot of the number of children treated in this room between 1 July 2010 and 31 January 2011 (Figure 4.3).

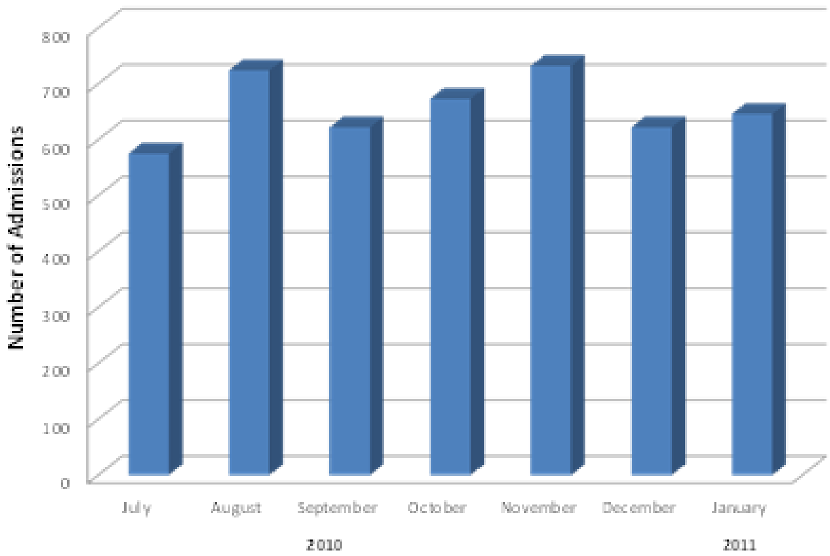


Figure 4.3: Number of children treated in the resuscitation room between July 2010 and January 2011.

In total, 4594 children were seen in the resuscitation room between 1 July 2010 and 31 January 2011, an average of 656 per month. July had the fewest admissions (575 patients). The most patients were seen in November (732), followed closely by August (724). Of the total, 53% (2412) were referred by other health facilities while the remaining 47% (2182) were brought in directly without a referral.

From the resuscitation room children were transferred to different destinations, depending on their immediate medical needs and hospital ward bed availability. Referral destinations are illustrated in Table 4.2 and Figure 4.4. These included short-stay wards, high-care, specialist wards and home. The majority of children (45.2%) were admitted to short-stay wards, while 3% were admitted to the ICU. Some referrals were not documented (12.2%) but 29.5% of children were discharged home from the resuscitation room.

Table 4.2: Referral destination from the resuscitation room

Referral destinations	
Short-stay wards	
S11	1737
A9	225
Total	**1962 (45.2%)**
High Care and Intensive Care	
B2	157
B1	143
PICU	**123**
Total	**423(9.8%)**
Specialist wards	
E2	99
D2	40
Total	**139 (3.2%)**
Discharged	
Discharged Home	1283 **29.5%**
Unknown (not documented)	
Unknown	530 **12.2%**

4.1.3. Staffing

Different areas within the Unit were managed by different members of the health care team. Nurses, radiographers, security guards, administrative and housekeeping staff work 12-hour shifts, while registrars allocated to the resuscitation room and medical officers working in the acute care consultation area, rotate off separate rosters. The unit director is a specialist paediatrician (who is referred to as a consultant in this setting) and a registered nurse is appointed as the OM. All staff managing clinical aspects of care had basic medical or nursing training, while the consultant, registrars and two professional nurses had received (or were currently receiving) specialist emergency or paediatric intensive care training. All staff had been trained in ETAT. The unit had different groupings of staff at different times of the day. These seemed to fit into three time periods over 24 hours (Table 4.3). This table only includes medical, nursing and support staff who were there to provide continuous care for children in the different areas of the unit and excludes those who were called on from other teams or disciplines to provide specialist skills for children who needed it.

Table 4.3: Staffing in the MEU during a 24-hour period

Staffing in the MEU					
Time period	**Reception**	**Triage room**	**Resuscitation room**	**Acute care consultation rooms**	**In situ supervision**
08h00-16h00	2 Clerks 1 Security Guard	2 Nurses (Enrolled Nurse and Enrolled Nurse Auxiliary)	2 Professional Nurses 1 Registrar	2 Medical Officers	Senior Medical Consultant Nursing OM
16h00-23h00	2 Clerks 1 Security Guard	2 Nurses (Enrolled Nurse and Enrolled Nurse Auxiliary)	2 Professional Nurses 1 Registrar (Senior Registrar from 17h00)	2 Medical Officers	
23h00-08h00	2 Clerks 1 Security Guard	2 Nurses (Enrolled Nurse and Enrolled Nurse Auxiliary)	2 Professional Nurses 1 Senior House Officer		

The staff allocated to the area varied significantly across the 24-hour period. Interestingly, the only uniform staff cover across the 24-hour period was the assigned security guard, the admission clerks and the nurses. Medical and senior supervisory presence varied and was less consistent despite this being a full 24-hour service.

The following section describes and illustrates staffing observed in the main areas of the Unit across three time periods more fully: time period 1:08h00-16h00; time period 2:16h00-23h00 and time period 3:23h00-08h00.

Time period 1: 08h00 -16H00

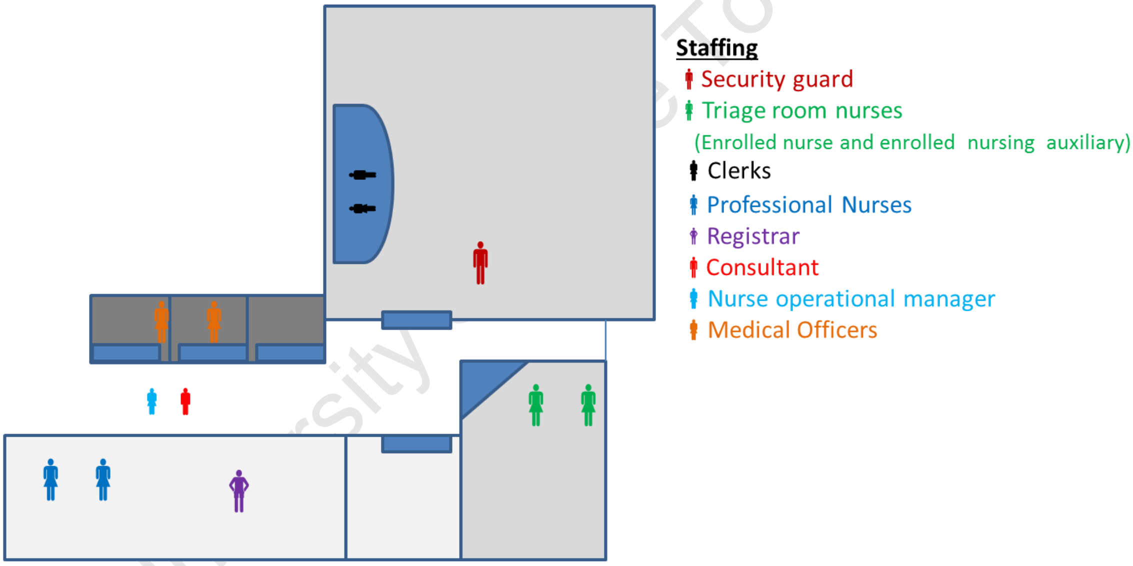


Figure 4.4: Staffing in the MEU between 08h00 and 16h00

The reception area was staffed with two clerks and a security guard (Figure 4.4) Clerks served both the trauma unit the MEU. Two nurses (usually one enrolled nurse and one enrolled nursing auxiliary) were allocated to the triage room where they triaged children and assisted the medical officers with minor procedures in the adjacent procedure room. Two medical officers worked from the acute care consultation rooms to attend to children triaged green and orange. The resuscitation room was staffed with two professional nurses and a registrar. When there were no patients in the resuscitation room, the allocated professional nurses would assist with triage. Similarly, the registrars would assist in S11. It is important to note that a registrar working in the short stay ward (S11) were available to assist in the resuscitation room. A nurse operational manager (OM) and senior consultant provided management and supervision in this time period. The nurse OM remained in the area, while the senior consultant came in intermittently for the ward rounds, or when called for clinical assistance or advice.

Time period 2: 16H00-23H00

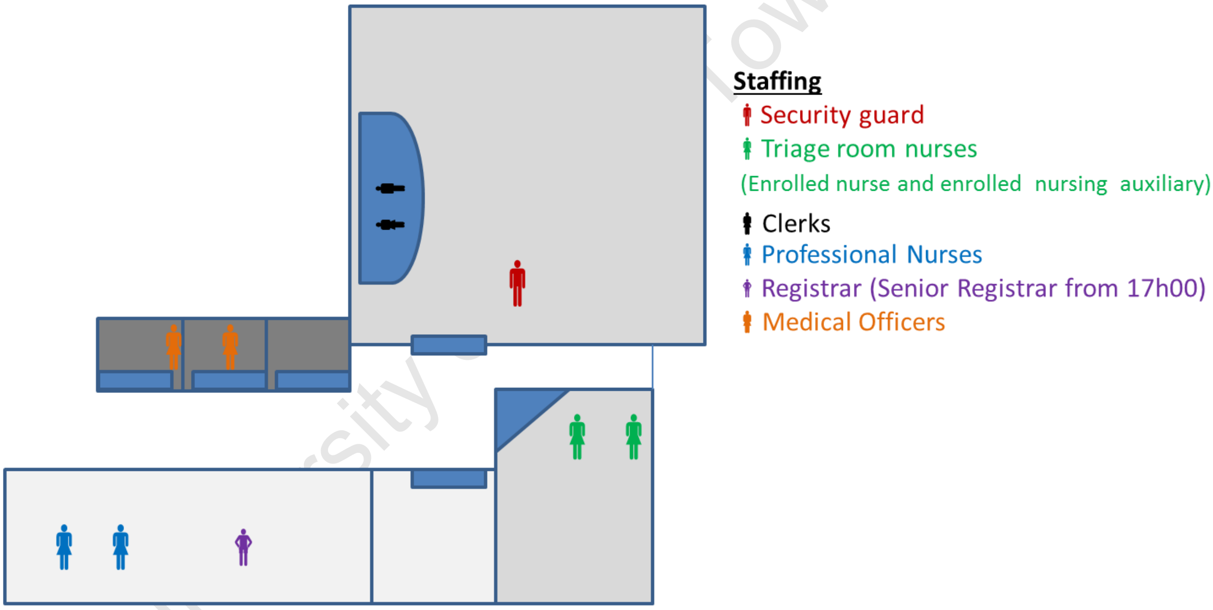


Figure 4.5: Staffing in the MEU between 16h00-23h00

During this time period there was a noted decrease in staff providing management and supervision (Figure 4.5).The nurse OM and senior consultant left the area and the registrar was replaced with a senior registrar. In this context, the Senior Registrar is a qualified paediatrician who is undergoing sub-specialty training.

Time period3: 23H00-08h00

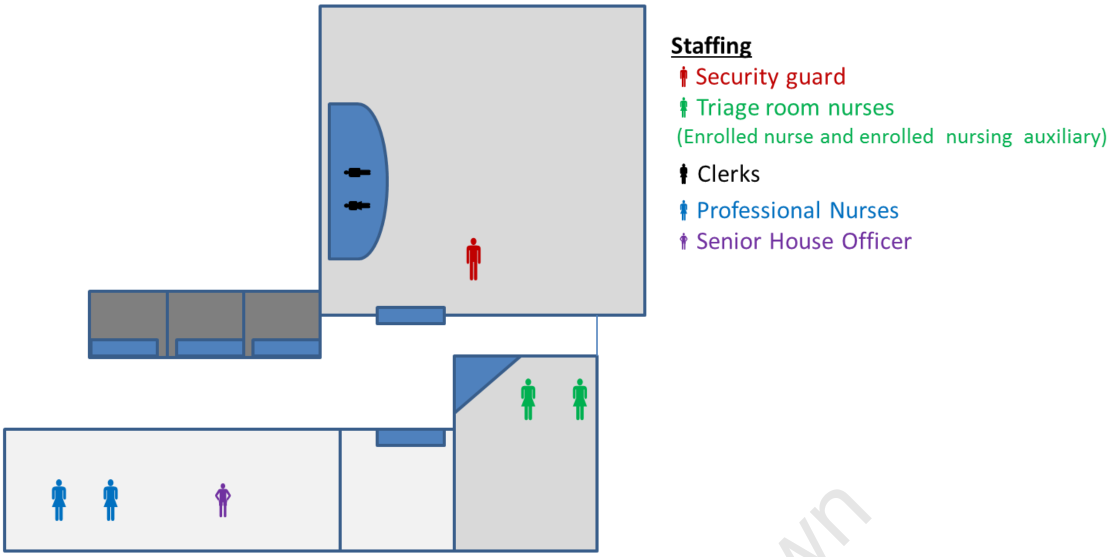


Figure 4.6: Staffing in the MEU between 23h00-08h00

A further decrease in the number and seniority of medical staff was noted (Figure 4.6) as the senior registrar was replaced by a senior house officer. The senior house officer is the most junior member of the medical team, with no specialty or sub-specialty training. With limited experience he or she is given responsibility for this area for the remainder of the night.

4.1.4. Policies

During the observation period there was on-going training in ETAT for all staff working in the area. Informal inquiry related to policies and guidelines led to the discovery of a policy and procedure file which predominantly consisted of various procedure and treatment guidelines specifically for the use of the registrars. It was in the process of being updated. No nursing policy specific to emergency care, other than ETAT guidelines for children, could be found in the area.

4.1.5. Resources and equipment

Equipment and supplies are additional resources that enable the staff to manage children in the triage and resuscitation rooms in this setting. Table 4.4 lists the resources observed in the area.

Table 4.4: Equipment, supplies and support services

Triage room	Resuscitation room
Battery-operated ear thermometer Baumanometer Gloves Nebuliser with tubing and mask Oxygen (central supply) Oxygen flow meters and blenders Saturation monitor Stethoscope Wall-mounted auroscope and ophthalmoscope Wall-mounted suction with tubing Weight scales (electronic sitting scale for infants and standing scale for children)	This room had all the equipment in the triage room as well as the following: Bag-mask device (manual resuscitator) Cardiac and saturation monitors (including oscillometer for non-invasive blood pressure measurement) Chest tubes Defibrillator Equipment for administering oxygen (nasal prongs and masks) Equipment for intra-osseous fluid administration Fully equipped resuscitation trolley IV administration sets Mask to fit bag-mask device Paediatric intravenous cannula Paediatric nasogastric tubes Patient warming device (overhead heater) Self-inflating masks for respiratory support
Medication	
Paracetamol	Essential drugs for emergency conditions Drugs from Essential Drug List
Laboratory support	
	Blood glucose Haemoglobin Blood gas (laboratory support for any further blood, urine

	or CSF analysis)
Other support services available in the hospital	
	X-rays CT scan MRI Echocardiogram

4.2. A typical pathway

This section describes a typical pathway of an ill child through the unit from arrival to transfer out. This is a map of how things were said to work (informal interviews) and sometimes seen to work (participant observations). Lean principles refer to a process map which gives a general indication of the norm (Dickson et al., 2009).This description came from analysis of data sourced from direct observations, field notes and informal conversations with the informants and other staff working in the area.

As described in the previous chapter, descriptive and pattern coding had allowed me to describe a pattern of activities that were associated with stabilisation. Analysis had demonstrated a typical sequence of events or patterns of stabilisation from entry to exit in all the pathways. Although the sequence of events or patterns were similar, the way in which they happened differed and were influenced by what was happening in the room and who was doing what. The typical pattern of stabilisation mostly happened through four broad steps (pillars), which were confirmed by the literature: rapid identification, prioritisation, early assessment and appropriate management (Molyneux, Ahmad, & Robertson, 2006; Baker, 2009). The typical pathway of a child through this unit will be described, with reference to these pillars.

4.2.1. Pillar 1- Rapid identification: Arrival, initial assessment and triage allocation

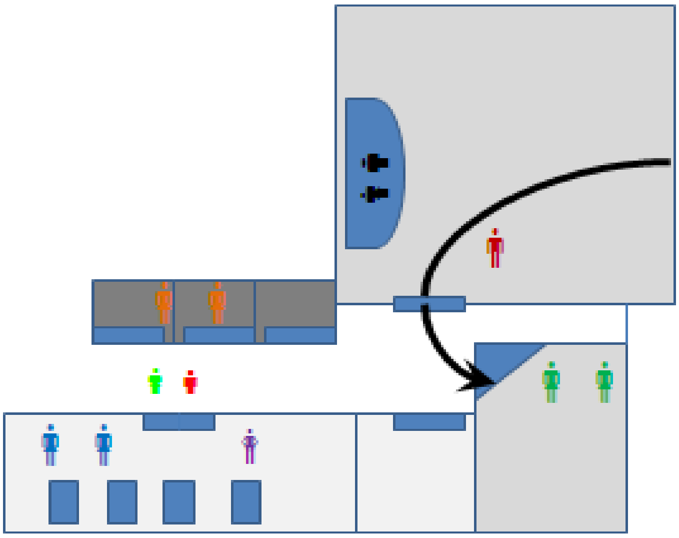


Figure 4.7: Rapid identification

Arrival, initial assessment and triage allocation are illustrated in Figure 4.7. At this hospital, ill or injured children enter at the reception area to the MEU. Their illness or injury determines the place of treatment. A security guard was positioned at the main entrance of the emergency department which leads to the unit. Although employed primarily for security purposes, the guard’s role includes directing children to various parts of the hospital for appointments, including to the triage room.Here they are received by a nurse who asks brief questions to elicit information related to the presenting illness, while conducting a basic assessment of the child. Many children were referred by outside medical centres, which meant that they brought a referral letter. The nurse read the letter and extracted information that was congruent with her visual assessment, and which could assist in the triage or in redirecting the child to a specialist clinic.

While speaking to the caregiver, the nurse assessed the child and routinely measured temperature and weight. Sometimes a haemoglobin (Hb) or haemo-glucose test (HGT) was done to confirm acuity. Findings and triage code were documented on the triage sheet by the nurse. Critically ill children brought in by paramedics bypassed the weighing room and went straight to the resuscitation room. Children with no priority signs were triaged as green while those with some priority signs were triaged as orange. Those with emergency signs were triaged as red and were considered as critically ill (Appendix D).From this point onwards, triage codes and time of day determined where children would be seen and by whom.

As described earlier, the time of day determines the allocation of staff, so the time of day determines the route the child will follow.

Between **08h00 and 23h00**, children allocated triage codes green and orange were directed from the triage room to thereception desk to obtain a folder, before returning to a queue outside the acute care consultation rooms (Figure 4.8). Thereafter, they were streamed by the medical officer into different treatment areas. Children triaged as green were sent to the medical OPD while the children triaged orange remained in the unit and were treated by the medical officer in the acute care consultation rooms. Those with referral letters were seen first. Children triaged as red were escorted to the resuscitation room. This small room had four beds and was equipped and resourced to manage critically ill children.

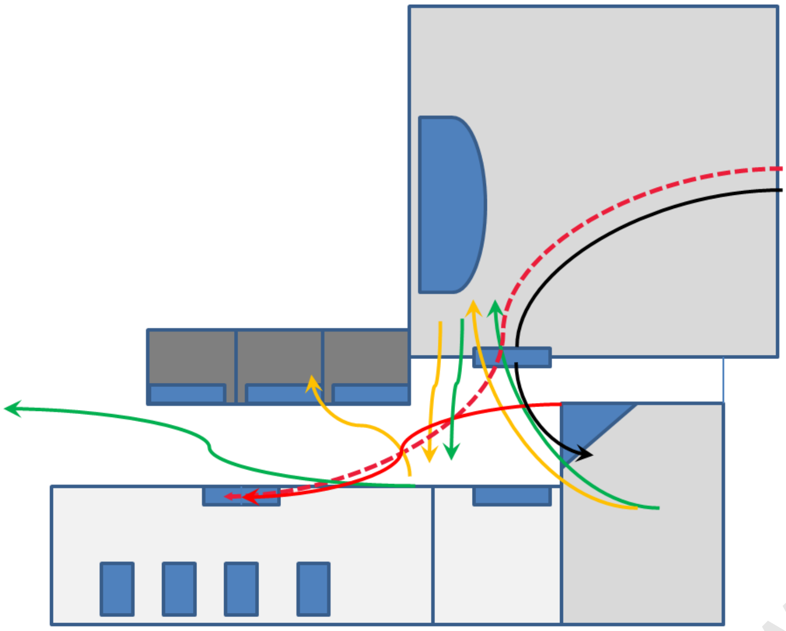


Figure 4.8: A typical pathway of care between 08h00 and 23h00.

At night, between **23h00 and 08h00**, all children coded as red, green and orange were seen and treated in the resuscitation room, which resulted in a high patient load and an unpredictable variability of acuity. Once in the resuscitation room, the triage colour determined the order in which children were seen. Children triaged as red were prioritised above those triaged orange, while children with a triage code green were seen after the others. According to informants this has been a traditional practice norm for many years. Figure 4.9 illustrates the patient streaming within this time period.

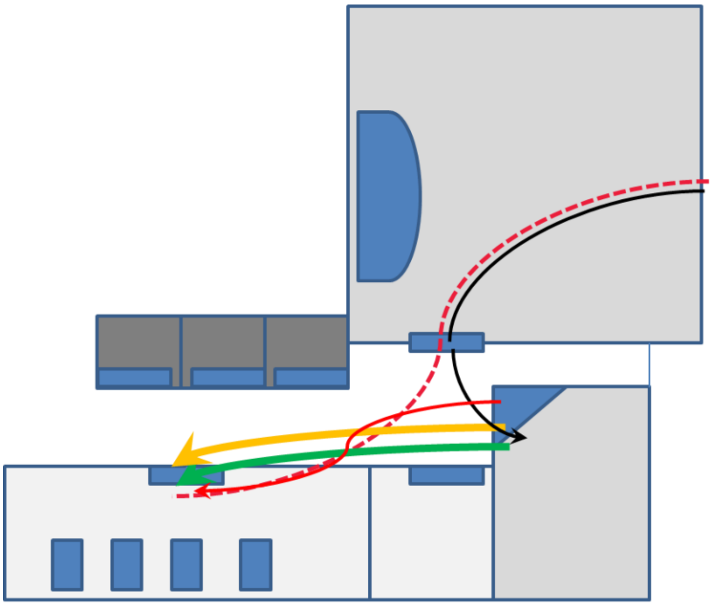


Figure 4.9: A typical pathway of care between 23h00 and 08h00.

The next section will describe the details of what happened after a child was transferred to the resuscitation room. At this point, I became specifically interested in the care of the children triaged red. However, care processes described will include the typical pathway of any child who was directed to the resuscitation room for further treatment.

4.2.2. Pillar 2 - Prioritisation: Priority assigned according to triage code

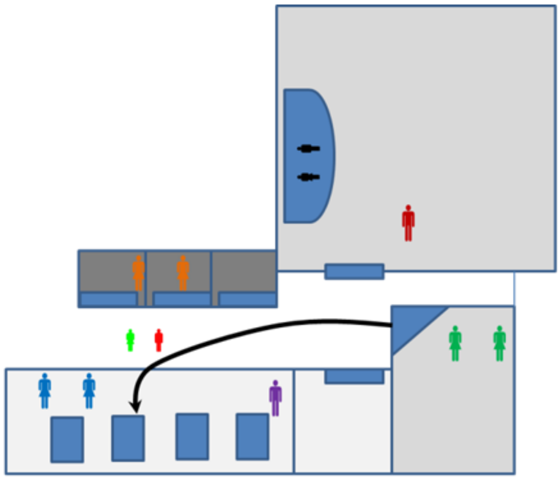


Figure 4.10: Prioritisation

Prioritisation includes the pathway from when the child is assigned a triage code to being directed to the resuscitation room (Figure 4.10). Here a brief handover took place. The child was connected to a cardiac monitor, the registrar allocated to the resuscitation room was notified, and the child was started on prioritised symptom-specific emergency treatment such as oxygen or fluid administration and, in some cases, cardiopulmonary resuscitation.

4.2.3. Pillars 3 and 4: Early assessment and appropriate management and treatment

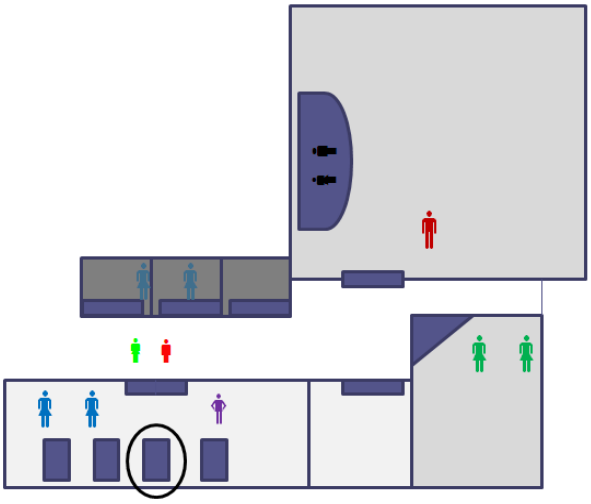


Figure 4.11: Early assessment and appropriate management and treatment

Appropriate management and treatment then followed (Figure 4.11). Continuing assessment included intentional monitoring of physiological parameters to guide diagnosis and planning. The tasks of monitoring and planning were clearly separated between the nurse and the doctor. A professional nurse usually monitored vital signs (temperature, pulse rate and respiratory rate), saturation, and completed the neurological assessment (AVPU), blood glucose (HGT) and blood pressure.

Registrars mostly identified life-threatening problems and established a working diagnosis and a plan. This was usually followed by the insertion of an intravenous catheter and drawing of blood samples. After this a more comprehensive physical assessment and history taking were conducted. Then decisions were made on further tests or diagnostic interventions, including: X-rays, lumbar puncture, urine analysis, CT scans and MRI. The registrar took responsibility for planning, initiating and conducting tests or interventions and was assisted by a fellow registrar or professional nurse, depending on who was available. With the assistance of the professional nurse and other staff members from various specialties, the child was stabilised before being transferred to the PICU, to a high-care setting, to an appropriate ward, or in some instances home.

4.3. Key themes: Activities related to patient care and organisational patterns

This section presents the two main themes that emerged from data analysis in the theoretical coding section described in the previous chapter. These themes were activities related to patient care and organisational patterns.

As described in Chapter 3the rigorous analysis process enabled me to link the codes to activities related to patient care in the sequence of the four pillars. The remaining codes yielded the second theme, called organisational patterns. Findings related to each of these themes will be described. In this section raw data will often be used to illustrate key findings.[1]

[1.] Symbols are used to link the findings with the raw data extracted from the child pathway ethnographic records, field notes, and informal interviews. These symbols have been placed alongside the descriptive text as a reference.

Symbols used in these sections are as follows:

❶❷❸❹❺❻❼❽❾❿	Reference to ethnographic record pathway data
✂	Summary from ethnographic record pathway data
✎	Extract from field note
☺	Informal Interview

4.3.1. Activities related to patient care

These refer to the set of codes and sub-codes refined in the process of theoretical analysis. This included all activities, interventions and conversations that took place around the bed space, and that could optimise or hinder stabilisation through the four pillars. Data used to demonstrate findings were extracted from the ethnographic records, field notes and informal interviews.

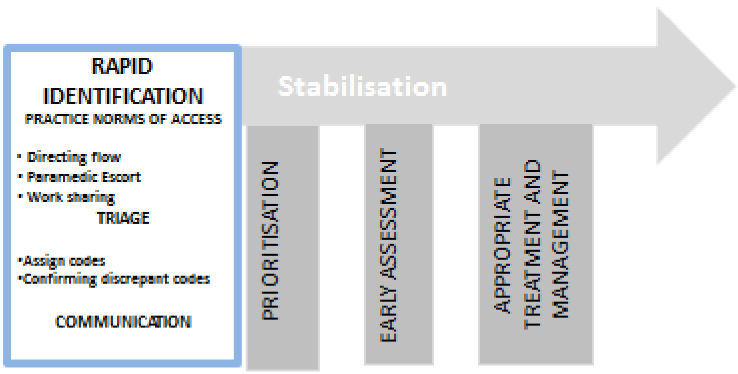


Figure 4.12: Theme: Activities related to patient care through rapid identification

4.3.1.1. Rapid Identification

Rapid identification occurs in the period between the child's arrival at the hospital and triage. Data indicated that there were certain activities which affected stabilisation in this pillar. Analysis of observations, interview and field notes reveal three key themes: practice norms of access, triage and communication (Figure 4.12).

4.3.1.1.1. Practice norms of access

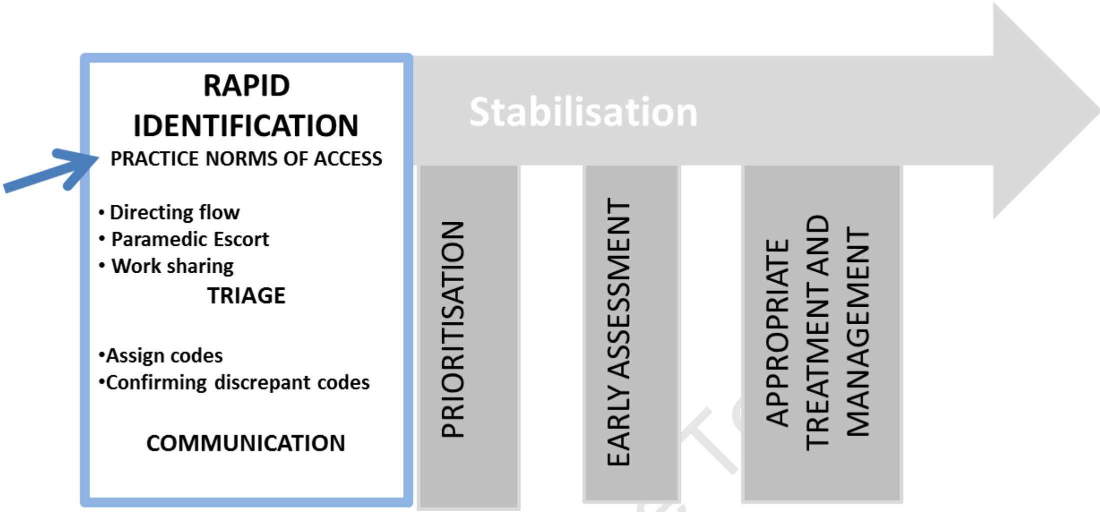


Figure 4.13: Practice norms of access within the theme of activities related to patient care

Practice norms of access determine how children are directed to access early triage. Getting the child to the right place in the shortest time possible is a priority. It became apparent that in this system certain aspects impacted on how quickly the child was triaged. Practice norms of access are described as activities that influence rapid identification and include: directing flow, paramedic escort and work sharing (Figure 4.13).

Directing flow

A security guard stationed just inside the entrance of the emergency department appeared to have the added task of directing patients to where they needed to go. The security service is provided by an independent security company. Guards worked two shifts over a 24-hour period. Regular rotations with colleagues often resulted in frequent turn-around. None of the guards were trained in ETAT.

The guard established contact with most people who appeared to need help. The security guard made eye contact with every person who passed and seemed to offer his assistance.

Some patients were on their way to the OPD for appointments while others came for emergency care. Interactions were brief and usually involved the parent producing an appointment card or referral letter, to which the guard responded by pointing and briefly telling them where they should go.

Observations showed a consistency in the added responsibility of the security guard. Directions seemed to be clear and assisted patients to get to the triage room quickly.

Paramedic escort

Critically ill children brought to the unit by paramedic escort bypassed the weighing room and went directly to the resuscitation room. On arrival, paramedics had usually identified that the child was ill on their own assessment, or on the assessment of the referring institution. A further assessment to allocate a triage code was unnecessary and so time was saved in this process. However, those who were less obviously critically ill, and were escorted in by paramedics, were taken to the triage room for triage.

> *"Three paramedics enter the resuscitation room wheeling a child on a stretcher. Mother is with them. They have by-passed the weighing room."* ✂❷
>
> *"Child is wheeled into the resuscitation room and is accompanied by two paramedics and the father. They bypass the weighing room. This was a referral from Somerset Hospital. The RCCH team are expecting this boy."* ✂❺
>
> *"A child arrives in the resuscitation room after bypassing the weighing room. The child is accompanied by three paramedics and the mother."* ✂❾

Work sharing to facilitate rapid triage (rapid identification)

This activity related to how the MEU team worked together to facilitate rapid identification and was observed in the triage room (to allocate an initial triage code) and in the queues outside the acute care consultation rooms (to detect deterioration).

Short queues outside the triage room were useful to enable rapid identification affecting time- sensitive stabilisation. The rate at which children were triaged appeared to depend on the number of children waiting and the number of staff performing triage.

In this unit triage happened consistently throughout the day but the numbers of patients arriving at any given time fluctuated. In one of the pathways, two different paramedics dropped off five children in a space of 15 minutes while one triage nurse was working in the area, while in another set of observations three children were triaged over a period of 15 minutes. Flow was predictable in that children arrived constantly, but larger volumes of arrivals were unpredictable and put pressure on the triage nurse.

Professional nurses allocated to the resuscitation room went to the triage room to assist the nurses with triage. This increased the number of children triaged and so assisted in early identification. Although this activity was useful, the availability of the professional nurses was dependent on the number of children in the resuscitation room. Work sharing was enabled by availability and not necessarily by need (high patient loads).

> *There is a steady flow of children through the weighing room. At least three children are being seen at any time. The room is staffed by two professional nurses and one enrolled nurse. Professional nurses are able to help here now as there are no children in the resuscitation room.*
>
> ✍*16.05.2011*

Another form of work sharing was intended to pick up early deterioration in children waiting in queues. Two groups of children sat in the corridor between the triage room and the acute care consultation rooms. The first group were those waiting to be triaged and the second group were triaged (green and orange) but were waiting to see the medical officer. Medical officers and nurses (triage room) scanned these queues when they came out to call in the next patient. The purpose was to detect early deterioration and to re-confirm suitable initial codes for those already triaged. The following extract demonstrates the value of this activity.

"The child is triaged as orange. TN sends the mother and child to reception to open a folder. They leave the room. (On admission to the weighing room, the child was able to stand on the scale for weight, but became increasingly lethargic. At the end of her assessment she was lying back on mother's lap and the white of her eyes were showing.) I notice that both the TN and PN1 (professional nurse) are hesitant in allocating the triage code. They look at each other and seem unsure. The child is triaged as orange. The temperature (high fever>38) is marked off as a priority sign. A medical officer (MO) sees the child in the passage and returns to the weighing room and queries the code with PN1. She suggests that the child be taken through to the resuscitation room. (It needs to be stressed, however, that the child's condition deteriorated in a short space of time.)"

Sometimes the triage room was operated by a single nurse when colleagues left for tea and lunch breaks or were called out to assist medical officers with minor procedures. Working alone and triaging lots of children sometimes challenged the extra responsibility of checking children`s condition outside the triage room.

"I am in the weighing room... A single auxiliary nurse is conducting the triage. Her partner is on tea. There is a queue of children waiting to be seen outside. As she sends one child out the next comes in. She systematically triages the children, none of whom are critically ill. She appears calm. A medical officer pops in and comments that the queue is long outside the weighing room and that there is no one to assess their (the children) condition to ensure that none are deteriorating."

✍07.03.2011

From this section one may conclude that practice norms of access facilitate early identification. Stabilisation is dependent on someone directing the child to the weighing room, where an adequate number of staff can triage and monitor children efficiently.

4.3.1.1.2. Triage

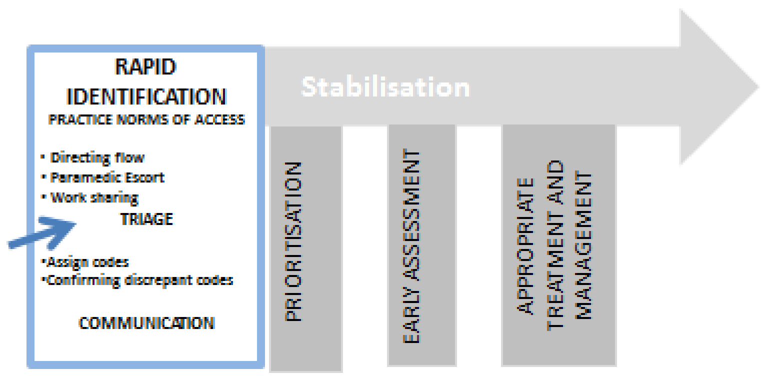


Figure 4.14: Triage within the theme of activities related to patient care

Triage codes were mostly allocated by the nurse working in the triage room, who was trained in ETAT. In addition, professional nurses assisted where possible. Triage codes were allocated according to ETAT guidelines and assisted by the nurses' experience. Findings showed that assigning codes and asking for help were two factors that impacted on speeding up or slowing down stabilisation in early identification (Figure 4.14).

Assigning triage codes

Assigning triage codes appeared to be mostly a matter of course and was aided by recurring disease patterns and the experience of the triage nurse. Although the majority of children presented with recognisable conditions, they varied in acuity. The format was simple. A greeting was followed by questions about the presenting problem. Triage code allocation (guided by ETAT) was mainly based on the presenting symptoms and excluded physiological parameters to guide code allocation. However, a temperature was always taken, and an additional oxygen saturation reading was done only when the child appeared to have respiratory difficulty. An outside referral meant that a child arrived with a referral letter, which helped in the initial comprehension of the problem.

> *"It's quick. It's not too difficult to code (triage) the child.... First you greet the mom and ask what the problem is. The letter (referral) may say something else so this means that you must ask to be sure. Then you write it down. Thereafter you will weigh the child and do a temperature. The child's condition will depend on what else you do...."*
>
> *☺ 10.10.2011*

However, a challenge was noted in allocating triage codes in some children, particularly those presenting with marginal acuity bordering on critical illness or non-acute complex conditions. In both, the challenge of assigning a code seemed related to the absence of relevant signs and symptoms on the code sheet to guide triage. In these challenging cases, where presenting symptoms did not match triage codes, it seemed as though the triage code decision was based on experience and "gut feel". However, substantiating the choice of code was sometimes difficult (Table 4.5).

> *"Sometimes triage is hard because you just don't know... but it's a gut feel"* ☺
>
> *10.01.2012*.

Table 4.5: Extract from child pathway ❶

Time	*Description of child pathway*
12:02	*PN1 brings child into resuscitation room. Attaches saturation probe, ECG leads and BP cuff. no one answers- PN1 alone with child (she is alone in the room).*
12:05	*PN1calls the DR in S11. TN enters the room. Mother receives a call on her cell phone and takes it.*
12:06	*PN1 does an HGT. The heel prick does not elicit any reaction from the child.*
12:07	*PN1 documents findings (respiration 48 bpm, pulse 103 bpm, temp 39.2 degrees, BP 113/67 map 92, sats 97%, and HGT 8.8mmol/l.)(From clinical notes)* *(These were the only documented observations in all the time that the child was in the resuscitation room).* *DR1 enters the room. Asks PN1 a question unrelated to the child. Makes a phone call. Looks at the child and asks PN1 " Has she been seen?" PN1 "No". DR1"Did you call someone?" PN1: "Yes" DR1 "What time?" PN1 "Twelve". DR1"Why is she here?" PN1" Meningitis".*
12:11	*DR1 leaves the room. The mother receives another call on cell phone.*
12:12	*DR2 enters the room and looks at the child briefly. DR2: "Why is she here? She is not an emergency patient". PN1 tries briefly to explain that the doctor from acute care had sent her into the resuscitation room. DR2: "I don't need to see her because she shouldn't be here". PN1 does not respond.* *NOTES: In the resuscitation room, the registrar is frustrated at the initial admission of the child as he does not think that she is an "emergency patient" "I don't need to see her because she shouldn't be here". The nurse is not able to 1) articulate that the child was initially triaged as orange and 2) that one of his colleagues suggested the admission to the resuscitation room. Instead she keeps quiet. Unfortunately she was not able to give a calculated reason for the triage red (even though I think she knew). At that point there was obvious LOC and lethargy in the child.* *There was a change in the atmosphere in the room between the nurse and doctor. She withdrew from the bedside and started packing away stock.*

This particular child's condition deteriorated rapidly from the time of arrival. Allocating a triage code was a challenge. Despite correcting the initial triage code, further challenges were noted. On admission to the resuscitation room, the nurse was unable to articulate the triage process.

Furthermore, all children observed in the ten pathways (except in❸) received some form of emergency intervention in the resuscitation room, despite being allocated triage code green and orange. Table 4.5 illustrates that half of the observed children were allocated a convincing triage code red but in other children, dissonance existed between the allocated triage code and intervention performed (Table 4.6).

Table 4.6: Triage code allocation to ten child pathways

Pathway	Triage code	Signs and symptoms matching triage code	Child's actual presentation
1	Orange	Temperature (higher fever >38C)	Child walked into weighing room, but deteriorated in a short space of time. Presented with pyrexia and lethargy. Referral dx: Meningitis
2	-	**NO RECORD OF TRIAGE**	Hypovolaemic shock, dehydrated and lethargic. Intra-osseous line in position.(referred)
3	Green	None indicated	Long hx of fever, mouth ulcers (seen at allergy clinic in 2007). Went to GP on 11/1/2011 given antibiotics Also had general pain last week and onset of weakness from 15/01/2011, unable to stand/walk alone and intermittent difficulty in passing urine. Complicated neurological condition (referred).
4	Red	None indicated	Two-day hx of stools, 3 days of vomiting. 10% dehydration. Other possible problems: pneumonia, malnutrition (child was not coded in weighing room, but was taken to resuscitation room where the professional nurse and registrar confirmed the triage code. No matching symptoms verbalised or written (unreferred).
5	Red	Severe lethargy or reduced LOC	Two day hx of headache and neck pain, 2/7 of pain dysphagia.GCS:13/15, marked neck stiffness. Referred from NSH with query meningitis.
6	None indicated	None indicated	Four-day hx of diarrhoea and vomiting. 10% dehydrated, drowsy (referral)

7	**Orange**	Tiny tot (< 2 months)	Two-day hx of dry coughing and breathing fast. Presents with respiratory distress. Severe pneumonia and query sepsis Referral from MPMOU.
8	**Red**	Central cyanosis, lethargy	Four-day history of vomiting and diarrhoea. Presents with pyrexia, 10% dehydration, grunt and recession. (unreferred).
9	**Red**	Convulsions	History of seizures. Three episodes in one day and received treatment at Gugulethu Day Hospital. Referral from Gugulethu Day Hospital.
10	**Red**	Central cyanosis	Known cardiac patient to hospital in cardiac failure. Admitted with respiratory distress and central cyanosis: saturation 77%. (unreferred)

In pathways❸❹❻ triage codes were without accompanying symptoms. This could have been due to forgetfulness that the triage code had to be categorised using the available symptoms on the triage code sheet (Appendix D). However, the child`s actual presentation indicated that further management or investigation was required.

"He was triaged as green but was brought through to the resuscitation room where the mom explained that her son was not able to walk or pass urine. He could not be classified according to the code sheet (no symptoms matched his complaint)." ✂❸

> *"TN hesitates with allocating a triage code to the child- she is unsure what to do. I can see that she is hesitant. She keeps looking at the child .She does not spend any time trying to figure this out. She picks up the child and goes straight to the resuscitation room"* ✂❹

Child pathway ❻ was an arranged referral. On arrival to the triage room, he was rapidly assessed and weighed. No triage code was allocated; however, the actions following seemed to indicate that he required immediate further emergency treatment. He was escorted to the resuscitation room where treatment was started. No reference was made to the absent triage code, nor did it hinder further management.

Data showed various challenges related to triage allocation. However, the absence of a triage code did not hinder further management, nor did the allocation of a triage code green or orange always mean that children did not require further emergency management or investigation.

A new triage system was trialled in the MEU in October 2011, after the completion of the study. The ETAT system relied primarily on clinical symptoms whereas the new system includes physiological markers to substantiate and confirm an allocated triage code.

Asking for help

Findings confirm that triage was not always straightforward. However, nurses mentioned support received from colleagues to re-assess a child's condition to assist in triage allocation. Nurses verbalised the benefit of being able to approach medical officers and resuscitation room staff to assist in confirming discrepant codes.

> *"It's not difficult to code the child. Where you are not sure you will call the doctor (medical officer)... because sometimes you look at the child and you know something is wrong."* 😐 *10.10.12*

> *"Child is brought into weighing room by mom. Appears lethargic...TN nurse asks what is wrong to which the mother replies that he has gastro…TN hesitates with coding the child- she is unsure what to do…She did not spend any time trying to figure this out, but took the child straight through to the resuscitation room…The child was immediately assessed… The red sticker was placed on the code sheet*

when the code was confirmed in the resuscitation room."

❹

Conversely, data showed the opposite when help was not sought. In child pathway ❶ the child with a deteriorating condition was triaged as orange. What makes this example relevant was that the triaging nurse showed non-verbal signs of being unsure, but did not ask for help.

From this section we can conclude that allocating triage codes can be a challenge, but clarifying difficult decisions among the multidisciplinary team can assist in stabilisation.

4.3.1.1.3. Communication

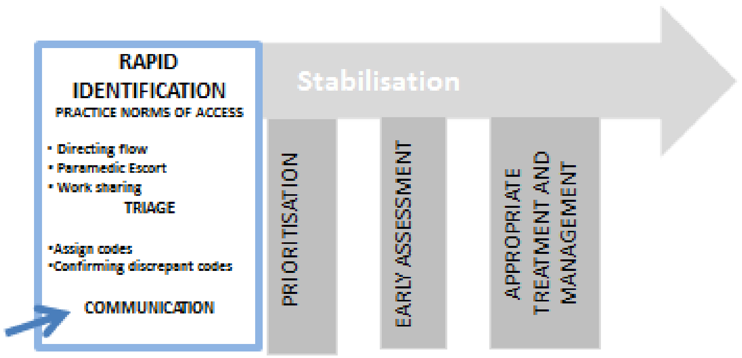


Figure 4.15: Communication within the theme of activities related to patient care

Verbal communication observed during this pillar was simple, yet vital cues were exchanged using few words in early identification (Figure 4.15). Verbal exchanges took place between:

the triage nurse and the mother; paramedics and triage nurses; triage nurse and medical officers; and between triage nurses.

On observation, the handover between nurses and paramedics was very brief. It consisted of mention of the presenting complaint and any intervention carried out during transport. Detailed information was mostly captured on the Metro Emergency Medical Services Patient Care Report Form, but little of this information was given verbally.

Triage forms were easy to complete. Information required included: child`s name, address, date of arrival, date of birth, gender, referral status, weight, and temperature. Furthermore, space was allocated for additional findings. Three columns listed possible presenting signs under the triage codes green, orange and red. The nurse was expected to tick off the presenting signs indicating the triage code. Lastly, a coloured sticker indicating the code was attached to the triage sheet.

Details included on these forms varied between pathways. In some, all the details were completed, while others did not have details of symptoms indicating the triage code, or the triage code was not indicated. The deficiency of these details was never questioned nor did they hinder further management and so the value of these forms was not fully understood.

To summarise, the presence of a security guard assisted in directing the child to the weighing room, supporting the goal: "the right patient is at the right place with the right provider at the right time" (IHI, 2003). Communication explaining the practice norms of who is seen when, was sometimes unclear, causing mothers to be unsettled and affecting the initial interaction with the nursing staff in the weighing room. Both paramedic escort and responsive job sharing had a positive impact on time-sensitive stabilisation. Conversely, a single triage nurse seeing to high volumes of patients resulted in bottlenecks outside the weighing room, as well as leaving vulnerable children in the transition space, with no one to monitor them for possible deterioration.ETAT guidelines facilitate rapid identification, especially in well-recognised seasonal disease patterns. Triage codes green and orange were allocated with ease. However, a challenge was noted in allocating triage codes to children who were (i) deteriorating, or (ii) where symptoms did not match triage code descriptors. Stabilisation was hindered by these challenges. Seeking help with discrepant codes directly shortened time to stabilisation, whereas not asking for assistance delayed allocating an initial triage code, delaying stabilisation. Lastly, although the triage process and triage forms were simple to complete, documentation was inconsistent and incomplete in many pathways. Although this documentation did not directly impact time-sensitive stabilisation, it influenced the integrity and track-ability of the child pathway.

4.3.1.2. Prioritisation

This section describes activities impacting on stabilisation in the period between triage allocations, through accompaniment to the resuscitation room, up to and including commencement of initial emergency treatment (Prioritisation). Although many actions and activities could influence stabilisation, the following arose consistently from the data and included: outside referral, monitoring devices, initial emergency treatment, and communication (Figure 4.16).

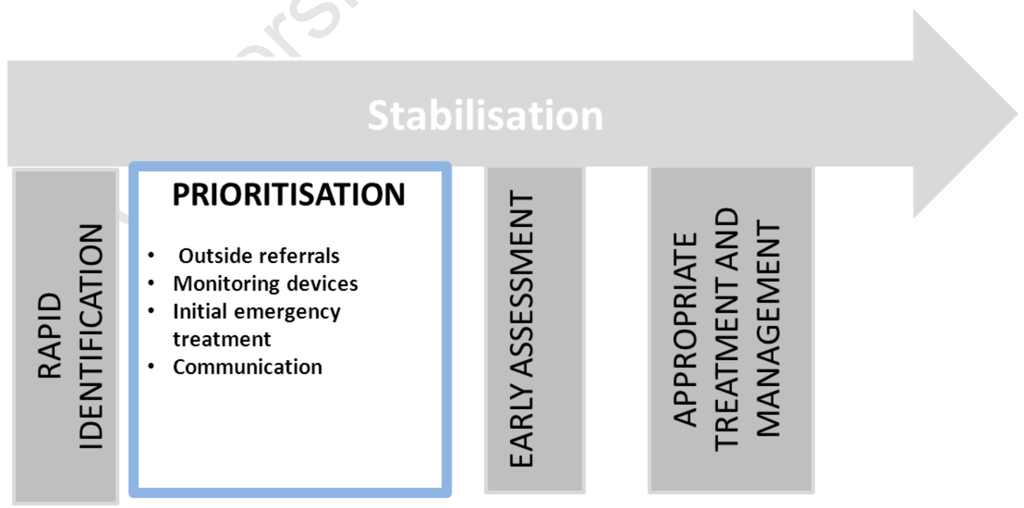


Figure 4.16: Theme: Activities related to patient care through prioritisation

4.3.1.2.1. Outside referral

The majority of children observed were referred from other medical sites and escorted by emergency service paramedics. This seemed to shorten the time to stabilisation as most often the degree of acuity had been recognised and initial emergency therapy such as oxygen or fluid therapy had commenced before arrival at the hospital.

> *Three paramedics enter the resuscitation room wheeling a child on a stretcher. Mother is with them. They have bypassed the weighing room. They are greeted by PN1. The child is immediately transferred onto a bed. He is on NPO$_2$ and has an intra-osseous line in position. The paramedic doctor (PD) conducts a handover and includes the following:*
>
> *The child is 5 months old and was born at 29weeks. He has had ahx of gastro for the past two days. They could not find a peripheral vein so inserted an intra-osseous line to commence fluids. He said that the child was dehydrated (did not include specific rationale for this).He said that the GCS had increased from 7 to 12 out of 15. He reports that there was no other hx except for the gastro.* ❷

> *Child is wheeled into S12 accompanied by two paramedics and accompanied by the father. They bypassed the weighing room. This is an organised transfer from Somerset Hospital and the team at RCWMCH are expecting this boy. He is currently on face-mask oxygen. PM does a brief handover to DR1 and DR2 who are at the bedside. He mentions that the child has suspected meningitis and that he has an increased temperature. He also mentions that the child received an initial dose of Ceftriaxone at the hospital prior to ambulance transfer.*❺

Patient arrives at resuscitation room, bypasses the weighing room. The child is accompanied by three paramedics and the mother. They are greeted by PN1. The paramedic says that the child is the expected referral from Gugulethu clinic. He hands the forms to PN1 (ambulance + referral form). The paramedic transfers the child onto the bed. The child is a 16-month-old boy admitted with a history of seizures. The PN1 is alone in the room. The paramedic leaves the room and there is no further dialogue. The child has an IV line in a left temporal vein as well as FMO_2. PN1 immediately connects the oxygen. (I later asked the PN1 why the paramedics did not do a comprehensive handover and she replied that all the child's details were discussed during the call dealing with the referral. She said that if there had been any changes along the way, they would have mentioned this on handover.)“

4.3.1.2.2. Monitoring devices

On arrival in the resuscitation room most children were attached to a cardiac monitor for initial monitoring (pulse rate; saturation and blood pressure) provided that there were only four admissions at one time. Admissions of more than four children resulted in monitors being shared. Values were not usually recorded immediately but established an awareness of baseline vital signs. This was routinely carried out by the professional nurse in the resuscitation room or the triage nurse escorting the child minutes after arrival (Table 4.7).

Table 4.7: Extract from pathways❶ and ❻

Time	Description from child pathway
12H02	PN1 brings child into resuscitation room. She attaches saturations probe, ECG leads and blood pressure cuff. Phone rings but no one answers- PN1 alone with child (she is alone in the room). ❶
13H12	PN1 receives the child. She immediately attaches the child to the cardiac monitor. ❻

4.3.1.2.3. Initiating emergency treatment

Initial emergency treatment was required in all pathways except one, and included fluid resuscitation and oxygen therapy. No observed child required cardiopulmonary resuscitation. From the findings it seemed that initiating emergency treatment was most dependent on: an initiator to direct the process; direct communication; and available and accessible equipment. .

An initiator to direct the process

Emergency treatment was most often initiated by the registrar, who would either start the therapy or ask a colleague, usually a professional nurse, to administer the therapy (Table 4.8).Data also showed that oxygen therapy was sometimes initiated by the professional nurse. ETAT advocates and teaches nurses to start emergency treatment; however, the majority of these interventions were led by the registrar.

Table 4.8: Extract from pathways❷ and❻

Time	Description from child pathway
21H43	DR1 enters the bed space. She speaks with the PD about how much fluid the child has been given.
21H45	DR1 attaches a new bag of fluid and connects it to the IO line- PN1 helps her. DR1: PD inquires about child’s weight. PD answers "6.5kg". DR1:PD asks whether antibiotics have been given to which the reply is yes. PN1 "I am going to do her observations". DR1 pushes fluids via the IO line. PD

	leaves the room.PN1 says that the temp is 36.1.
21H50	DR1 continues to push fluids and ask the PN1 to test the blood sugar. PN1 agrees to do this. ✂❷
13h16	DR1 enters the space and ask. PN1 to check whether the drip is working and asks to give 85ml/hr of Ringers Lactate stat.RN1 agrees. DR1 assists in checking the drip site. PN1 collects a bag of Ringers lactate and starts the fluid. It is running into the existing drip site via the IVAC. ✂ ❻

Direct communication

Direct communication between the person initiating treatment and the person requested to administer treatment, facilitated rapid and accurate administration of oxygen and fluid therapy (Table 4.9).

Table 4.9: Extract from pathways ❻,❼ and❿

Time	Description of child pathway
13H16	DR1 enters the space and asks PN1 to check whether the drip is working and to give 85ml/hr of Ringers Lactate stat.PN1 agrees and immediately carries out the instruction. ✂❻
14H25	DR1 asks PNC1 to start child on NPO2. PNC1 starts the NPO2. ✂❼
11H35	DR3 asks PNS2 to attach NPO2. PNS2 starts oxygen immediately. ✂❿

Available and accessible equipment

Equipment and disposables were easily available, accessible and in working order in all pathways. However, some challenges were noted with measuring blood pressure. The problem seemed primarily related to the blood pressure cuffs. Readings were attempted and regularly repeated due to inappropriate findings. Not all readings were obtained. This will be elaborated on in Pillars 3 and 4.

4.3.1.2.4. Communication

The triage nurse or paramedic accompanied the child to the resuscitation room and was responsible for handover. Handovers ranged from a brief mention of the presenting complaint or symptom to a detailed description of history and intervention. This section looks at “who tells whom what” and includes handover between weighing room nurses and resuscitation room professional nurses; paramedics and registrars, and paramedics and professional nurses.

Handover between weighing room nurses and resuscitation room professional nurses

In pathways ❸❻❽❿ handover was initiated by the weighing room nurse and directed at the resuscitation room professional nurse. These handovers were brief: in pathways ❸, ❽ and ❿, the presenting sign was mentioned. In pathway❻, the verbal exchange was minimal and only included a mention that the child was an expected referral. However brief, they seemed acceptable as there were no further questions asked.

> *Child is wheeled into the resuscitation room by TN, accompanied by the mother and grandmother...The TN tells PN1 and PN2 that the child has been unable to walk and pass urine. The TN leaves the room. PN1 turns to the mom and asks what happened....*
>
> ❸

Child admitted to the resuscitation room. She is brought in by the TN and is assisted by the mother. ...A triage coding sheet was completed…the child was coded as red by the TN and the reason indicated was central cyanosis...TN says to the PN1 that the child is distressed and that her saturation is 77%. RN1 puts the child on the bed. TN leaves the room

✄❿

Handover between paramedics and registrars

In pathways❷, ❺ and ❼ the handover was led by a paramedic and directed to a registrar. These handovers seemed to include more information and often the registrar would ask more questions than were asked in the previous group. Information exchanged included the child's age, history, suspected diagnosis and treatment administered by the paramedic or referring health care centre, where relevant.

Handover between paramedics and professional nurses

A third group of handovers was between paramedics and professional nurses. In pathway ❾ the child was an expected referral. Although the child`s condition was complex, the handover was brief. I (the researcher) approached the professional nurse to clarify why so much vital information was omitted. The professional nurse assured me that all the information was discussed telephonically on arranging the transfer and that the paramedics would have included any information relating to a change in the child`s condition during transport. This resulted in a brief handover between the paramedic and professional nurse.

In this section data showed that accompanied handover took place across the pathways. Handovers between nurses was brief and usually relayed information about the presenting signs. There was no formal reference to the triage form. Due to the basic assessment triage required, little information could be obtained and therefore it did not seem that there was an expectation of more verbal content. There seemed to be an understanding of shared responsibility between the weighing room and resuscitation room staff. Handover reflected a continuation of care. Comprehensive handovers between paramedics and registrars seemed to be based on the amount of knowledge obtained prior to admission as well as actual clinical interventions reported on. Appropriate to this understanding, handovers contained more information and were more formal than those between hospital staff.

4.3.1.3. Early assessment and appropriate treatment and management

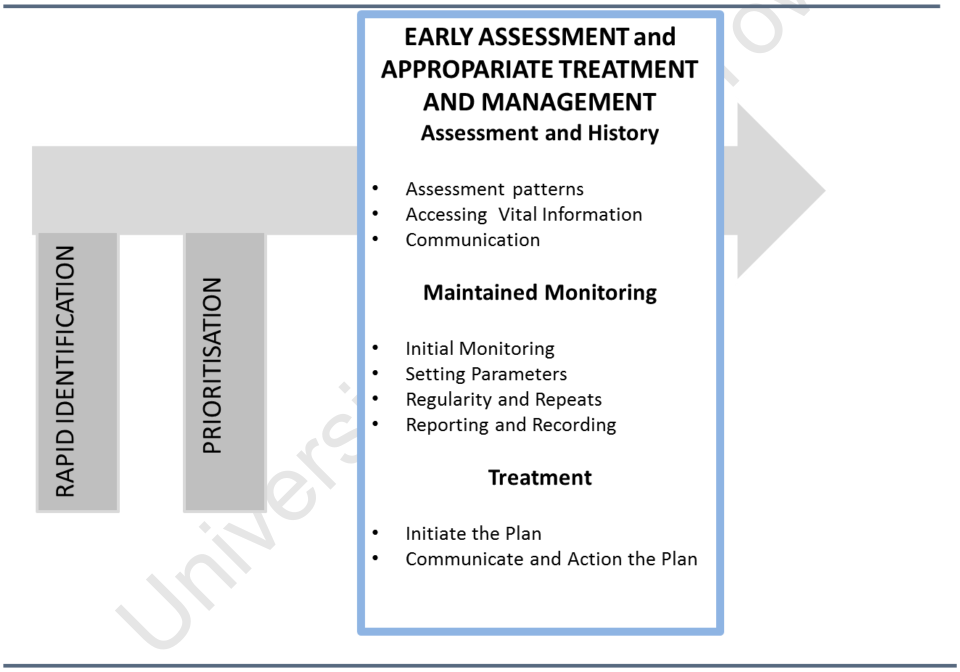


Figure 4.17: Theme – Activity related to patient care through early assessment and appropriate treatment and management

Early assessment and appropriate management refers to the phase after prioritisation and includes assessments, diagnostic tests and treatment before referral out (Figure 4.17). These pillars were mostly observed in the resuscitation room, although for diagnostic tests such as CT scans or MRI children were taken to different sites. Health carers contributing to the pathway included: consultants; registrars; senior house officers; specialists from other areas; radiographers; social workers; the acting nurse OM; and professional, auxiliary, and enrolled nurses Other nursing staff allocated to work in the unit for various periods included community service nurses and postgraduate diploma nurses.

The findings in this section will be structured slightly differently to that of rapid identification and prioritisation. The aim was to combine both early assessment and appropriate management and treatment into one section, as it became difficult to separate these in some pathways.

As there are a myriad of factors that could facilitate or hinder stabilisation, I chose to discuss major themes highlighted by data analysis. As in the previous sections, possible factors were considered that, when subjected to time, could accelerate or slow down stabilisation. In no particular order they are as follows: assessment and history taking; maintained monitoring; and treatment.

4.3.1.3.1. Assessment and History

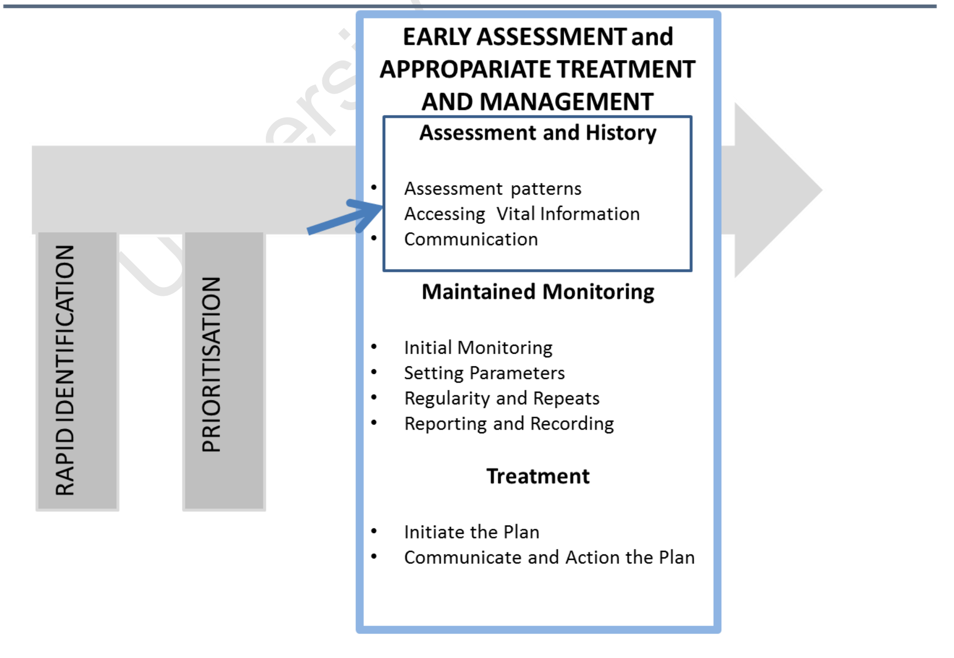


Figure 4.18: Assessment and history within the theme of activities related to patient care

This section illustrates assessment patterns and history taking across the ten pathways (Figure 4.18). These activities were vital in trending the stabilisation process and facilitated a clear plan for treatment and intervention.

No pathway was the same, causing patterns to differ. However, the differences were pertinent to how information was collected. The type of information collected seemed standard across the pathways. What made them different were the diagnosis, acuity, unpredictability of admissions and patient loads, and who was doing it. Different people from different teams had different work ethics and therefore managed similar challenges differently. The reason why these patterns became important was that basic assessment and history mapped the way forward for stabilisation. Furthermore, the complete documentation of this information was essential before a child could be transferred to a ward. Three sets of patterns were noted, namely clustered, prolonged and fragmented. Each will be discussed in more detail.

Assessment patterns

Clustered

"Cluster" is defined as "a grouping of similar things or events" (*FreeOnline Dictionary*, 2011). Participant observation revealed that in some pathways assessment and history were grouped and intentional. It seemed that clustering was more likely to happen when there were fewer and less acute cases, and fewer interruptions and distractions in the resuscitation room.

> *The referred child was admitted to the resuscitation room after being re-triaged from code orange to red. The child arrived in the resuscitation room at 12h02 and the registrar arrived at 12h14. The registrar immediately started a conversation with the mother relating to reason for admission and where they were referred from. The registrar continued to ask questions pertinent to the referral diagnosis (meningitis). At 12h26 he commenced a physical assessment. On completion of the assessment, the*

registrar called the consultant for assistance to confirm his findings. Much later, after bloods had been drawn and an intravenous catheter inserted, the registrar documented findings. While doing this, the registrar carried out short examinations to confirm his initial findings. During this whole period, the child was the only admission in this area. ✀❶

However, the nature of this setting was usually more challenging. Pathway ❿ showed an intentional process despite there being between three and four critically ill children in the room throughout. Furthermore, history taking and assessment were organised around more important and urgent interventions such as immediate fluid resuscitation and diagnostic tests to confirm the diagnosis. Although there was a slight delay, assessment and history were clustered.

The child arrived at 21h40 and required emergency fluid resuscitation. An existing intra-osseous line facilitated rapid commencement of fluids by the registrar while the paramedic proceeded to hand over details relating to the history and management. At 21h55, on completion of the first bolus, the registrar clarified information with the paramedic relating to management at the previous site and en route to hospital. The registrar continued by administering another fluid bolus. This was followed by the insertion of an intravenous catheter and drawing bloods. This was followed by a call to the laboratory to stress the urgency of the results. Thereafter, the registrar returned to the bedside and took history from the mother between 22h15 and 22h26. Following this, a physical examination was conducted, which lasted minutes. Summary ✀❷

Prolonged

History taking and assessments could also be drawn out over a prolonged period of time. Owing to the unpredictability of medical emergencies, children could present with rare, non-acute conditions requiring comprehensive assessments to confirm diagnosis. Prolonged history taking and physical assessment were only noticed in one pathway.

Appendix I illustrates the number of times the child was examined and a history was taken (details of the examinations are not included but the intention is to highlight the number and extent of these across the admission period). Here, parts of physical assessments and questioning were conducted by four different health care professionals (excluding triage). In just over three hours the child was examined on eight separate occasions, while the mother had five different sets of conversations.

This pathway presented a complex diagnosis, however the child was not critical. There was nowhere else for this child to be seen in the system. Prolonged assessment in this pathway and in similar examples, impacted on the resources of time and staffing, rare commodities in this setting.

Fragmented

Furthermore, history taking and physical assessment were fragmented. To fragment means "to break or separate (something) into fragments" (Dictionary.com, 2011). This pattern seemed to be associated with high patient loads and frequent interruptions.

> *A child arrived in the resuscitation room where the triage code was confirmed by the registrar and the professional nurse. Soon after settling the child, the registrar and professional nurse left the bed space to conduct a lumbar puncture on the child in the neighbouring bed. Minutes later, the registrar returned to the bed space and conducted a physical assessment. Two minutes after the assessment was underway, the telephone rang and the registrar was called away. After ten minutes, the registrar*

returned to the bed space and prepared to draw bloods and insert an intravenous catheter. While starting the planned procedure, the registrar asked the mother questions related to the onset of the illness. Due to a language barrier, the registrar called the professional nurse to interpret the conversation. Inserting the intravenous catheter and drawing of bloods proved challenging and caused the registrar to abandon the questions and focus on the procedure. On success of the procedure, the registrar asked the professional nurse to start intravenous fluids.

Ten minutes later, the registrar returned to the bed space and asked comprehensive questions related to the child`s medical and social history. This conversation ended with the registrar confirming that the child needed to be admitted. Summary ✂❹

The referred child was admitted to the weighing room. A triage code was not assigned, nor were presenting signs marked off on the triage form. However, after the basic checks had been done and recorded, including weight and temperature, the child was escorted to the resuscitation room. Fluid resuscitation was commenced on the instruction of the registrar while the professional nurse initiated recording vital signs. The registrar proceeded to examine the child seven minutes after arrival. While examining the child and simultaneously requesting the professional nurse to administer oral potassium chloride, the registrar was interrupted by a student nurse. The registrar was called away from the observed child to board medications for another patient. This caused the registrar to leave the bed space to return minutes later.

On return, the registrar asked the professional nurse to administer more fluids. The registrar did not complete the physical assessment but left the observed child to tend to another child (not an emergency).

Ten minutes later, the registrar returned and started a broken conversation with the *mother, eliciting information relating to the child`s medical history. This conversation continued for approximately 12 minutes when the phone rang three times in five minutes. Two of the calls were for the registrar. After completing the telephonic conversations, the registrar returned to the bed space, where she was interrupted by a professional nurse who is concerned about another child in the room. The other child`s saturation was 49%. The registrar left the bed space immediately.*

This was followed by a period of 40 minutes where other procedures were carried out on the child under observation. After this, the registrar returned to complete the physical assessment and history taking.

Summary ❻

Table 4.10 from pathway ❻ illustrates how busy the resuscitation room was. It shows the number of children, nurses and doctors in 15-minute intervals across the pathway. It also indicates who was there (consultant) and others entering and leaving: porters, general assistants, staff from the general hospital stores, and parents of children previously admitted to the room. Furthermore, medical officers, surgeons, social workers and policemen were included. Everyone who entered had a short or extended conversation with someone working in the resuscitation room. The phone was a disturbance in this particular pathway. It was often left unanswered or, on some occasions, I would tend to the calls.

Table 4.10: Illustration of the complexity and number of people and activities in the resuscitation room (pathway ❻)

Time	No. of children	No. of nurses	No. of doctors	Consultant in room	No. of people passing through the room	Phone ringing
13:10	4	3	1		1	
13:25	4	3	1		1	
13:40	4	3	1			3
13:55	4	3	1	1		1
14:10	4	3	1	1		
14:25	4	5	1	1	3	
14:40	4	4	1		1	
14:55	4	4	1		4	
15:10	5	4	2		2	
15:25	5	3	2		1	1
15:40	5	3	3	1		1
15:55	4	1	3		2	
16:10	5	3	3		2	
16:25	5	3	3		1	

The data illustrate the variation in assessment and history taking across pathways. Clustering seemed the most beneficial, but was not always possible. Prolonged practice was only due to a complex diagnosis; however, this practice could have negative implications on the mother and child as well as on other children in the room. Interruptions and time of day could result in fragmented history taking and assessment, which is least beneficial to the child and health provider as it allows for gaps in both the planning and actioning of care.

Accessing vital information

Accessing information referred to the ease with which important information could be accessed. Referred critically ill children, brought in by paramedics usually had the benefit of initial information that could assist in knowing what to do next. However, the mother was the richest source of information. Traditionally, mothers were sent out to open a folder (register child onto hospital system) at the reception desk soon after the child arrived in the resuscitation room (Table 4.11). This was not problematic if the child was stable, but delayed accessing important information that was necessary to start early treatment.

Table 4.11: Mothers sent out to open a folder

Time	Description from child pathway
22h04	Mom leaves the room to open a folder (asked by professional nurse) ✂❹
13h18	DR1 asks the father to open a folder at the admissions desk. She explains to him where it is. Father leaves the room. ✂❺
13h15	PN1 sends the mother to open a folder. Mom leaves the room ✂❻

However, a change was noted in pathway❿ where the professional nurse called the clerk to the resuscitation room to admit the child, thereby allowing the mother to stay at the bedside. This change in practice was of immense benefit to the child's psychological state as well as ensuring that the richest source of information was available to assist the doctors in obtaining an accurate history.

Communication

Doctors' notes were filled in on the hospital's clinical notes in all pathways and a separate form (Hospital Rehydration Unit Summary Chart) was developed for children presenting with gastroenteritis. Tick boxes and specific questions elicited the most important details.

Documentation seemed to follow a similar trend as assessment and history taking. Each pathway varied in when and how documentation was completed. In some pathways, documentation was completed soon after the physical assessment and history taking, while others were written just before the child was transferred out to a ward. It was evident that great value was placed on the accurate and timely completion of these clinical notes. Completion was an early sign that a child was "finished", despite incomplete treatment and interventions.

Early completion of documentation accompanied by appropriate administration of planned treatments and interventions facilitated stabilisation. Incomplete documentation delayed transfer out .Transferring a child out in a timely manner (as soon as possible) could assist in facilitating the stabilisation of another child. Delayed documentation of a stabilised child and delayed transfer out impacted on the stabilisation of other children.

4.3.1.3.2. Maintained monitoring

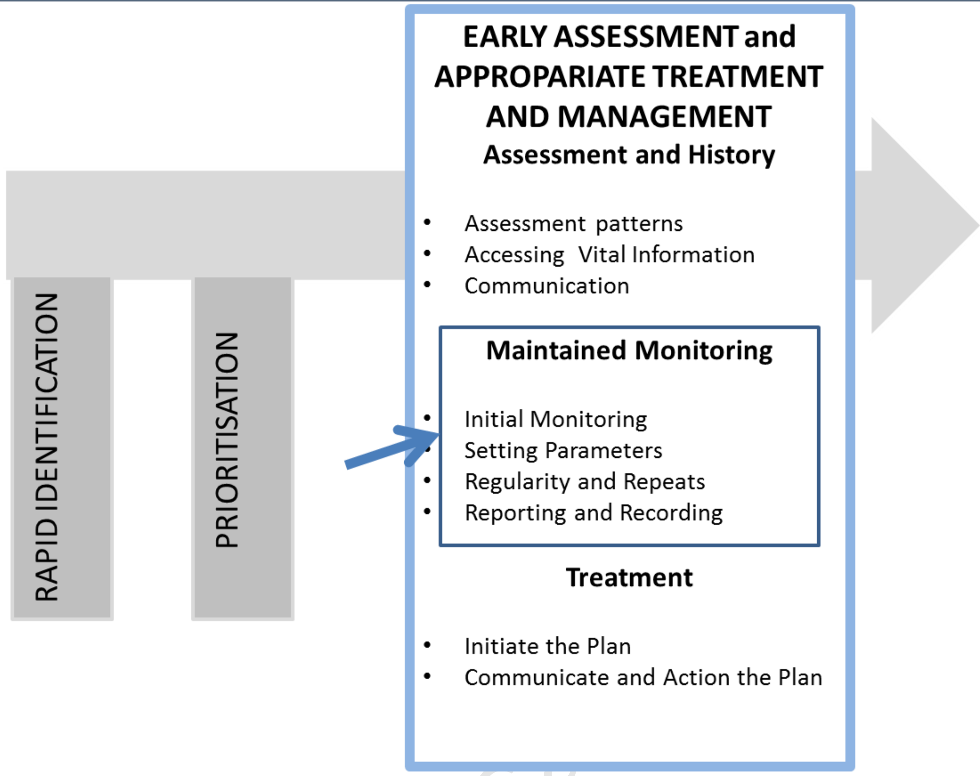


Figure 4.19: Maintained monitoring within the theme of activities related to patient care

The following section describes maintained monitoring and includes: vital signs (respiration rate, pulse rate, temperature and saturation); level of consciousness (AVPU); blood glucose test (HGT) and blood pressure (BP) and will be discussed under the following headings: initial monitoring; setting parameters; regularity; reporting and repeating. It was important to look what happened around baseline findings as they were essential to monitor the on-going condition of the child, as well as to gauge the effectiveness of interventions towards stabilisation. Data were sourced from ethnographic records and retrospective review of clinical notes.

Table 4.12 is an overview and illustrates the frequency of monitoring across the ten pathways.

Table 4.12: Overview of maintained monitoring across pathways

✘❶❷❸❹❺❻❼❽❾❿

Pathway	Time of arrival in resuscitation room	Time of vital signs	Temperature	AVPU	HGT	Blood pressure	Frequency
1	12H02	12H07	12H07	12H07	12H07	12H07	Once on arrival
2	21H40	21H45	21H45	21H45	21H51	21H34- unsuccessful	(clinical notes not traceable)
3	13H50	13H50	13H50	13H50	14H09 (documented as 13H50)	14H05 (documented as 13H50)	On arrival
4	22H04	22H25	22H25	Not written	Not done	22H25	On arrival
5	13H10	13H30 (documented as 13H00)	13H30 (documented as 13H00)	13H30 (documented as 13H00)	13H30 (documented as 13H00)	13H30 (documented as 13H00) Repeated at 15H32- not documented.	On arrival
6	13H10	13H20 15H20	13H20 15H20	13H20 15H20	14H28 (documented as 15H20)	14H59- re-attempted BP , obtained accurate reading at 15H30.(documented as 15H20)	Twice
7	14H21	14H30 16H20	16H20	14H30 16H20	14H30	None recorded	Twice
8	18H10	18H20 19H00 20H00 21H00 21H50 22H50	18H20 19H00 20H00 21H00 21H50 22H50	20H00 21H00 21H50 22H50	18H20	21H50- attempted	Multiple
9	11H38	11H45 14H10	11H45 14H10	11H45	11H45	11H45	Twice
10	13H25	13H35 15H00	13H35 15H00	13H35	13H35	13H35 15Hoo	Twice

Initial monitoring

Initiating the monitoring of vital signs (respiration, pulse rate, temperature, saturation), AVPU (awake, voice, pain, unresponsive) and HGT (blood glucose test) occurred early in a pathway when a child was connected to the cardiac monitor. Saturation, respiration and pulse rates became visible on the screen. These values were recorded for tracking purposes at different times, depending on the emergent needs of the child.

Temperature was always measured in the weighing room during triage. This value was copied onto the Admission and Resuscitation Nursing Record on arrival in the resuscitation room and documented alongside the same time as the initial pulse rate, respiration rate and saturation, even though it was not measured simultaneously. This seemed an acceptable practice as the child was transferred from the one room to the next within minutes and therefore it was reasonable to expect that little would change.

A scale to measure level of consciousness (AVPU) was conducted simultaneously with vital signs. Four measures were observed: awakeness (A); response to voice (V); response to pain (P); or unresponsive (U). It seemed that AVPU was habitually checked with vital signs.

The blood pressure and HGT were checked later in the pathway. The HGT was most often measured when blood was taken to avoid unnecessary discomfort for the child. An HGT was routinely checked in all pathways except one. Furthermore, monitoring of blood pressure appeared to be a challenge due to faulty cuffs.

Setting parameters

Ongoing monitoring of vital signs was a priority, considering the acuity of children admitted to the resuscitation room. Cardiac monitors made the physiological parameters (pulse rate, respiration rate and saturation levels) visible on the screen. However, the success of this technology was dependent on whether the monitor was displaying correct and accurate readings and whether the alarms were set appropriately to detect and alert to changes in physiological parameters.

Intentional setting of alarm parameters related to a child’s specific needs was only observed in pathway❿. In this pathway a child with a known cardiac condition had the saturation alarm limits reduced, as her normal saturation was 70%. Setting the monitor alarms appropriate to a child`s needs was not an observed regular pattern of practice in the resuscitation room.

Regularity and repeats

This section will highlight findings related to the regularity and repeats of maintained monitoring techniques in child pathways and will be discussed under the following headings: vital signs, AVPU, HGT, and blood pressure.

Vital signs

At least one set of vital signs was recorded in every pathway. However, in pathways❶❸❹❺ these were the only set recorded from entry to exit. Of these, two children presented with pyrexia. Even though both were treated with paracetamol, neither had a temperature repeated to monitor the success of the intervention.

In the other pathways, vital signs were recorded twice between admission and the resuscitation room. Pathway ❽ showed hourly documented vital signs from admission to discharge out, which was different from the other pathways.

AVPU

In pathways❶,❸,❹,❺ and ❿ the level of consciousness was assessed once in the time admitted. In pathways❸ and ❿ children were allocated an “A” and were visibly awake and responsive. However, in pathway❶, an “A” was allocated to a sleepy child who did not respond to a finger prick for an HGT. Despite an inappropriate scoring and a visibly decreased level of consciousness, the AVPU was not repeated. Similarly in pathways❹ and ❺ children were scored at “V” and “P” respectively. Neither child had a repeat assessment.

In the remaining pathways, the AVPU was conducted more than once. In pathway❽, an alert child had the APVU scale and the vital signs repeated every hour. In pathway ❻ this assessment was repeated twice. This child responded to pain in both checks. Nevertheless, documentation indicated attempts to check and track the child's level of consciousness appropriately.

HGT

An HGT was conducted by a professional nurse in all pathways except one. It did not seem that an abnormal reading would automatically warrant a repeat. In the one pathway it was repeated despite the first reading being within normal limits. This specific pathway showed a general increased vigilance in initial and ongoing monitoring as it was the only pathway where observations were done every hour. The researcher deduced that regularity and repeats were determined by the professional nurse and not necessarily by the value of the HGT.

In ❻ the HGT was unnecessarily repeated. This resulted from not recording or reporting the first result. The nurse went on tea without handing over. On reading the Admission and Resuscitation Nursing Record, a second nurse assumed that the HGT had not been done and repeated it 40 minutes later.

Blood pressure

Blood pressure monitoring was challenging. In six of the nine pathways, readings were only obtained after the second attempt. Furthermore, in pathway ❻ a reading was attempted six times over a period of one hour before an acceptable value was established. The challenges were due to incorrectly sized cuffs and technical difficulties. Data showed that it was a time-consuming and a sometimes futile exercise. In two pathways attempts were abandoned owing to lack of success. Blood pressure measurement was mostly initiated by the professional nurse in the resuscitation room. However, data showed that on occasion these measurements were requested by a registrar. There were differences in how this took place across the pathways.

A pattern of practice relating to the regularity and repeats of maintained monitoring was difficult to establish. Initial monitoring was conducted across ten pathways, but there was no established pattern of practice to substantiate why some readings were repeated and others not. Abnormal readings did not warrant repeats any more than normal readings. On having a conversation with the senior consultant, I verified that there currently is not an expected norm in terms of how frequently maintained monitoring should occur owing to the visibility of some readings on the cardiac monitor. **A** pattern reflecting the regularity and reason for vital signs, AVPU, HGT and blood pressure was difficult to establish, since abnormal readings and acuity did not necessarily warrant repeats.

Reporting and recording

This section briefly describes data relating to how values were reported and recorded and follows the same sequence as the previous section.

Vital signs

In all the pathways vital signs were recorded on the Admission and Resuscitation Nursing Record. Most, but not all readings were signed off by the practising professional nurse. It was not clear whether these were read and not recorded, or just not recorded. Furthermore, some readings were verbalised but this was not necessarily determined by the abnormality of the finding. In one instance of pyrexia, the value was verbalised to a registrar. In another example the professional nurse would habitually verbalise the findings, even though they were within normal limits. I began to appreciate the importance of verbalising all findings as it helped the rest of the team keep up with what was happening around the observed child. Therefore, vital signs were documented, but a pattern of what was communicated and to whom was not obvious to me.

AVPU

All neurological assessments were documented but seldom verbalised. However, one professional nurse verbalised normal AVPU levels. Even though this was unnecessary, it was very useful in other areas related to stabilising the child and to keeping the team in step.

HGT

All HGT values were recorded, except for one unrecorded reading resulting in an unnecessary repeat. I heard reporting of HGT results which were normal. Other findings showed that abnormal readings were not reported. It became evident that verbalising findings was not related to the actual result but was rather a way in which team members who had worked together for a long time, communicated with each other. This was not a standard of practice, but was dependent on individuals.

Blood pressure

The registrar specifically requested an urgent blood pressure reading in pathway❻. The first request was not directed at anyone specific in an already busy room. More than ten minutes later, a professional nurse saw that the routine blood pressure had not been done and commenced a set of unsuccessful attempts to establish a reading.

In pathway❿ an elevated blood pressure was repeated on request by a registrar. The second reading was abnormally low but was recorded without being reported. The registrar noticed the value and requested a second repeat. The last value was within an expected range. This value was verbally reported to the registrar and documented.

Data showed that all values that were obtained were recorded but not always reported. In comparing observation notes with clinical notes, data showed that the blood pressure measurement was routinely carried out at a different time to that of vital signs. However, these were always recorded together, thus giving the impression that they were done at the same time. The discrepancies were noted when comparing participant observations with clinical notes.

Some of the values that were recorded were not within expected limits for the child who naturally should have raised questions around whether the monitor was faulty or the child was sick. During observations, no such discussions were conducted. This raises the questions as to whether these recorded readings were considered in the treatment, or was there an expectation they were faulty due to continual difficulties in obtaining values.**A** pattern reflecting the reporting and recording of vital signs, AVPU, HGT and blood pressure was difficult to establish. Some abnormal readings were recorded but not reported, while some normal readings were reported.

4.3.1.3.3. Treatment

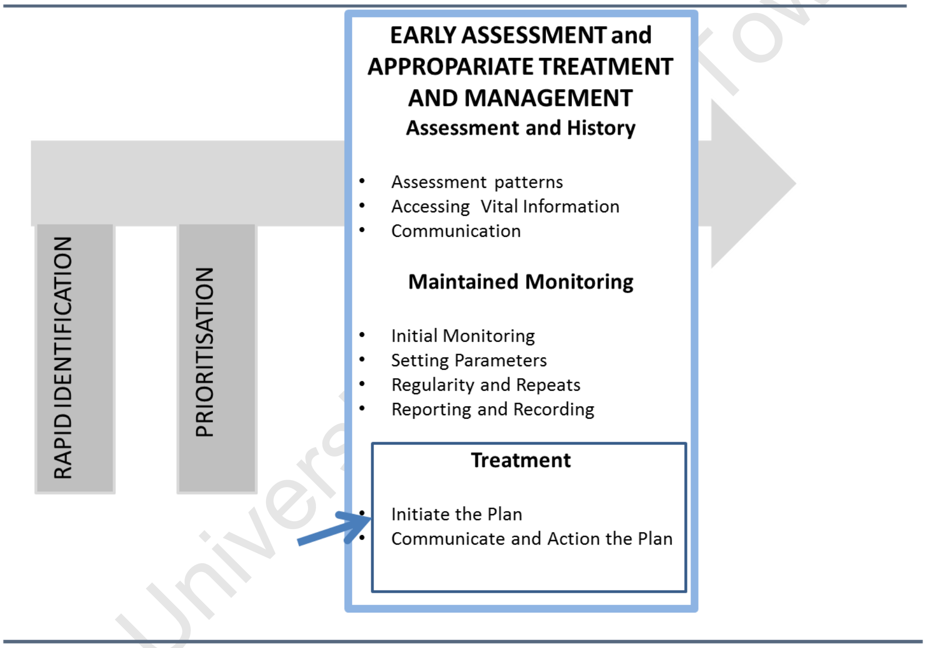


Figure 4.20: Treatment within the theme of activities related to patient care

In the observed pathways, treatment was guided by findings from initial monitoring, clinical signs and assessment. These included various medications, oxygen and fluid therapy. This section does not focus on what treatment was administered, but rather how it was administered. Therefore I have chosen to discuss activities related to the administration of fluid and antibiotic therapy. These were selected due to the frequent administration across the pathways and will be discussed under the subheadings of: initiate the plan and communicate and action the plan (Figure 4.20).

Initiate the plan

All medication and fluids were prescribed and initiated by the registrar. In some pathways these decisions were discussed with other registrars and, in two instances, were confirmed by the consultant. In one example, the consultant suggested a specific medication. However, the norm across pathways was that the registrar independently prescribed most medications and fluids. The professional nurse administered the medications and fluids, although registrars were seen to administer emergency fluids.

Communicating and actioning the plan

Data showed two simple but clear patterns determining the rate at which medications or fluids were administered. The rate depended on whether the instruction was verbal or written. Direct verbal requests were always carried out in a time-sensitive manner, while indirect (written) requests delayed administration.

> *The registrar asked the professional nurse to administer antibiotics. The professional nurse verbally acknowledged the instruction. The registrar left the bed space. Three minutes later the professional nurse prepared and administered the antibiotics. Two minutes later, the registrar spoke to the professional nurse from across the room, confirming that the antibiotics had been given. The nurse verbalised agreement. Later in the pathway, a decision was made to add another antibiotic. The registrar went to the professional nurse and communicated his findings on the child. Included in this was the plan for further treatment and the administration of another antibiotic. Eight minutes later the professional nurse administered the medication.*

Summary ❶

This pathway illustrates the value of direct communication on outcomes. It also hints at the value of closed-loop communication where the actioning of the instruction was confirmed. This was not a pattern of practice across the pathways, but was related to individual traits of registrars specifically.

In pathway ❺, the registrar gave the professional nurse two fragmented instructions minutes apart. The first was to administer antibiotics. This was followed shortly by a direct request to give paracetamol. The professional nurse prepared the paracetamol and just as she was about to administer it, the registrar interrupted the process by requesting a change in administration route. The professional nurse agreed on the change and carried out the request. The antibiotic was administered 20 minutes after it was requested, highlighting that direct communication facilitated the rate of administration, despite interruptions or a change in plans.

In pathway ❶, the child required maintenance fluids. Because they were not urgent, they were written up by the registrar on the blue board. The professional nurse noticed the prescription and commenced it immediately. In pathway❷, the professional nurse asked the doctor, who directly requested the start of fluids and specified the rate. This commenced immediately.

However, the absence of direct requests resulted in delayed administration of up to one hour.

> *In pathway ❹, data showed an example of the implications of the lack of verbal communication on the administration of medication (antibiotics). Antibiotics were written up one hour and forty five minutes after the child had been admitted. They were prescribed on the blue board with no verbal reminder or instruction. This was a particularly chaotic night where the patient load fluctuated between three and five children. The registrar was assisted by two student house officers and one professional nurse. On discharging the child, the professional nurse gathered the notes and noticed the prescription of antibiotics. Antibiotics were administered 43 minutes after prescription and almost two and a half hours after the admission of a*

2-year-old child with 10% severe dehydration. *Summary ❹*

Similarly, in pathway ❼, antibiotics were prescribed by the registrar at 14h53.This was not verbally communicated. At 15h51, a professional nurse noticed that they had not been given. At 15h56 and 16h13, the antibiotics were administered.In pathway ❽, the registrar prescribed antibiotics. Although this was verbalised, it was not directed at anyone specific. At the time, a child had passed away and there were three sick children in the room. The child was admitted after 18h00, so a change in shift was about to take place. An hour after the prescription had been written up, and between a fluid resuscitation and X-ray, the professional nurse noticed the prescription and administered the medication.

In pathway ❼, maintenance fluids were prescribed on the blue board by the registrar at 14h53. The baby in the observed pathway had suspected sepsis and had made some weak attempts at breastfeeding. At 16h41 I reminded the professional nurse that fluids had been prescribed. These were commenced immediately. This incident stressed the importance of direct communication with or reminders to team members of the plan of action for any child.

Summary ❼

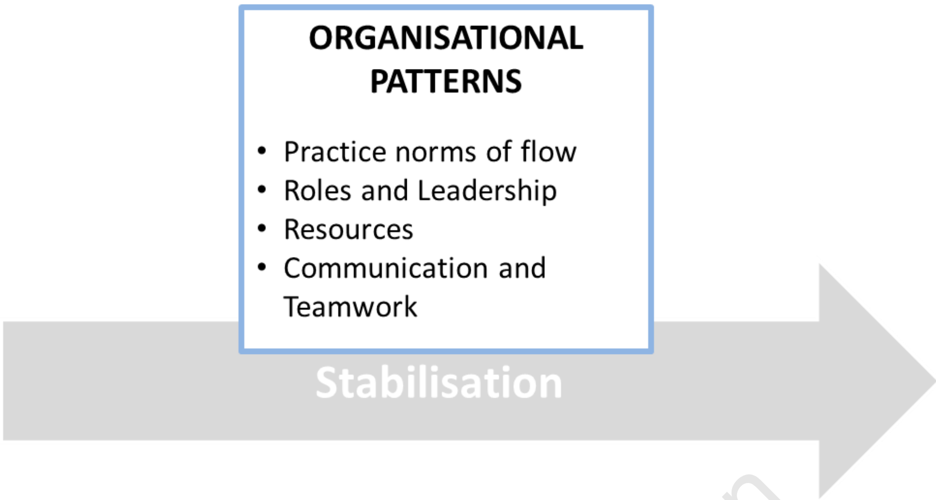
Direct verbal instructions together with closed-loop communication both facilitated the rate of fluid and medication administration, stabilisation and confirmed completed tasks. Written instruction delayed administration and could hinder stabilisation. Written prescriptions of fluid and medication, combined with the verbal request for administration, ensured that the right treatment was given. However, poor documentation of medication and fluids compromised the integrity of the pathway, causing a discrepancy between what was done and what was documented.

4.3.2. Organisational patterns

*"*Organisational patterns*"* is a term I formulated to describe the set of codes which emerged from the data analysis and describe patterns that have been incorporated into the function of the system. They are behaviours and organisational norms that have been incorporated in the structure of the organisation and influence the process of stabilisation. They seemed to determine how children move through the MEU, what providers do with what they have available, and how they work together in this setting.

Data analysis indicated that organisational patterns within the system had an effect on stabilisation of the critically ill child. This was evidenced in the sub-themes of practice norms of flow, roles and leadership, resources, and communication and teamwork (Figure 4.21).

Figure 4.21: Themes of organisational patterns



4.3.2.1. Practice norms of flow

Figure 4.22: Practice norms of flow within the theme of organisational patterns

Practice norms of flow (Figure 4.22) are organisational practices within the system of the MEU that largely determine who gets seen when, where, and by whom. According to the key informants, norms were developed to accommodate internal hospital needs and demands as well as to accommodate external pressures from the broader health care system.

Rigorous analysis yielded codes and patterns that identified recognisable ways of how children were seen through the pillars and what was done. Meticulous observation created an opportunity to examine how flow really worked, in comparison with what was said about how a “typical” pathway happened. Additional demographic data from the resuscitation room, and comparison to triage data (accessed from hospital statistics) showed where and when children were seen relative to the triage codes and assisted clarifying the flow norms.

Key informants communicated that flow was determined by the time of day and the triage code. Observations showed that this pattern of flow through the unit was often very flexible and often not consistent with what was said. Further exploration revealed which children were seen where in relation to the time of day, and assisted in clarifying flow. Adding the length of time children remained in the resuscitation room and how this was related to acuity, brought further clarity of norms of flow.

Tracking where children are seen and when (time of day)

Figure 4.23 illustrates the triage codes during a snapshot period between July 2010 and January 2011. It was interesting to see that the majority of children seen had been coded orange.

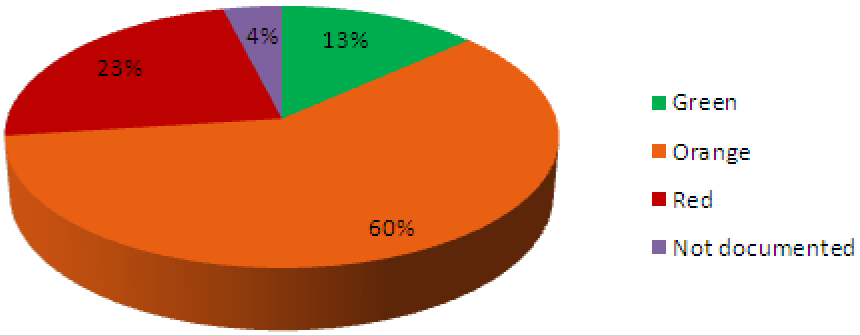


Figure 4.23: Triage codes of children treated in the resuscitation room between July 2010 and January 2011

Figure 4.24 confirms this trend over a 7-month period. Admissions were as follows: triage code green presented as a median of 81 (range 67-117); triage code orange 391(323-428) and triage code red 150 (125-166). The months of August and November indicated an increase in patients; however, the fairly equal distribution over the six months highlighted the consistency in triage codes of admissions to the resuscitation room.

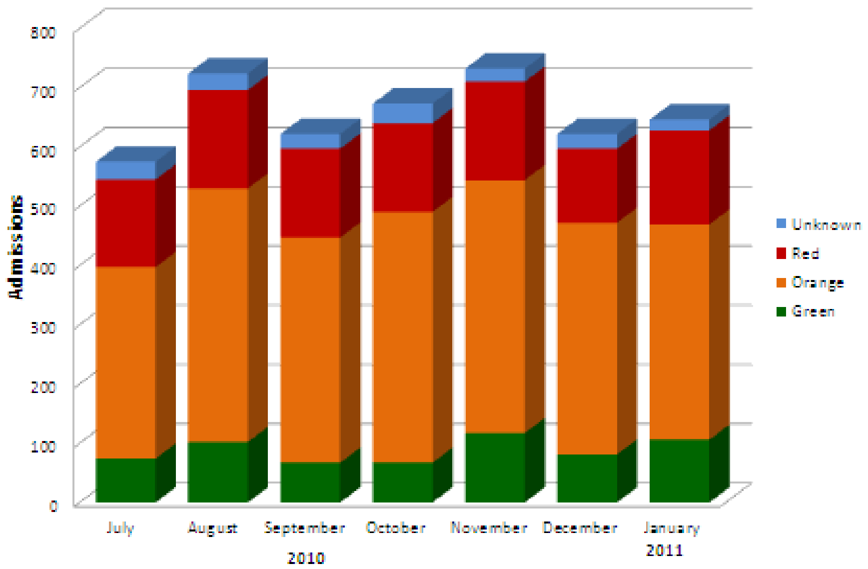


Figure 4.24: Resuscitation room – Number of children seen according to allocated triage codes between July 2010 and January 2011

A clear difference can be seen in the proportion of triage code green, orange and red. It is significant that the majority of children admitted to the resuscitation room were triage code orange, despite the established practice norm that appeared to reserve the room predominantly for children triaged as red.

These findings prompted a further look at the distribution of triage codes over a 24-hour period. To comply with practice norms of flow, it could be assumed that the majority of triage codes orange were seen after 23h00. Figure 4.25 distils the triage demographics over the 24-hour periods. These periods were significant as I became interested in the triage distributions and how they related to staffing allocation. The findings contradicted the assumed practice norms of flow.

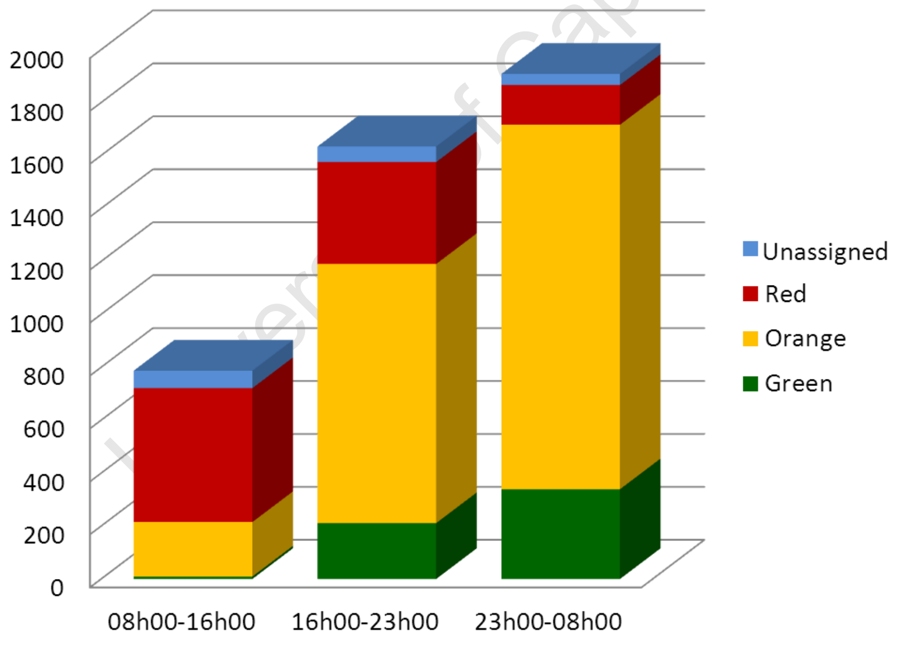


Figure 4.25: Triage demographics in the resuscitation room over a 24-hour period

It was a point of interest to note that there was a discrepancy in data from two sources seen in Figure 4.13 and Figure 4.14 (Hospital Statistics and Resuscitation Room Child Register).The comparison showed two noteworthy differences in the number of triage codes captured in the two areas during the same period. Fewer triage codes red were logged in the triage room compared with the actual number treated in the resuscitation room. Valid reasons were identified to explain the discrepancies. Hospital statistics only captured the actual number of children triaged in the triage room, and so critically ill children who were accompanied by paramedics and bypassed the triage room were missed and were not included in these counts. Furthermore, ethnographic records confirmed that children were sometimes under-scored and allocated triage code orange but were sent through to the resuscitation room for emergency treatment.

Table 4.13: Comparing the number of children triaged as red (triage room) and treated (resuscitation room) (July 2010-January 2011)

Data Source	July	August	September	October	November	December	January
Number of children triaged (red) (Triage room)	79	87	67	101	98	67	101
Number of children treated (red) (Resuscitation room)	148	166	150	150	166	125	159

Table 4.14: Comparing the number of children triaged as orange across two data sources (July 2010-January 2011)

Data Source	July	August	September	October	November	December	January
Number of children triaged (orange) (Triage room)	1066	1179	1136	1158	1120	1062	989
Number of children treated (orange) (Resuscitation room)	323	428	380	423	427	391	363

Length of stay

Data taken from the month with the highest admissions (August) were analysed to identify length of stay (hours) in the resuscitation room by triage code (Figure 4.26).Regardless of triage codes, children remained in the resuscitation room for extended periods of time. Length of stay varied between 1 and 12 hours. The percentage of children who remained in the resuscitation room for longer than 4 hours were: triage code green (43.4%), triage code orange (31.3%) and triage code red (22.4%), which also means that 77.6% of triage code red children were discharged before the 4-hour mark. A fair number of "inserts" into the Child Register did not specify the triage code or time of arrival or time of discharge. These were "calculated" as "unknown".

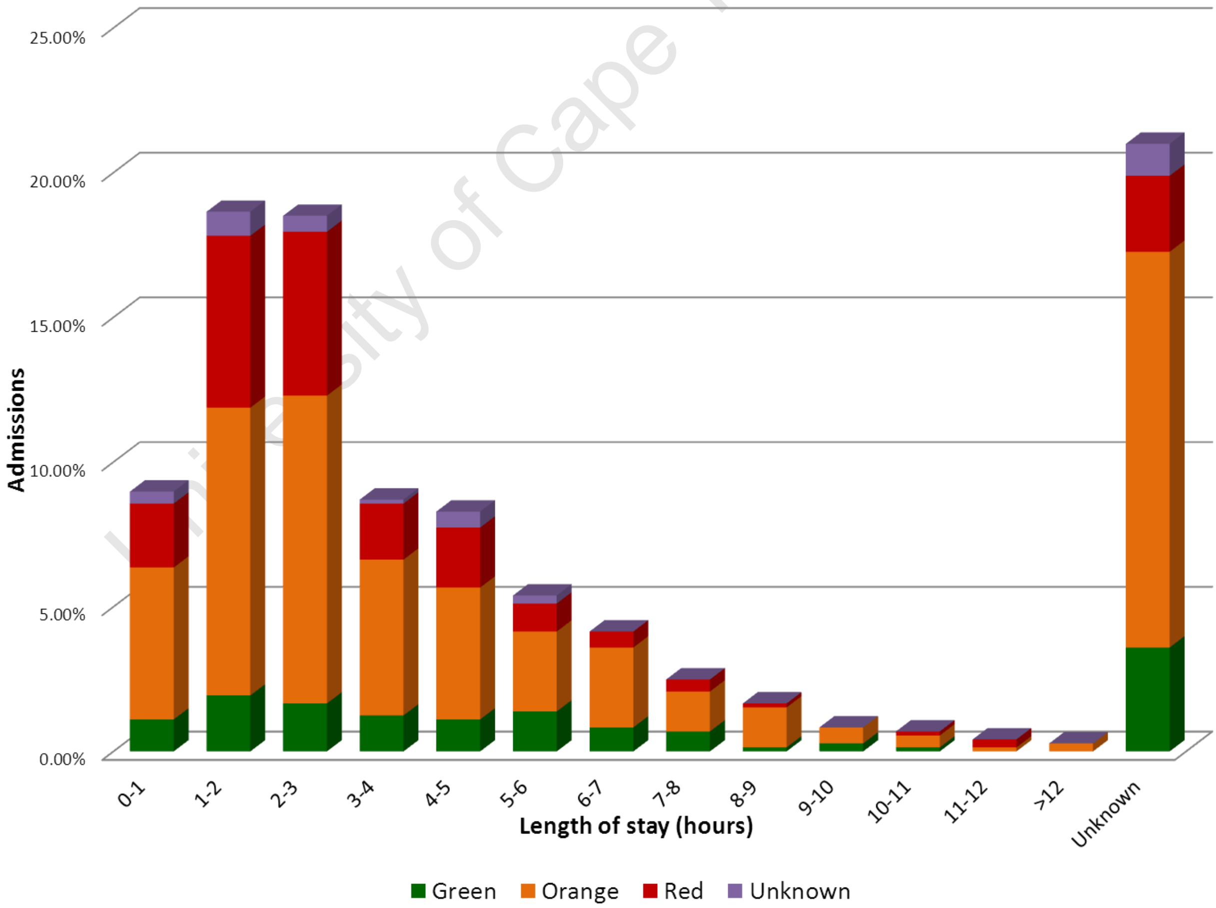


Figure 4.26: Length of stay in the resuscitation room related to triage codes

The Resuscitation Room Child Register statistics evidenced mixed triage demographics in the resuscitation room in time periods, which contradicted the assumed practice norms. It became important to look at the sample of ten pathways and see whether there were any factors that would explain why children coded as orange remained in the resuscitation room for extended periods of time.

Table 4.6 illustrates that 50% of the children seen in the resuscitation room were triaged red, while 20% were orange and 10% were green (the status of the remaining two was unknown. Despite the triage codes, all children except for the one with triage code green received some form of emergency treatment in the resuscitation room. The next section relays the findings on triage connected with activities related to patient care. However, the main point is to bring to light the finding as to why a child triaged as green would be seen in the resuscitation room during the day.

Complex but non-acute conditions

Participant observations from child pathway ❸illustrate the admission of a child with a non-acute but complex neurological condition, who was admitted to the resuscitation room with a triage code green. His symptoms did not match any indicated on the triage sheet. The child was in the resuscitation room for just over 4 hours for extensive assessments and examinations by a number of health care professionals from various sub-specialties in an attempt to clarify the diagnosis and formulate a treatment plan.

Appendix J demonstrates the burden on resources and time allocated to this child, who presented with a complex rather than an acute condition. It illustrates the number and range of staff required in the care of a child triaged as green in the resuscitation room. The horizontal bar refers to various health care workers involved in the care of the child, including: nurses, radiologists, registrars, a consultant and neurologists. The time bar down the centre indicates the period of admission in 10-minute slots. All staff indicated were involved in the care of this one child.

This illustration might have appeared different if other sicker children had required urgent medical care in the resuscitation room. The generous presence of staff around the bed of a non-critically ill child is not usually possible in this setting. However, extensive history taking and examination needed to establish a diagnosis was time-consuming (Appendix I). This illustrates that children who are non-critical (coded as green or orange) and present with complex conditions can demand extensive time and resources from this area. On this particular day the resuscitation room was quiet and so the care of this child did not interfere with others. However, given more admissions to the resuscitation room, the outcome and impact might have been very different.

These findings show that in this unit children are treated in the resuscitation room for both emergencies and complex conditions. However, the practice norms that determine where children should be seen are guided by a triage tool, which is designed to identify acuity and not complexity. This may explain why the resuscitation room is populated at different times of the day with children from varying triage codes. To make further sense of the mixed patient demographics, findings showed that adopted norms further influenced who was seen and when.

Adopted norms

Various norms adopted over a period of time determined which children were seen where and by whom. Data were obtained from observations and clarified and confirmed by the informants. The adopted norms were as follows:

- All inpatient hospital transfers from other medical facilities to the RCWMCH enter via the MEU and the resuscitation room, where they are assessed and stabilised.
- Children from up-country coming for follow-up appointments to the Cardiac Clinic had to be triaged and thereafter assessed by the unit registrar on the day or night of arrival.
- All children with complex, non-acute conditions were triaged and assessed in the unit before transfer to a ward.

- Children transferred to RCWMCH from another hospital for a special investigation, for example CT scan or MRI, were triaged in the weighing room and then kept in the resuscitation room until the investigation was completed.

It seemed that children were seen in the resuscitation room as a consequence of there being no other appropriate arrangement to deal with them and their particular problems. This added to the pressure on the system, with a notable impact on care delivered to the sickest child. To illustrate the impact of adopted norms, I chose to give more context and data from pathway❹.

Table 4.15 gives an indication of the number of children, nurses and doctors in the resuscitation room between 22h00 and 24h30.It illustrates the impact of high flow due to the mixed triage demographics in the resuscitation room.

Table 4.15: Dynamic admissions of children to the resuscitation room at night (pathway ❹)

Time	Nr. Children	Nr. Nurses	Nr. Doctors
22:00			
22:15	3	1	1
22:30	2	1	1
22:45	2	1	1
23:00	1	1	1
23:15	1	1	1
23:30	2	1	3
23:45	3	1	3
00:00	3	1	3
00:15	4	1	4
00:30	5	1	4

The resuscitation room was staffed by two professional nurses and one registrar. The total count of nurse indicates one, as the two professional nurses rotated for tea as well as assisting in the weighing room. The registrar was later joined by two, and then a third senior house officer. The two child admissions between 23h30 and 23h45 were critically ill and demanded high-intensity care. Children arriving after that required assessment prior to a cardiac outpatient appointment the following day.

Pathway ❹was severely dehydrated (10%), with bradycardia. While potassium was required and prescribed, the child left the unit before receiving potassium chloride. In the clinical notes it was documented that severe hypokalaemia only resolved 48 hours later. In this pathway the room became busy and crowded. Each child had an accompanying parent, which meant that at one point there were 15 people in this small four-bedded resuscitation room. Furthermore, a senior house officer new to the area was responsible for a large number of children varying in acuity. A combination of factors can impact on prioritising care for the sickest children.

4.3.2.2. Roles and leadership

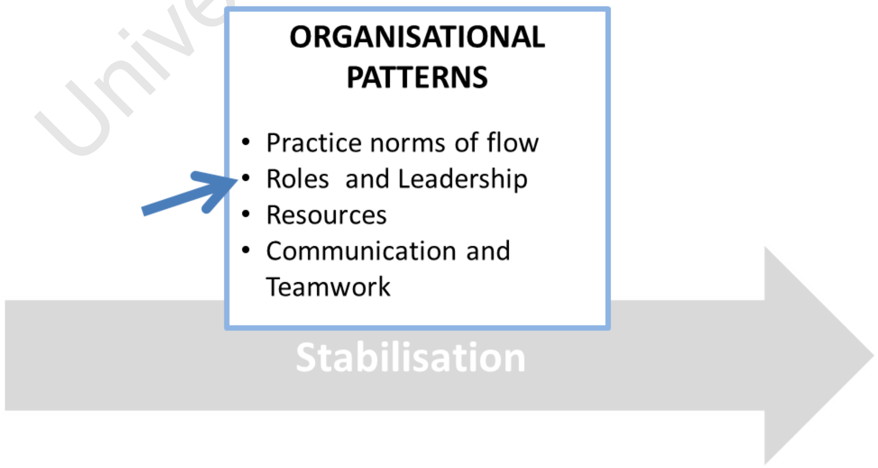


Figure 4.27: Roles and leadership within the theme of organisational patterns

“Roles” relate to what health care workers do and how they do it in order to collaboratively facilitate efficient stabilisation of children through the MEU. This section is subdivided into two categories which focus on perceived roles of health care professionals and leadership (Figure 4.27).

4.3.2.2.1. Perceived role of health care professionals

This section describes the perceived roles of professionals working in the setting and was obtained through direct observations and informal conversations. Various health workers from different specialties contributed to the pathway of the critically ill child in the unit. It seemed that the professional nurse and registrar working in the resuscitation room carried the most continuous and variable responsibility, and so the focus in this section is on their roles.

The professional nurse and the registrar worked together but in different roles to stabilise ill children. The perceived role of the registrar was to plan and initiate steps toward the stabilization of a child as well as facilitate flow through the area. The perceived role of the professional nurse was to support and activate these steps as well as to resource and organise the space. The roles of the consultant and the Nurse Operations Manager will be discussed under the sub-heading of leadership.

The following section gives a description of what data showed as the norm, and they represent what happened most of the time, and not necessarily all of the time. I tried to identify the strongest trends in the roles of professional nurses and registrars. However, data showed that a deviation occurred in different aspects across pathways. These deviations are demonstrated by what happens at the bedside and will be highlighted in activities related to patient care.

Professional nurse

Table 4.16 illustrates and describes various aspects of the observed role of the professional nurse in the resuscitation room. The extent to which these roles were carried out was determined by who was doing it, who was working together, and what was happening in the room. So it is fair to say that not all of these tasks were carried out all of the time. The observed and perceived role of the professional nurse can be divided into four key areas:

- Prepare and ensure the readiness of the resuscitation room
- Initiate monitoring and routine checks
- Support clinical management and treatment by activating steps towards stabilisation
- Other roles

Table 4.16: Observed roles of professional nurses in the resuscitation room

Role	Observed activities	Details
Prepared and ensured the readiness of the resuscitation room	Stocked resuscitation room and ensure that all equipment was serviced and in working order. Checked and stocked the resuscitation trolley and ensured the proper functioning of the defibrillator. Checked oxygen points and suction apparatus at each bed space. Prepared disposables for various procedures. Replaced or filled antiseptic hand spray.	
Initiated monitoring and routine checks	Attached a child to the cardiac monitor on arrival to RR Re-connected a child on return from a procedure or diagnostic test e.g. CT Scan or X-ray. Carried out and wrote results from initial and ongoing monitoring (level of consciousness, vital signs and blood pressure monitoring). Repeated checks spontaneously or on request from the Registrar. Did routine checks such as HGT and urine sampling (mostly routine but sometimes requested by the registrar)	
Supported clinical management and treatment	• Actioned clinical and other instructions (mainly through verbal requests or written instruction) • Assisted doctors with procedures. • Prepare children for procedure and assisted other health professionals with procedures.	**Actioned clinical and other instructions** Steps to clinical care were mainly planned by the registrar. Activation required the registrar to communicate specific instructions to the professional nurse (verbal request or a written instruction). These included: administering medication; fluids; feeds; starting oxygen; calling for laboratory results; arranging X-rays and CT Scans; arranging space in a ward etc. The rate of activation was directly related to how the message was communicated. Verbal instructions was carried out more rapidly while written instruction delayed activation. **Assisted the doctors with procedures** Professional nurses were available to assist with procedures (inserting intravenous catheters, drawing blood and intermittent urinary catheters etc.) Availability was determined by the busyness of the room. Professional nurses mostly assisted with the initial emergency therapy which often included fluid resuscitation or oxygen therapy followed by drawing bloods. **Prepared and accompanied a child for a procedure** The Professional Nurse prepared a child for a procedure outside of the resuscitation room such as CT Scans, MRI or X-rays (Initiated by the registrar). Professional nurse prepared the documentation; detached the child from the cardiac monitor; organised infusions, fluids and medication according to the child`s needs. The acuity of the child and procedure determined whether the Registrar or Professional Nurse would accompany the child. If the procedure e.g X-rays was done in the Resuscitation Room, the Professional Nurse would assist the radiographer.
Other roles	• Admitted a child to the resuscitation room and transferred a child out. • Handover (new admission; transfer out; nursing handover between shifts). • Supported the parent and the child • Answered telephone calls • Tended to queries • Nursing duties: ensured nutrition (where possible); managed pain; maintained skin and mucosal integrity. • Usually arranged place in follow-up ward • Documentation (observations; nursing process) • Attended selected meetings	

Registrar

The registrar had multiple roles which consisted of the following key activities:

- Assessed and planned steps for initial stabilisation and ongoing care
- Co-ordinated care
- Documentation
- Communicated progress of all children to peers and senior leadership
- Co-ordinated ward placements for transfer out to high-care unit or PICU.
- Assessed and planned steps for initial stabilisation and on-going care

The registrar used information from the rapid assessment to see whether emergency intervention was required immediately. If so, the intervention was followed by a further assessment to gauge whether the intervention was successful in achieving an initial level of stabilisation. Once a measure of control had been achieved, the registrar could get a history and do a physical assessment to define the diagnosis and plan future management. This formed the foundation of what to do next and influenced further diagnostic tests and treatment. The registrar had to collect blood specimens and obtain vascular access after which specific instructions were given to the professional nurse to start intravenous fluids or administer medications. Initial decisions were most often made by the registrar; however, it was observed that decisions were confirmed in discussions with other registrars and/or the specialist paediatrician. However, ongoing treatment plans were discussed and confirmed with fellow registrars and the specialist paediatrician on ward rounds. In summary, the registrar took on the role of planning stabilisation and also made the decision on how these plans would be implemented.

Co-ordinated care

Furthermore, the registrar co-ordinated all the processes affecting a child and was responsible for: arranging laboratory testing; organising diagnostic tests or investigations; calling on specialists from other departments where needed; following up on results; co-ordinating with other facilities for transfers to the RCWMCH. At this point it must be said that sometimes the professional nurse would assist with these tasks. This seemed dependent on who the nurse was and sometimes the registrar asked the professional nurse to assist. It was also the responsibility of the registrar to take outside calls. Many calls came from members of the public or from primary health care facilities to ask for advice or consultation about a sick child. Early on in the research, the national poison line call centre was based in the resuscitation room. This meant that calls would constantly come in from individuals needing urgent advice around poison queries. It was expected that the registrar was expected to take these calls, which led to numerous interruptions in the bedside care of sometimes critically ill children.

Documentation

Registrars documented the patient's clinical notes which included the diagnosis, assessment findings and any relevant information tracking what were found and done to a specific child. Furthermore, the registrars wrote up the medications and fluids on the medication chart which was signed off by the person administering the fluid or medication. Furthermore a record was kept of diagnostic tests, blood gases, chemistry and hematology that were carried out. It was the responsibility of the registrar to follow up on the results and document them in the appropriate places. Written communication and documentation was extremely important and a child could not be transferred out unless this was completed.

Communicated progress of children to peers and senior leadership

Regular informal conversations between registrars were noted around the bedside. These appeared to have an accountability value where registrars would briefly check with one another to ensure correct decisions were made. Although the registrars were intentional about starting and finishing a specific child (where possible), these conversations were useful in ensuring that all the registrars in the room were aware of what was happening to each child. The professional nurse was not once seen to be included in these conversations. Furthermore, the specialist peadiatrician would visit the resuscitation room to monitor the progress of the children as well as guide clinical decision making. Most often, short handovers would take place during these visits where the registrars would briefly communicate details of each child as well as voice concerns. The consultant would offer advice and very often make suggestions to facilitate stabilisation.

Lastly, a registrar handover was observed daily at 16h00. Registrars from other areas would gather in the resuscitation room together with the specialist paediatrician. The main purpose of this was to prepare for the evening and inform the registrars on call of children`s conditions.

Co-ordinated ward placements for transfer to high-care or PICU

While the professional nurses mostly arranged ward space in the short-stay wards, the registrars took the responsibility of organising high-care, PICU and ward placements. This would include a call to communicate the details of the child to the receiving ward. Once a space had been confirmed, the registrar would hand this over to the professional nurse who would prepare the child for transfer out.

4.3.2.2.2. Leadership

Leadership in the resuscitation room was observed to operate at two levels. Firstly, the bedside clinical process was led by the registrar and supported by the professional nurse. Secondly, the nursing OM and senior consultant provided a broader leadership oversight to this area. The senior consultant took responsibility for the clinical management and medical staff, while the OM organised nurse staff placements and managed operational aspects of the unit.

The nurse OM

The OM was responsible for the oversight of the both the weighing room and resuscitation room. Due to some changes that took place in the MEU, a decision was made to rotate this position every three months. Prior to the commencement of the research, the unit had worked closely with the short-stay wards. Up until that point nursing and medical staff were shared across the two areas and were overseen by one OM. A decision was made to separate the two areas to work independently. Thus, an OM had not yet been assigned to the unit. The majority of the candidates were senior professional nurses working in the area; however, one professional nurse was newly qualified. Observations showed that these OMs were clinically well experienced. Although they were involved in clinical care, a lot of time was spent doing administrative tasks which robbed the area of a much-needed resource.

The OM entered the resuscitation room regularly and one OM in particular was interested in knowing what was happening to the children. She also had a great awareness of who was coming in and out and communicated regularly between the doctors and nurses. However, it still seemed up to the registrars to facilitate the flow and make the discharge decisions.

The OM took responsibility for sorting out queries, overseeing stock and equipment and keeping records of ward statistics. However this expression of this role varied with the individuals and was not related to position.

Senior consultant (specialist paediatrician)

The senior consultant was responsible of ensuring quality of care and checking on appropriateness of care. Furthermore, he was responsible for managing the unit team and ensuring that the clinical standards were appropriate. The senior consultant was considered as the team leader and supported the registrars in clinical decision making and, at times, facilitated the flow of children through the resuscitation room. He assisted registrars with specific treatment plans and pointed to diagnostic tests, medications and the inclusion of team members from other specialties. It was also evident that he would often converse with the acting nurse OM as well as talk to the parents. On some occasions I noted bedside teaching. In one pathway, the resuscitation room was busy with five admissions. The consultant entered and attempted to assist the registrar in identifying children that could move out. In another pathway, the consultant arrived timeously to resuscitate a baby. At the time there was one other registrar in the room who was kept busy by the child under observation.

The senior consultant seemed responsible for managing the system of the MEU, collaborating with other consultants from other wards and representing the unit at hospital management meetings. He worked very closely with the senior consultant from the outpatient department, who often made herself available for clinical assistance and planning. Both of these consultants were responsible for registrar management and work scheduling.

From the observations it was noted that the consultant looked in at various times in the day and always attended the late afternoon ward round. Besides this, he was available telephonically and responded to calls from the registrars for emergency or clinical inquiries. However, I did not notice the consultant's presence at night.

4.3.2.3. Resources

Figure 4.28: Resources within the theme of organisational patterns

Organisational patterns are a set of behaviours and norms that are incorporated into the function of the system. Contributing to the functionality of the system was the availability of resources to aid stabilisation (Figure 4.28). These included equipment, supplies, support services and staffing. Both have been elaborated in previous sections. Table 4.4 demonstrates the availability of equipment, supplies and support services used to stabilise childrenand Table 4.3 refers to the available staff in the unit. No noteworthy challenges related to equipment shortage or support services were noted during observations or on informal interviews.However, a shortage of nurses in the triage room was noted during tea and lunch breaks and when a nurse was called out of the triage room to assist a medical officer in the procedure room. This resulted in only one nurse triaging the children. Furthermore, it was interesting that, when I compared staffing across three time periods with triage demographic data from the resuscitation room, I found that in the last period of the day (23h00-08h00) there were the most children, varying in acuity, and overseen by the most junior member of the medical team.

4.3.2.4. Communication and teamwork

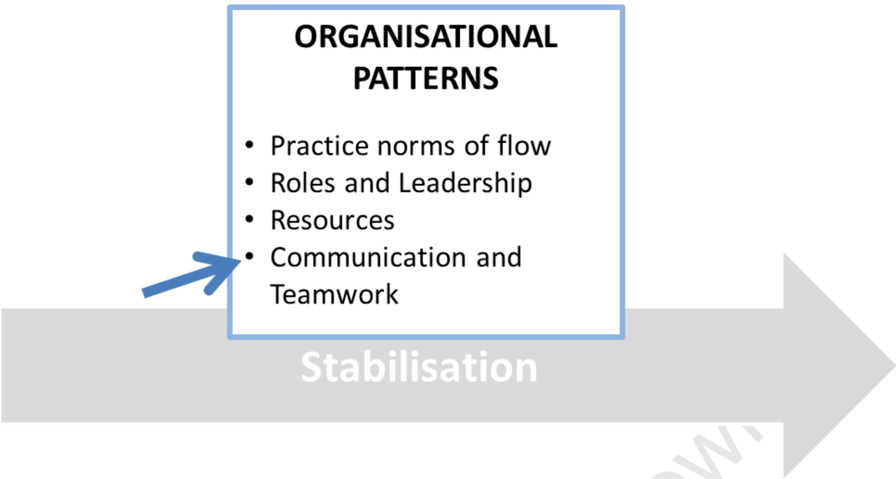


Figure 4.29: Communication and teamwork within the theme of organisational patterns

Communication and Teamwork were sub-themes in organizational patterns (Figure 4:29).In this setting the team comprised a core group of more permanent staff with others rotating through the system to provide emergency care for critically ill children. The core permanent group per shift consisted of: five nurses (one nurse OM; two professional nurses; one auxiliary nurse; one enrolled nurse assistant), one consultant; two medical officers; two administrative staff, and one housekeeping staff member. Rotating members of this team were registrars and senior house officers allocated to working on 3-month rosters. Furthermore, teams were assembled depending on the condition of a particular child. The registrar or consultant assembled the specialists or groups from intensive care, cardiology, and neurology specialists. Dynamic teams would often work together for short periods of time with specific stabilisation goals. Communication and teamwork were categories in both major themes, indicating their broad effect on stabilisation. In this section there will be a specific focus on communication and teamwork as a set of behaviours that contribute to the functionality of this system: three monthly registrar rotations; direct versus indirect communication; team communication about general matters; and communication around child-specific stabilisation.

4.3.2.4.1. Three-monthly registrar rotations

New registrars rotated through the area every three months. The Registrars role was to direct care for all the children in the resuscitation room, regardless of paediatric emergency experience. In all pathways, professional nurses were seen to assist the registrar. Professional nurses said that they found it a challenge to adapt to a new set of colleagues every three months.

> *"….it's difficult. Most of the new doctors don`t want guidance. Some listen, but others don't want to be told. It is difficult because we know what to do."☺PN 17.10.2011*

> *" …the processes are more led by the doctors. There are some doctors that don't like it when you make suggestions. It is difficult in a situation when you know what to do but can't intervene because the doctor won`t listen to you (take advice). Some of them have attitudes. It's a challenge when you know what to do and can't intervene." ☺PN 17.10.2011*

> *"I feel frustrated because I don't always feel like I can do what I need to do, Firstly, because there are not always guidelines that would support what I do, but also the processes are more led by the doctors."   ☺PN 17.10.2011*

Furthermore, professional nurses expressed frustration when they felt that their experience in the setting was unheeded. No guidelines or practice standards existed to support their actions.

"Many of the doctors are nice and we can work easily with them but it takes time to get used to how they work. They are all different. Some are quiet and others easily tell us what to do. It`s difficult sometimes. We have to get used to them."☺PN 17.10.2011

4.3.2.4.2. Direct versus indirect communication

In all ten pathways communication was the means of mobilising plans of stabilisation into action. Planning and discussion mostly took place between registrars and the consultant. Registrars would initiate the immediate clinical intervention such as inserting an intravenous line to commence fluids or oxygen administration. However, they relied on the professional nurses for assistance. Because professional nurses were not involved in the planning, activating steps towards stabilisation seemed to rely on direct communication with the professional nurse.

Observed data showed that direct versus indirect (written) communication influenced the time in clinical activities were implemented. Table 4.17shows examples from the observed data which specifically highlight time delays related to these two forms of communication.

Table 4.17: Direct versus indirect communication

Direct verbal communication

Instruction		**Action**	
13h15	DR asks the PN to administer 85ml of Ringers Lactate. PN agrees ❻	13h17	PN commences the Ringers Lactate ❻
19h06	DR asks PN to administer a 25ml bolus of Ringers Lactate ❽	19h07	PN connects and administers the Ringers Lactate ❽
14H25	DR asks PN to commence nasal prong(NPO2) oxygen ❼	14h26	PN starts the child on NPO2 ❼
21h50	DR asks PN to test the HGT ❷	21h50	PN tests the HGT

Indirect Written Communication

Instruction		Action	
23h34	DR writes up Ampicillin on the medication chart, but does not communicate this verbally ❹	24h28	PN notices the prescription on the medication chart and administers the Ampicillin❹
14h53	DR writes notes and prescribes antibiotics on the medication chart. This is not verbalised ❼	15h51 15h56	PN reads medication chart and sees that antibiotics not given. Asks the other PN if medication given. PN Administers Ceftriaxone
13h37	One DR tells another DR that he is writing up Lasix and prescribes it on the medication chart. This is not communicated to any nurse ❿	13h58	The PN checks the medication chart and sees that Lasix is prescribed and administers it immediately❿[1]

4.3.2.4.3. Team communication: General matters

Despite the regular rotation of registrars in the unit, no place existed where the professional nurses could meet with the new intake of registrars to discuss preferred ways of communication or even expectations of the existing team.

> *"It is difficult (three monthly rotations) because we don't have an opportunity to tell the doctors what we like and expect… There is sometimes confusion…."* ☺*PN 17.10.2011*

A monthly morbidity and mortality meeting was mostly attended by medical staff and the nurse OM, even though all staff were welcome. The nurse OM said that the intention is to have more nurses attend, but that this is often difficult due to work load. I attended this meeting. It was a doctor-led forum to discuss problems experienced in the area as well as the presentation of case studies related to critical incidents.

> *"…it is mainly the OM that goes to that, but what is discussed there does not filter down to the nurses, so they don't really have a handle on what is going on and what*

people are talking about". ©PN 17.10.2011

Interestingly, this respondent may not even know that morbidity and mortality is discussed there…she even seems uncertain about "what they talk about".

> *"We (weighing room nurses) don't attend meetings. We will only hear from the higher level who attends the M&M. We don't get direct feedback. They say that we will be able to go to meetings but it hasn't happened yet. Sometimes we would like to be informed on what is what." ©TN 10.10.2012*

This also indicates the hierarchy and perceived importance of the 'highers'. Yet all are expected to help with same work.

4.3.2.4.4. Team communication: Child-specific stabilisation

Professional nurses' opinions were rarely sought in the care and treatment of children in the resuscitation room. There was evidence of frustration at not being heard when offering care suggestions, especially to new registrars. Stabilisation plans were based on the decision of the registrar who sometimes consulted with the senior consultant. However it was noted in pathway ❾ that the acting OM was approached by a junior registrar to clarify a treatment protocol.

> *"DR returns to the bed. She begins a conversation with PN1 about phenobarbitone. She says that the child received two doses of lorazepam and two doses of phenobarbitone. DR1 said that she thought that this was incorrect. PN1 explains that this is in fact the protocol that the unit uses. DR1 says that there is a protocol on the wall which indicates a different regime. PN1 says that what DR1 has seen was a*

study. PN1 confidently explains what the protocol is and that the child received the correct dose".

Professional nurses were given instructions/requests to perform tasks with no indication of the reason, context or plan. The reason could not always be observed but seemed dependent on individuals-– some communication was more inclusive or more enquiring. Incomplete information was observed to delay tasks because information was not directly communicated, but written down (Table 4.16).

No interdisciplinary handovers were observed in all the time spent in the unit. Handovers between doctors would take place independently from handovers between nurses. Similarly, care plans or common goals for stabilization were not discussed across the disciplines. This may mean that doctors had a full perspective of the goal of care and the professional nurses had only parts of these plans.

4.4. Summary

In summary, data analysis yielded two predominant findings namely: activities related to patient care and organisational patterns. Activities related to patient care were organised in the four pillars of stabilisation. Within each pillar activities were identified that could speed up or slow down stabilisation. In rapid identification it seemed that the presence of a security guard, paramedic escort and work sharing assisted in saving time to triage a child. Allocating triage codes was sometimes a challenge, but it helped to have colleagues assisting to sort out discrepancies. Prioritisation was assisted when children were referred from other medical institutions, as this gave some baseline information and usually meant that initial treatment had been administered. Furthermore, it was essential to have someone lead the process of what to do next and it seemed as though the way in which plans were communicated impacted on how quickly steps were taken. Early assessment was vital, although the way in which history and assessment were conducted varied and delays occurred; although they often resulted from what was happening in the room. Gathering vital information was essential in tracking the child’s condition and response to treatment using physiological markers. Interesting patterns were noted in how these were monitored, reported and recorded. Lastly, a person was required to initiate treatment and guide the stabilisation process. It was confirmed that how this was communicated to the team determined how quickly it happened.

Organisational patterns highlighted aspects of the culture and norms of the unit. A norm of flow of patients through the system seemed challenging for various reasons and led to a high patient load in an area that was set aside for the treatment of critically ill children. Furthermore, roles and leadership showed a specific hierarchy in the area. Roles were mostly well understood, although some role confusions were identified that influenced clinical aspects of stabilisation. Resources in this area were predominantly abundant. However, staffing shortages, especially in the triage room and the resuscitation room (at night), were seen to challenge aspects of stabilisation. Lastly, communication and teamwork highlighted the strengths and weaknesses of how the team currently works together and communicates.

The following chapter will lead a discussion about the research findings and methodology used.

Chapter 5: Discussion

The most predictable aspect of any paediatric emergency unit, the one in this study and every other in the world, is probably its complexity. The ebb and flow of people – the sick and those that bring them, and the conditions that bring them there, are all unpredictable. The people that work in these settings accept and possibly love this unpredictability. While some may not, it seems that the way these people work and organise their practice may be how they manage this unpredictability. This study has been about how the people–nurses, doctors, other therapists, clerks and housekeepers, matrons and managers –work and work together to stabilise critically ill children by managing this unpredictability

This study sought to identify and describe factors that facilitate and hinder stabilisation of the critically ill child in the MEU at the RCWMCH. Ethnography called for rich qualitative data and complementary quantitative data and contributed to a broad understanding of how things work in this setting. The researcher's three-year engagement with this varied and often changing group of health professionals and support teams has yielded an in-depth emic view and understanding of day-to-day practices, and organisational and cultural norms which make this system work. Central to this understanding and description was that complex organisational patterns determine and guide the activities related to patient care and are fundamental to how a child moves from the rapid identification, initial prioritising, thorough assessment, critical monitoring and treatment, to the four pillars of stabilisation.

This final chapter draws together the study by considering two key aspects– the methodological choice and what the description has produced – by answering two key questions:

1. How have the methodological processes of ethnography enabled a conceptually adequate description of what influences how critically ill children are stabilised in this setting?

2. What insights gained from this study contribute to a broader understanding of the social processes in the emergency unit and how children are stabilised there?

The first question is about the process of the research, the methods, data gathering and analysis, and how the quality of these can be judged to assess the methodology used. The second is about the findings, their usefulness and how they relate to the current literature.

5.1 How have the methodological processes of ethnography enabled a conceptually adequate description of what influences how critically ill children are stabilised in this setting?

Ethnography was used because a research methodology was required that would allow the multiple layers of this complex care setting to be better understood and thus to assist in understanding how a critically ill child was stabilised in this setting. This broad research question required an approach that would offer a description beyond the measurement of single clinical outcomes and linear causal relationships. A methodological design that described social processes was necessary to carefully capture, describe and conceptualise the different layers and complexities that affect the care of the critically ill child. Ethnographers have explored cultures and traditions and have also used qualitative methods to increase the understanding of patterns of behaviour. This was helpful in this study.

As analysis progressed it also became evident that demographic data were needed to add to the description of practices of care. As described, analysis of this aspect of the study was statistical. Stenius, Mäkelä, Miovsky and Gabrhelik (2008) suggested that it is imperative that in both qualitative and quantitative research the description is conceptually sound and demonstrates a well-organised analysis. Interestingly, these authors point out that there are fundamental similarities in the processes of classification, deduction and interpretation in both qualitative and quantitative research. While steps in quantitative analysis are recognisable and well defined, those in qualitative operations are much less so. Two distinct differences are that in qualitative studies, data gathering and analysis often occur concurrently and the data are not limited to a well-defined and circumscribed data set as they are in quantitative studies. The processes of constant comparative analysis as well as a full description of what data were included in the qualitative data sets and ethnographic records compiled around child pathways are fully described in Chapter 3.

The challenges of constant comparative analysis in this study were expected as the researcher collected the data and was also the primary data analyst. It meant that some level of interpretation could not be avoided as the next observations and interviews occurred. As the researcher also serves as the “instrument” of the study, quantitative researchers may raise the concern that researcher bias can affect the results. An early Finnish paper by Sulkunen in 1987 (quoted by Stenius et al., 2008) offers the perspective that “the [qualitative] researcher's preconception of a social phenomenon does not determine the research results to the same extent as in quantitative research”. In a quantitative study, the variables are usually pre-determined and data are subjected to these particular measures and criteria. In this study data could only be subjected to comparative statistics and yielded numeric values for: monthly admissions to the resuscitation room; triage codes of children seen in the resuscitation room; distribution of triage codes over 24 hours; location transferred to from the resuscitation room; and triage codes by length of stay.

So while variability in gathering observational and interview data was to be expected, tracking variability added to the rigour. Keeping a research log assisted in tracking any redirecting called for by what data emerged. Research decisions about the direction were also included in process notes. This was a great help as the larger picture of this complex system was being pieced together.

The aspects of the methodology that remain for this chapter are the quality and appropriateness of the methodology to answer the research question. Stenius et al. (2008, p. 85) observed:

"There are some differences between the evaluation of qualitative and quantitative research.

The replicability of a qualitative study cannot be formulated as a problem of reliability, and the accuracy of a qualitative interpretation cannot be compared to the explanatory power of a statistical model"

These authors propose three criteria that may be useful to assess the quality of qualitative data:(i) significance of the data set and its social or cultural place; (ii) sufficiency of the data, and coverage of the analysis; (iii) transparency and repeatability of the analysis. While the full description of the research design and analysis is in Chapter 3 of this report, these criteria will guide the discussion of quality linked to appropriateness.

5.1.1. Significance of the data set and its social or cultural place

Underpinned by the MDG expectation to lower the currently still high infant and under-five mortality and motivated by an inherent commitment to provide the best care possible for children attending the RCWMCH, a number of studies were underway. A large "pathways to care" of critically ill or injured children seen at the hospital was being planned and numerous smaller studies were being proposed or underway. Questions included: time from medication prescription to administration in the MEU; use and validity of triage tools, and mothers' reports of the journey to hospital. There were numerous collaborations, existing and planned, between medical and nursing departments, with the University of Cape Town, with the Department of Health and emergency services, and with international collaborators.

The publication in 2009, by Kissoon et al. from the World Federation of Pediatric Intensive and Critical Care Society, which reinforced that critical care extends beyond intensive care, formed the basis of the large proposed 'pathways' study. As described before, this created an opportunity to look carefully at the emergency room setting as a key part of the critical care pathway. The ultimate intention was to understand how critical care was delivered at the hospital, and this study offers a part of this understanding.

In the RCWMCH, critical care "happened" in the medical emergency and trauma units, the high-care wards in medical, surgical and specialist wards, and in the intensive care unit. The

MEU was the first place of contact between the “outside” world and the hospital and care delivered in this component impacted significantly on morbidity and mortality (Rivers et al.,2002). Large numbers of children with various conditions and varying acuities were seen here and no child was ever turned away. The care providers were from a variety of departments and sub-specialties – some were permanently there and others rotated through the unit. The researcher is a nurse and was working in the practice development unit, where the core themes are participation and inclusion, a commitment to finding appropriate evidence in local settings, and nursing and health care provision as relational practices. Considering the nature of practice in an emergency unit as a social process made complete sense.

This may not be explicit in studies which traditionally explore practice in an emergency setting where quality, safety and outcomes are usually analysed through a more defined lens. In this setting, studies had already provided some insights related to the clinical management of critically ill children (Rossouw et al., 2011). These provided valuable data on the management of children with septic shock. In the emergency care unit regular root cause analyses were done after the monthly morbidity and mortality meetings. These have resulted in revised policies and adapted clinical interventions to address isolated problems. But as Porter and Ryan (1996) explains, the positivist paradigm focuses on causal relationships and while this may be useful to identify a particular aspect of care or treatment, in settings like these, it fails to explain how the system works to facilitate care of the critically ill child.

The perspective of practice as a social process, explored by a nurse from within an interpretative paradigm, contributed to a broader understanding of the practice. Studies confirm that identified problems can be better understood within the context of the whole system (Nugus et al., 2011).

The researcher as nurse influenced the study in a number of ways. Her perspective directed thinking about who was in the system, what they did and how they worked together.

Inclusion of the security guards, clerks and housekeeping personnel can be attributed to a nursing perspective. This perspective also allowed for the understanding that how things work is influenced by an inherent culture and traditional norms and practices (Hodgson, 2000). As this was an *a priori* study in this context, a practice audit was conducted to explore ways of looking at this complex practice setting. It was also in this setting that the researcher could build and explore relationships with medical personnel on the team. Her role as researcher contributed to her engaging medical clinicians while she could position herself as both nurse and researcher in the rest of the unit.

This intentional inclusion was justified by Stenius et al.'s (2008) assertion that in a qualitative study the "criterion for selecting the target group is not demographic but cultural representatively". In the present study the researcher chose to explore the practice and social process and then to interrogate these social processes to understand what hindered and facilitated stabilisation of a child in the setting.

5.1.2. Sufficiency of the data, and coverage of the analysis

In quantitative studies the extent of data required can be statistically calculated as power. There are, however, no similar methods in qualitative studies and so the concept of "saturation" is used. This is described as the point at which no new insights are evident from the data and data collection can stop. Strauss and Corbin (1998) asserted that data collection can be terminated when further data no longer reveal new aspects or understanding. This is not a predictable point in a qualitative study and can be difficult to determine, especially with the "includer" stance that this nurse/researcher took. It was difficult to consider ending data gathering or analysis when there could possibly be another perspective or instance that had not quite been described or understood.

Events and processes in the MEU are complex and ever changing. Children present with a range of medical problems: some conditions are acute even critical, while others are complex, yet non-acute conditions. Seasonal disease patterns help to anticipate and plan the service to some degree, but on a day-to-day basis it was difficult to know who would arrive when and how sick they would be. This context increased the challenge of what data were gathered to understand the factors influencing stabilisation.

The question of who and what to look at for data was guided by an ethnographic goal, which is not to explain the variation but to make sure that the data are sufficiently varied (Stenius et al., 2008). So taking a look at practices and what people did in the unit was another consideration. How things were done was reliant on norms, cultures and traditions, some of which were entrenched and unconscious. Other practices were responsive and changing to address immediate needs in the unit. Norms determined who would be seen where, when, how and by whom, while complex cultures and traditions determined how things worked, and especially how people worked together in teams in this environment. The teams were made up of different people, often from different sites, with different roles and often different work and communication cultures, which resulted in different ways of doing things. Even though collaborating together around a child was focused on stabilisation, outcomes were influenced by how people worked together, how they spoke to one another, what they believed to be true about one another, and how they included or excluded one another from the process.

To add to this, care at the bedside was further affected by how sick the child was, who was in the room, how many children were in the room, how sick the other children were and whether or not something else more urgent was happening in the next bed. So in this setting, stabilisation seemed reliant on the balance and interplay of numerous factors.

The choice of focusing data collection on what happened around a particular child was very useful as it allowed a variety of practices and processes to be observed and described in the immediate context of stabilisation. It also enabled the data to describe and better understand the cultures of practice, a core of the ethnography, which centres around describing and understanding a culture (Spradley, 1980). Rather than studying people, ethnography is focused on learning from people and the insights that are gained are intended to enhance understanding rather than to control (Hodgson, 2000).

5.1.3 Transparency and repeatability of the analysis

The study design and analysis have been described in Chapter 3.At this point some additional aspects of the researcher's reasoning are clarified to add to transparency and to enable the reader to better follow the research reasoning and interpretations.

Articulating data sets as ethnographic records around one particular child assisted in formulating a clearer picture of a whole process of activities described as pillars of the process of stabilisation. It enabled the data to be understood as they relate to the aim of stabilisation and also to see how people communicated with one another about the situation or process. It added elements of triangulation of data collection and analysis as the researcher could clarify observations and practices.

Articulating the steps of the analysis and the theoretical reasoning as facilitated by the Glaser process was very helpful in tracking the sequence of theoretical development. It also helped in being able to track the steps of analysis that resulted in initially describing the process of stabilisation and then the complex influencing factors that helped and hindered stabilisation.

Ethnography enabled the story to be told through the lens of a child pathway and findings were confirmed by those who walked alongside. Participant observations were useful to capture a detailed account of minute-to-minute events around a child pathway from entry to exit (Murchison, 2010; Fetterman, 2009). The researcher had the benefit of describing and making visible regular patterns of clinical practice that were often not visible to practitioners. While this was what the methodology intended and a goal of the research, it was not easy to be the one to place some practices in the spotlight. The commitment to data interpretation through a cultural lens meant that practices were more easily recognised as not quite correct, but it also meant that the researcher found herself thinking and saying: "It's the way we do it and it's too busy there to do it any other way." At other times there was less empathy for what the data revealed and it was at these times that member checks, peer and supervisor interaction could assist with the data analysis.

Regular patterns of clinical practice, communication and cultural aspects were apparent and some unpredictable factors were highlighted through the data collection and analysis. It was on these occasions that the advantage of "ethnography seeking to explain both explicit aspects of a culture (what all members are aware of and take for granted), and tacit elements (outside of awareness)" (Hodgson, 2000).

A further benefit of ethnography was that data collection and data anlysis happened simultaneously (Hammersley, 1989). Questions emerged from data collection and analysis which prompted further investigation into aspects that were unclear. One aspect investigated was the collection of statistical data. Ethnography in its commitment to gathering rich descriptive data invited incorporating a range of methods and approaches (Savage, 2006).Furthermore, ethnography enabled gathering the links between what happened on a day-to- day basis around a child linked with wider cultural and system factors (Savage, 2006). This was an invaluable methodological characteristic that set ethnography apart from other methodologies. The way in which ethnography makes links between the micro and the macro aspects, between everyday action or interaction and wider cultural formations through its emphasis on context (Fetterman, 2009) made it the most appropriate methodology for this study.

In summary, ethnography was the best methodology to answer the research question. Participant observation and extended time in the area assisted in developing a way of looking in order to recognise the relevant activities and conversations that happened around the child pathway and affected how a child is stabilised. Observations highlighted aspects of tradition and culture that were further explored by informal conversation, field notes and statistical data. Probing helped identify and describe unanticipated outcomes of culture and norms of practice, which were often obscured by how things actually happened.

5.2 What insights gained from this study contribute to a broader understanding of the social processes in the emergency unit and how children are stabilised there?

Activities related to patient care and *organisational patterns* were the two predominant themes affecting stabilisation. *Activities related to patient care* directly influenced how quickly aspects of stabilisation were set in motion (directing flow, paramedic escort, work sharing, assigning codes, confirming codes, outside referrals, initial emergency treatment, initiating the plan);how important information necessary for stabilisation was accessed (monitoring devices, assessment patterns, accessing vital information, initial monitoring, setting parameters, regularity and repeats, reporting and recording) and, lastly, how important information to mobilise stabilisation was shared (communication through all pillars). What happened along these four pillars seemed directly related to *organisational patterns.* Practice norms of flow determined how children moved through the system, while resources related to who and what was available, roles and leadership reflected who was doing what, while communication and teamwork influenced how people worked together.

These findings and the practices that they have attempted to describe confirm a complex system. Rather than discuss the relevance of each of the themes, the researcher has selected to discuss the findings using a complex systems approach. Frush (2006) suggests that it is the complexity of the system rather than negligence or incompetence of people in the system that increases inefficiencies and, by implication, the potential for harm.

Despite findings being structured along seemingly linear pillars, within the component of emergency care (which is further structured along a linear critical care continuum) factors affecting stabilisation resulted from non-linear interactions. These were similar to those mentioned by (Nugus et al., 2011, p. 2002) and include "interpersonal relationships, negotiations between individuals, interactivity between individual actions and policy, and the continual negotiation of practice that occurs within a shifting milieu of changings structural influences, such as professional training and organizational targets".Strauss et al.

(1985) further confirm that care does not always follow linear, predictable rules, but rather that rules are adapted and changed by varying circumstances.

Early in the study report, the IHI principles related to optimal outcomes were mentioned (right child, being in the right place, with right provider, and the right information, at the right time). These principles seemed to provide a reasonable set of guidelines by which to compare and evaluate descriptive findings. However, time in the research setting quickly revealed that these measures were probably too simplistic due to the complexity of how things worked in the MEU. It would be difficult to define who the "right child" was for this setting: some children had obvious medical emergencies, while others presented with a range of acute, complex (but non-acute) conditions; and still others had neither acute nor complex conditions, but were seen here as there was nowhere else for them to be seen in the system.

The "right place" of treatment was further complicated by the range of children seen, and even though practice norms predict flow, case-by-case management often superseded the triage code in selecting the right place. The "right provider" depended on who was placed where, and to do what job. In this context trained staff were allocated to different areas at different times of the day. This was reasonable, but how well the unit functioned and who was there was affected by various factors such as fluctuating patient loads, absenteeism, and lunch and tea breaks. The "right information" varied. Ways of gathering information differed because of who was doing it, how they were doing it, who was providing it, and what was happening in the room. Lastly, the "right time" was difficult to determine, despite time being a key factor in most children's outcomes. But how quickly or slowly important aspects of clinical care were carried out depended on who was making a plan and how it was communicated, and on what else was happening that could interrupt care. The IHI provides a useful structure to think about these aspects but also highlights the complexity and interdependence of factors that impact on stabilisation.

Initial thoughts about factors mentioned in response to the IHI principles may lead to the assumption that care in this unit is disorganised or lacks standardisation. However, important study findings emphasised that the medical unit is not a mechanical structure but rather a complex human system that is responsive to a myriad factors involved in emergency care and complicated by people working together. Differences or deviations from what may have been expected as the norm were not necessarily due to a lack of standardised practice (although sometimes they were), but more often due to the complex system.

In his attempt to make sense of a complex setting, Sidney Dekker in his book *Drift to Failure* challenges the current thinking around accident causation and safety in systems. He strongly challenges traditional linear ways in which systems are evaluated. In a review, Rob Robson from the Healthcare System Safety and Accountability acknowledges Dekkker`s contribution and remarks "how seemingly reasonable actions at local level may proliferate in unseen ways until finally some apparent system failure occurs" (Dekker, 2011, kindle loc.79).To make sense of complex systems, he uses an approach he calls "up and out" (2011, p.130). The usual mechanistic approach to understanding what affects stabilisation would be by highlighting strengths and flaws in the system. In Dekker's words (2011,p.130), to "shake the organisation around, to find out what`s loose in there, what`s rattling," then to "find the loose parts, close the box, hand it back". However, this was not the intended outcome of the study. Dekker (2011) suggests that a better way is to lift the study out of a fixed position with its broken parts. The study's intention was to sketch the current situation and consider the possibilities of what could affect stabilisation.

System thinking is about: "relationship, not parts… complexity of the whole, not the simplicity of the carved-out bits… non-linearity and dynamics and not about linear-effect-cause sequences" (Dekker, 2011, p.33). So to make different sense of this complex system of the MEU, study findings are presented as relationships, not parts, and will be described under the following headings: the environmental influences; the organisational structure of the unit; and linear (simple) versus non-linear (complex) interactions.

5.2.1 The environmental influence

The MEU at the RCWMCH is not an isolated structure, but forms part of, and interacts with, a wider system, which in turn was placed in a particular environment. These include primary and secondary healthcare facilities and emergency services and the rest of the hospital (including the PICU). All of these components were placed in the environment of Cape Town, which predicted to some extent the child presenting to the hospital, and the nature of common childhood illnesses and climate-related seasonal disease patterns in this environment. Changes in one component were likely to affect and influence other parts (Sharp & Priesmeyer, 1995). An increase in sick children seen in the unit (due to seasonal diseases) was likely to increase demand for short-stay beds. Consequently, a full short-stay ward, high-care unit or PICU determined whether or not children could be moved out of the MEU, further impacting on demand versus capacity (American College of Emergency Physicians, 2006; Pines, 2007). It was not an anomaly for the four-bedded resuscitation room to have more than four children in it, or to see large numbers of children either waiting to be triaged or waiting to be seen by the medical officers. Patient influx or crowding was influenced by factors in other components and the environment. Although crowding is often associated with emergency, it is a system-wide challenge: crowding in one area of the hospital has an effect on the entire system (Derlet & Richards, 2000; White et al., 2012). Furthermore, numerous factors have proven adverse links with crowding: mortality (Chalfin et al.,2007; Fatovich, 2005; Gilligan et al., 2008; Richardson, 2006; Sprivulis, DaSilva, Jacobs, Frazer, & Jelinek, 2006); prolonged admission (Derlet et al.,2001; Cowan & Trzeciak, 2005); delays in treatment (Pines & McCarthy, 2011; Joint Commission International Centre for Patient Safety, 2006); and risk of nosocomial infections (Jo et al., 2012).

The MEU's position in the hospital environment also seemed to increase the frequency of interruptions. Its position in the corridor adjoining one of the main entrances of the hospital to the OPD meant that many unrelated people seemed to "just pop in" or "quickly ask something”. The effects of interruptions have shown contradictory outcomes, however. Reason (2000) believes that they are not intentionally built into the systems and cannot realistically be eliminated. McGillis Hall et al. (2010) agree that they should be understood and managed within the context of the system.

5.2.2 The organisational structure of the MEU

The unit was adequately staffed in comparison with other emergency departments in countries with limited human resources (Robison, Ahmad, Nosek, Durand et al., 2012; Molyneux, 2006). It is reported that in many of these settings, emergency areas are run by untrained or unsupervised staff (Baker, 2009; Molyneux, 2006; Baker, 2009; Clark, 2012). It is not suprising that Biai et al.,(2007) have shown a link between training and inpatient mortality. However, all staff in the MEU were trained in triage (ETAT) and some in specialist emergency and critical care. Significant differences in the management of critically ill children have been associated with the level of training and specialisation, especially of doctors (Tolhurst, McMillan, McInerney, & Bernasconi, 1999; Isaacman, Kaminer, Veligeti, Jones, Davis et al.,2001; Dharmar et al., 2008.)

Stabilisation required children to progress through different areas in the MEU. Staff were allocated to different areas at different times of the day while teams from other specialties were called for specific cases. Trained in ETAT, auxiliary and enrolled auxiliary nurses performed triage. Stabilisation was taken further as registrars (and senior house officers at night) and professional nurses took over the responsibility, while the consultant and the nursing operational manager provided leadership and clinical support. In this organisational structure, role definition was evidenced in regular patterns of who was doing what, rather than being defined by explicit outlines. Traditionally, doctors assumed responsibility for patient management and led stabilisation, while nurses performed a supportive and complementary role. This is recognised in other contexts (Nugus, Greenfield, Travaglia, Westwood & Braithwaite, 2010). Little obvious role conflict was seen as cultural practice norms and examples by peers seemed to predict nurses’ role. Registrars and senior house officers were introduced to their roles on entering a rotation through the unit which therefore constituted to a relatively stable and predictable social order.

Social order includes structural influences on relationships between professionals (Martin,Currie & Fin, 2009). Handy (1999) suggests that roles are linked with behaviour, or expected behaviour, in positions within organisations and involve interactions and relationships, and so to think that roles are associated with a list of what to do is unrealistic. Further complicating these issues are the multiple layers of interactions and relationships that would be required when considering the wide circle of contributors, especially in emergency care. Hughes (1971) further asserted that a role cannot clearly be known or defined by what is handed down. For this reason roles may be confused in an environment such as the MEU, where roles are culturally based and demonstrated through example.

Hughes (1971) suggests that roles can only be successfully built up and constructed by ongoing communication between colleagues who understand the division of labour. Constructing roles requires the "points of view of all kinds of people involved in it, whether their position be high or low, whether they are at the centre or near the periphery of the system" (Hughes, 1971, p. 310). In this unit there was little seen or spoken about how roles were perceived or understood within the context of the team. Senior and emergency-trained professional nurses expressed frustration at not being included in clinical decision making or being entrusted with initiating emergency treatment. Even though they considered themselves capable, these were not traditionally part of their practice and there were no clinical guidelines that could substantiate and support their actions. Nugus et al. (2010) found that doctors tend to constrain the input from colleagues in different roles, as they are "socialised, in tertiary education and at work, though legal, organisational and cultural structures, to see themselves as key-decision makers about patient care" (2010, p.908).

There seemed to be few policies and standards that could guide clinical practice for both nurses and doctors working in the area. This is not an unusual finding when compared with other emergency settings (Baker et al., 2013; Baker, 2009b; Nolan et al., 2001). Matlow and

Bohnen (2009) propose that standardisation of care reduces harm and improves quality of care. They advocate that standardisation results in reducing variations in care to a standard and uniform set of practice guidelines (evidence-based protocols) to specifically guide practice. Currently, this is available in part to a selected group in the unit.

Why and how allocation happened seemed deeply embedded in the cultural norms of the unit. It was interesting to discover a 1972 publication in which Leary, a medical consultant in this setting, described similar patterns. At the time, the ward was also led by a senior consultant while registrars and a senior house officer worked similar patterns as currently followed (Leary,1972).The American Academy of Pediatrics (2001) advocates and recognises the essential benefits for patient care of senior oversight, and so having a consultant and nurse operational manager were advantageous. The consultant provided senior oversight of the unit. Nurses were led by the operational manager, while the registrars, medical officers and senior house officers were managed by the consultant. Registrars or senior house officers were positioned to lead all activities in the resuscitation room, while the consultant provided clinical oversight and assistance until 17h00. Robison et al. (2012) found that senior-level clinical support directly contributed to reducing patient mortality in an emergency setting. In the MEU senior support was available on site for two-thirds of a 24-hour period, with the most junior member of the medical team on shift at night.

Patterns of communication that happened around the child pathways and related to patient care became increasingly predictable from the observations and seemed linked with role definition. Nurses spoke to nurses, doctors spoke to doctors and, mostly, doctors asked nurses. In this unit, communication norms between nurses and doctors was not clearly defined and so seemed reliant on the individual. Nurses were not expected to be, or were seldom included in clinical decision making and ward rounds. Undefined communication norms hampered clinical care as direct communication was seen to have a measurable difference from indirect (written) communication in how quickly treatment was administered.

5.2.3. Processes and patterns of interaction: linear (simple) versus non-linear (complex) interactions

The next section will discuss how certain processes (simple and complex interactions) happened along the pathway of the critically ill child to produce both familiar and expected and unplanned, unexpected or non-visible outcomes that affected stabilisation of the critically ill child. Dekker (2011, p. 12) believes that in complex systems, decisions are made under “uncertainty, ambiguity and time pressure”.

5.2.3.1 Linear interactions

Linear interactions amongst components are familiar and result in visible and understandable outcomes (Dekker, 2011, p.127). Components refer to different parts and role players in a complex system, and in this study, referred to every aspect included in the study setting (and beyond) that could affect how stabilisation happened.

The themes of *activities related to patient care* and *organisational patterns* yielded a bank of linear interactions that produced visible, understandable and favourable outcomes for critically ill children. They became a normal part of the picture and were sometimes difficult to identify. However, they provided a strong backdrop from which to identify non-linear interactions. Linear interactions were visible to some extent in all pathways.

These resulted from the interplay between various components that resulted in part (or in full) in seamless, rapid identification of illness; prioritisation; early assessment and appropriate treatment. In this system, however imperfect, numerous critically ill and other children were safely stabilised through the various pillars of stabilisation by a team of committed individuals, who used what they had to do their best for the children. Some of the most obvious interactions that can be described as linear, and their effects on how stabilisation happened, were seen at the interface between: a triage nurse and a child (presenting symptoms allowed for accurate triage); triage nurse and professional nurse (clear but quick handover); professional nurse and registrar/senior house officer (working together, using clear two-way verbal communication to facilitate stabilisation); registrar and mother (gathering important information); registrar and support services (accessing and processing diagnostic tests and results);consultant and registrar (providing clinical assistance and support); nurse operations manager and registrar/senior house officer/consultant (discussing which children are ready to move out); registrar and transfer wards (communication about bed space); registrar and primary or secondary facilities (telephonic discussions related to children transferred to ward). However, this study highlighted that although linear interactions were frequent and produced planned and recognisable outcomes, the complexity of the culture, the environment and multiple layers of interactions sometimes yielded outcomes that were unplanned and possibly unexpected.

5.2.3.2 Non-linear interactions

"Interactive complexity" refers to components that are non-linear, unfamiliar, unexpected or unplanned, and either not visible or not comprehendible to people running the system (Dekker, 2011, p.127). Therefore complex interactions between components can produce outcomes that are not necessarily visible to those working in the area, or necessarily immediately understood (Dekker, 2011).

There are many examples in Chapter 4 that indicate complex interactions that produce unfamiliar, unplanned or non-visible outcomes. The interesting observation is that most of these examples were not due to negligence or incompetence but reflected the complexity of the system. Decisions were made in some points of care that seemed to be the right decision for that moment; however, the later effects were not seen or understood. Figures 5.1 and 5.2 illustrate two of many examples that can be extracted from the findings. Figure 5.1 shows what happens when a child's code (as captured for statistical purposes) does not reflect (a) the child`s condition, or (b) the resources required. Even though the child received the necessary care, recurrent episodes could have led to unexplained crowding and a drain on limited resources.

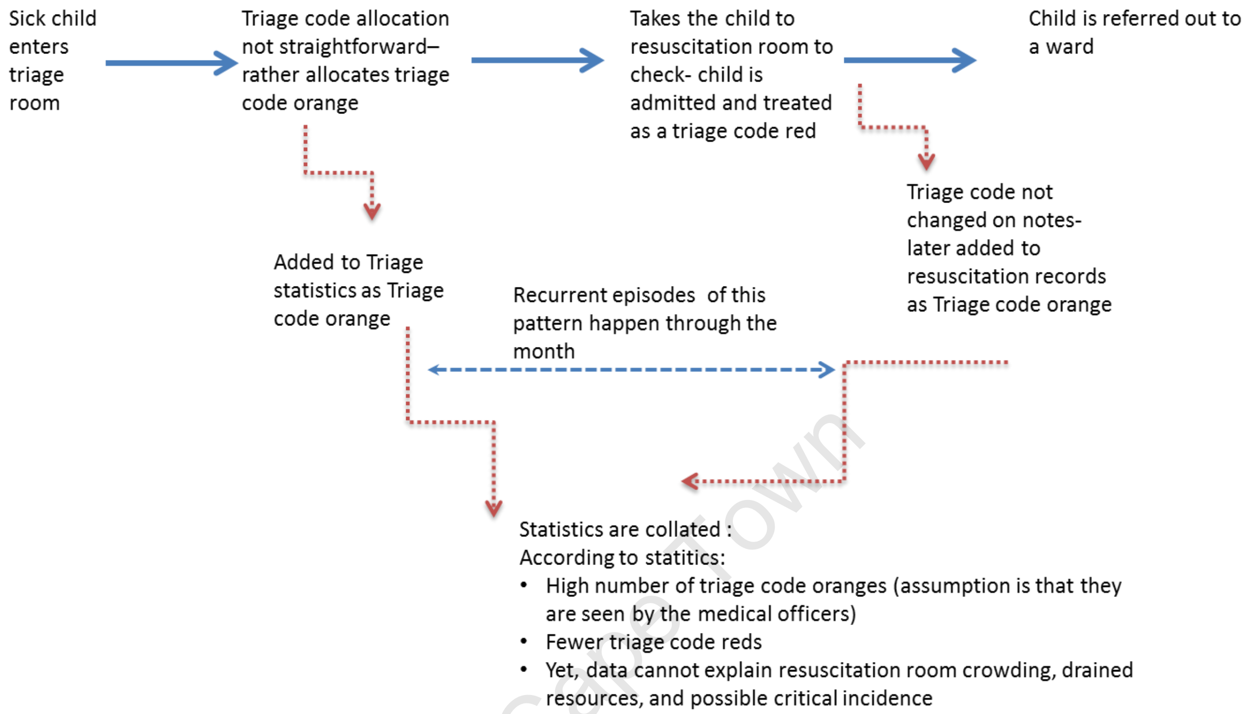


Figure 5.1: The effects of non-linear interactions on the perceived patient load versus reality

Figure 5.2 simply illustrates the effect of non-direct communication between staff members. This may be as a result of the absence of communication norms in the setting rather than unco-operative team members, but it has a direct effect on stabilisation

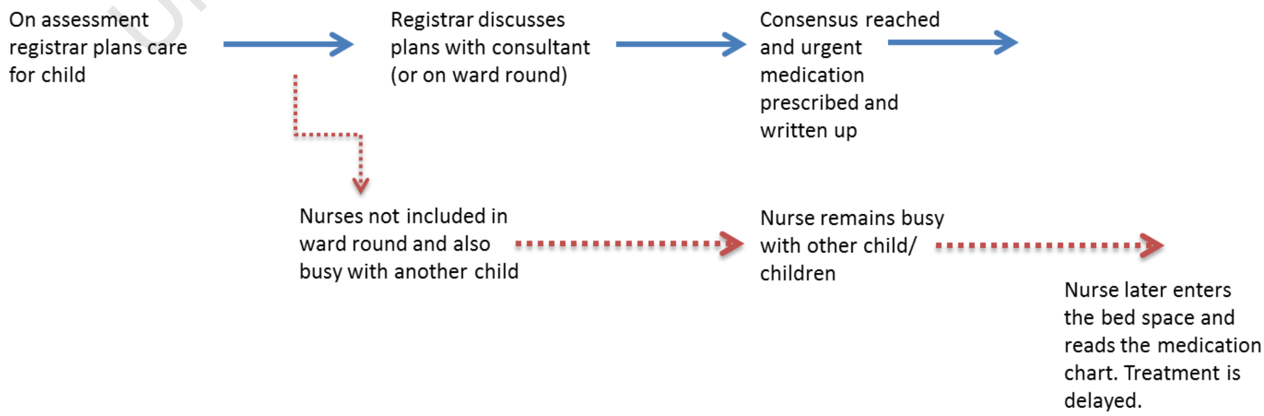


Figure 5.2: The effects of non-linear interactions on treatment

Further discussion focuses on a novel outcome from the study, which illustrates the effect of non-linear interactions on practice norms of flow. In essence, it expands on Figure 5.1 and will specifically address practice norms of flow and all the complexities involved that affect how a child moves through the system and further compares the findings to current literature. It starts with the initial interaction between two components, namely the triage nurse and a child.

Practice norms of flow

Half of the children who die in hospital do so in the first 24 hours after admission (Molyneux, 2001), and Argent (2009) firmly believes that the way in which emergency care is organised has a dramatic impact on outcomes. The most important priority, however, is that the system organises admissions so that the neediest are seen first, but all are cared for efficiently (Molyneux, 2010).

In this unit, the system is organised so that children with different triage codes are seen in different areas before 23h00. The resuscitation room is a space dedicated to the sickest child (triage code red) and is mentioned as a priority in an emergency department by Molyneux (2010). The practice norms of flow of children after triage are mentioned in a recent publication from the hospital by Buys et al. (2013, p. 162) and confirm study findings relating to the typical pathway. Children are triaged using the ETAT tool, designed to identify acuity using clinical signs and priority feature to grade the care needs of all children presenting to the unit (Buys et al., 2012).

Statistical analysis of data from the Resuscitation Room Child Register and comparison with hospital triage statistics helped to clarify the practice norms of flow. It was initially interesting to note these two sources of demographic data (hospital statistics recording the number and triage codes of children to the MEU triage room and statistics from the Resuscitation Room Child Register) showed significant discrepancies, which questioned how we determined whether the right child was in the right place. The comparison showed two noteworthy differences in the number of triage codes captured in the two areas across the same months. Fewer triage code reds were logged in the triage room compared with the actual number treated in the resuscitation room. Furthermore, approximately one third of those triaged as orange were treated in the resuscitation room. The distribution of triage codes over 24 hours from the Resuscitation Room Child Register showed a mixed triage demographic to the resuscitation room before 23h00, therefore contradicting the practice norm of flow. Both of these findings were significant and raised questions about the place where stabilisation happens.

Practice norms of flow identified by observation and confirmed by comparing two data sources (Resuscitation Room Child Register and hospital admission statistics) implied a dissonance between the assumed practice norm of flow and what was actually happening. Evidence from the Resuscitation Room Child Register showed 60% of children treated in the resuscitation room were triage coded as orange, while 13% were green. Interestingly, the number of triage green and oranges in the resuscitation room before 23h00 (220 and 1185 respectively) were not significantly different from those seen after 23h00 (339 and 1377).In addition, non-red triaged children boarded in the resuscitation room for up to eleven hours, far exceeding the recommended six hours (Henneman et al, 2010; Gordon et al., 2001; Henry, 2001). Often children remained in this area waiting for ward beds to become available, or else they were waiting for the completion and results of tests. These findings are similar to those by Cowan and Trzeciak (2005). Although crowding and bottlenecks were not measured in this study, explicit examples were seen in the pathways where the number and acuity of patients exceeded the capacity of space and staffing during both day and night shifts. The effects of demand versus capacity are identified by numerous authors (Gordon et al., 2001; Bernstein & Asplin, 2006; Bernstein, Aronsky, Duseja, Epstein., et al 2009).The effects of crowding have been well documented and are associated with poorer outcomes of care, including delays in important treatment, higher complication rates (including nosocomial infections), and higher mortality and nosocomial infection rates (Pines, 2007; Pines et al, 2010;Trzeciak, 2003; Pines & McCarty, 2011; Jo et al, 2012).

Molyneux et al. (2006) believe that it is essential to evaluate how patients move through the department to avoid causing bottlenecks in the system. Evaluation of why so many triage green and orange children are treated in the resuscitation room during the day showed the following: triage code allocation was sometimes challenging; allocating a triage code to a child presenting with a non-acute complex condition was difficult; and adapted norms of practice resulted in a variety of case scenarios too "broad" for the existing triage system in the resuscitation room.

All child pathways followed, except one, received some form of emergency treatment in the resuscitation room despite the allocated triage code. Although the sample size of observation data was small, demographic data confirmed the findings. This may suggest that allocating triage codes are not always simple and that children in this context may be under-triaged. Under triage is simply an allocation of a lower category to an ill child (Twomey et al., 2013). In most settings this may be deemed as "under-safe" (Twomey et al., 2013), but in this context, in spite of the triage code, most children seemed to receive the care they needed. It was not measured, but gauging from what happened in the child pathways and comparing it with statistical data, it was likely that children who were under-scored were still taken to the resuscitation room where they received treatment. Triage codes were seldom changed on the data collection system. Arkun et al. (2010) also found that patients were often under-scored when the triage category did not match the acuity and concluded that the triage system was flawed. Various studies have recently been conducted to investigate the current and alternative triage tools.

Buys et al. (2013) strongly advocate the use of the adapted ETAT tool at the RCWMCH emergency unit. It has proved to be effective in this unit, which has similar challenges of high case loads and limited resources of time and staff (especially in the triage area). ETAT uses clinical signs to allocate a triage code (Buys et al., 2013). In the same context, Twomey et al. (2013) have recognised that a combined score of vital signs and clinical discriminators enable a more accurate triage (Day & Oldroyd, 2010; Bradman & Maconochie, 2008). In

South Africa, the South African Triage Score (SATS) has been used extensively in emergency departments across the Western Cape (Twomey & Wallis, 2007; Wallis, 2006; Twomey, Wallis, Thompson, et al., 2012). In 2011, a revised paediatric version of SATS (which includes aspects of ETAT) was being validated. A cohort study was undertaken to validate the scale across six emergency centres in 2011, including the RCWMCH, and was reported as safe and robust with a sensitivity of 91% and a negative predictive value of 95.3% (Twomey et al., 2013). A further interesting finding was that where only clinical signs or only vital signs were used, the under-triage rates were 42.9% and 24.4% respectively. Despite evidence-based outcomes, there are still concerns about its use, especially in unco-operative or very sick children or infants (Day & Oldroyd, 2010).More relevant, especially in the context of the research setting, is the time taken for triage, and it has been argued that this method is too time- consuming. However, study findings indicate that triage allocation should be further investigated at the hospital.

The problem was not whether or not children should receive care associated with their triage code, but rather it related to using a system that recognises the difficulty of allocating triage codes for challenging cases. Otherwise, it may just be that when children are up-coded, it should reflect in the hospital and resuscitation room statistics.

Understanding the complexity of admissions to the unit and resuscitation room shows that deviating from organisational practice norms of flow does not necessarily imply a lack of prioritised care for the sickest child, but rather a reaction to a wider circle of need. The senior consultant to the unit summarised that the scope of care provided extends across primary, secondary and tertiary levels and ranges from initial evaluation and therapy to management of life-threatening illness. Ideally, all children should be referred from other levels of care in the health system. Unfortunately, due to the nature of paediatric illnesses and poor distribution of primary and secondary services, all children are seen in the unit, which places an immense burden on resources allocated for specialist care. Furthermore, a set of adopted norms calls for a range of other, non-emergency patients to be seen here.

The majority of these are required to be seen by a registrar, and they are admitted or "held" in the resuscitation room, sometimes for an extended time. These adopted norms were developed over a period in response to different needs at different times. It seems unlikely that these have not been evaluated or even questioned, nor does it seem as though the impact on the sickest child is taken into account.

Children present to the unit with non-acute but complex conditions and are streamed using a tool developed for identifying acuity. These children seemed difficult to triage as they did not present with the signs that would classify them as requiring urgent care. However, the complexity of their condition caused them to be transferred to the resuscitation room for investigation and usually meant that they were coded as green. This seemed to be an appropriate path of care for further investigation as there was nowhere else for them to be seen in the hospital. Determining the workload is difficult, although an example from the child pathways indicated high-resource requirement. Nugus et al. (2011) confirm that resource consumption for lower triage categories has not been well documented, but they also agree that complexity of a patient's condition can increase work pressure. In this system, a child who is triaged as code green is assumed to deplete the least amount of time and resource. This is primarily because workload and resources are associated with triage codes, which in turn reflect acuity.

Fitzgerald (2010, p. 86) states that "Triage systems are designed to serve the value of human life and health with fairness and the efficient use of resources". They do this by sorting those who need immediate care from those who would not be harmed by waiting. Furthermore, it has become increasingly necessary to address the disparity between the medical needs of patients and available resources.

Hospital management are reliant on statistics provided by the triage room, which give them some indication of workload related to triage codes. It is assumed that triage code green requires the least amount of work and resources in contrast with triage code red. Besides the discrepancies in statistics across these two areas, a further lack of data to inform care was the absence of statistical analysis to indicate diagnosis, length of stay or resource requirements. It is therefore safe to assume that hospital management have an unrealistic impression of patient load (beyond acuity) and resource requirements due to unavailable information and the assumption that practice norms of flow are followed. However, these were unrealistic especially in an emergency setting that provides primary through to tertiary care to children presenting with medical emergencies as well as complex, non- acute conditions.

The effect of simple actions (or their absence) on bigger and mostly unintentional outcomes has been illustrated in this discussion. Many more exist within the system in the MEU, which affect especially the sickest and most vulnerable critically ill children. Even though we sought to identify a clear set of factors which facilitate and hinder stabilisation this may have been an unrealistic expectation. Instead we discovered that in this setting, the care of a child is constantly affected by internal and external factors, relationships, cultures and norms. There is no doubt that each child received the best care possible, however due to the range of admissions and care offered at this emergency unit, it seemed difficult to always prioritise the care of the sickest child. This study did not set out to measure how well critical is delivered, but rather illustrated the multiple factors that affect how it is delivered in this setting.

Chapter 6: Conclusion

This study sought to identify and describe factors that facilitate and hinder stabilisation of the critically ill child in the medical emergency unit at the Red Cross War Memorial Children`s Hospital. The emic nature of ethnography facilitated the collection of useful data that aided an understanding of day-to-day practices and organisational and cultural norms, which impacted on how the system worked. Statistical records contributed to a thick description of data. Central findings of the study were that organisational patterns and activities related to patient care were fundamental to the efficiency of stabilisation through the four pillars.

The following research aims were addressed and achieved:

- Study participants were engaged early and involved in the research process from initial entry, through validation of findings to the completion of the study and delivery of results.
- Participant observation facilitated the description of what happens along the pathway of the critically ill child. Informal interviews, field notes and statistical data added to the description and served the purpose of triangulation of data and brought to light current norms and practices.
- Factors that affect stabilisation were identified and described. However, due to the complex nature of emergency care and the impact of both linear and non-linear interactions on care, it was unrealistic to produce two lists of factors that either facilitate or hinder stabilisation.
- The ethnographic records and additional quantitative data accounted for system-wide patterns from which key themes were extracted.

6.1. Relevance of findings

Hammersley (1998) is of the opinion that even if study findings are true, they may not necessarily be of value, and so whether or not the study adds value is of great importance. The numerous feedback sessions scheduled with staff after completion have resulted in enthusiastic recognition and proposed or intended actions. However, Hammersley (1992) maintains that, relevance that may be important to the researcher may not be important to those involved in the process.

The next section comments on the relevance and contribution of the study, with some recommendations pertaining to children admitted to this area, nurses and other health care professionals, and managers.

6.1.1 Relevance to the care of critically ill children

No study has been found that explored factors that optimise stabilisation of critically ill children in a similar context, or elsewhere, using ethnography. This study is unique in that it explored care delivered from the perspective of a child pathway and highlighted that delivery of care in a complex environment. Care of the sickest child, was not simple and was dependent on a myriad of complex factors. Owing to its descriptive nature, this study did not set out to implement improvement, but it has highlighted factors that could either facilitate or hinder stabilisation in this context.

6.1.2 Relevance and implications for nurses and other health care professionals

The findings in this study provided a comprehensive description of the complexities of practice that affect stabilisation. They helped to identify both the strengths of linear interactions as well as highlight the non-linear interactions that were embedded in the system and were thus less obvious to those working in the area for a long time. The following were most relevant to the nurses and other health care professionals working in the unit:

The Resuscitation Room Child Register identified important data which had not been statistically analysed prior to this study and therefore does not contribute to resourcing decisions. Data included: triage codes of children admitted to the resuscitation room; distribution of triage codes per month; distribution of triage codes over 24 hours; location transferred to from the resuscitation room and triage code by length of stay in the resuscitation room. These data describe the significant burden placed on the care provided at different periods of the day and offer significant evidence for reviewing resourcing to the area.

Furthermore, the data revealed the importance of clear and intentional communication norms and strategies on clinical outcomes. It highlighted the value of direct communication, interdisciplinary ward rounds, and shared communication norms as agreed upon and discussed across disciplines. It also showed hints of differences in the approach to some aspects of clinical management of children between professional nurses and registrars. Data revealed few standardized policies and protocols, and none that were shared by both nursing and medical professionals, thus decreasing the chances of cooperative working protocols and relationships to optimise stabilisation. Currently, shared standards of care for paediatric emergency care are being revised in the Western Cape Province. Implementation of these would require additional and ongoing in-service training and professional development which includes doctors and nurses. While drawing teams out of this high pressured environment will remain a challenge and calls for creative ideas, the proposed Simulation training at the hospital will contribute to training. This would facilitate rapid stabilisation by interdisciplinary team.

Lastly, it identified the difficulty of triage. The unit admitted a range of children and offered a range of services. The data confirmed that allocating triage codes was not always simple; especially challenging was allocating a triage code to a child with a complex condition. Although all children received the treatment they needed, triage codes allocated did not always reflect the acuity or complexity.

Implications of the findings to clinical practice therefore were:

The data suggest that stabilization of the critically ill child could be optimised by:

- Capturing accurate data on the number and triage codes of children seen both in the triage and resuscitation rooms. To date, data was captured only in part and was not fully utilised. These data provide invaluable information on how children move through the system and give an indication of the patient load in both areas.
- Conducting directed focused multidisciplinary rounds where both nurses and doctors contribute to and set clear care action plans. Conducting regular a multidisciplinary orientation and updates with new registrars and nurses to communicate the unit's culture, values and practice norms and expectations are clarified.
- Considering a communal tea room or a regular gathering where members from the multidisciplinary team can meet informally to promote relationship building and team collegiality.
- Ensuring that all Professional Nurses undergo postgraduate training in Paediatric Critical Care Nursing or Emergency Care Nursing. Furthermore, all staff working in the area should be trained in ETAT and SATS.

6.1.3 Relevance and implications for managers

This study tracked staffing in the unit at different times of day, and showed that the care burden of many children with high acuity and complexity of disease were being tended by the fewest and least qualified staff in the MEU. It clarified the patient demographics and highlighted that there are children routinely seen in this area whose conditions are neither acute nor complex. These are often chronically ill children who need assessment and treatment planning but the specific subspecialist area is unclear. There was nowhere else for them to be seen in the system. The study further highlighted the difference between acuity and complexity, and illustrated that less acutely ill children did not by implication, require fewer resources. This does indicate that statistics from the triage room were not well matched with planning needs of staffing and resources. This aspect could certainly assist as a contribution to the proposed new unit being planned.

<u>Implications of the findings for managers</u>

The data identified several areas of practice change that could better facilitate stabilization and outcomes for the critically ill child:

- The current triage tool does not identify complexity, there is therefore a need to assess the triage process and evaluate the efficiency of using a triage tool to determine the care pathway of children who present with both acuity and complexity.. Differentiating between the two may clarify an unexplained burden on the system.
- A better understanding of patient load and resource requirements could be gained by exploring data from both the triage room and the resuscitation room.
- The broad nature of children presenting to the medical emergency unit as a result of norms adopted over an extended period of time should be re-evaluated and may assist in providing other effective avenues of care in the Hospital.
- There is a need to reconsider the position of the resuscitation room in the Hospital as the current position makes this area susceptible to unnecessary interruptions.

6.2. Summary

In summary, factors that could either facilitate or hinder stabilisation of the critically ill child were identified and described. With the help of ethnography, the research study revealed surprising results, which highlighted that care delivery was not simple and that complex interactions produced both expected and unexpected, and unseen, outcomes in care. This study has therefore contributed to a limited body of descriptive knowledge, which was especially useful for those working in the area as it provided a picture and an inquiry into why things happen as they do. Ethnography provided a method that was congruent with the research aim and assisted in identifying how practice and cultural norms affect: what happens at the bedside, how children move through the area; and how people communicate and work together. The insider's perspective gave an overwhelming impression of the pressure under which people work in this area and provided some insights into why this happens. Many of these observed practices would be difficult to explain by those working in the area, or may just be accepted as the norm. It was useful to have the researcher voice, not only to partner those working in the team to identify the complexity, but also to present the current description to decision makers outside of the unit.

The study identified and described factors that impact on stabilisation in one emergency setting at the RCWMCH. The study aims were achieved and the research question was answered. Outcomes were different to what was initially expected, but they highlighted the complex nature of this setting. These descriptive study findings provided a structured way of 'looking' and are a starting point to understanding factors that affect stabilisation.

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List of Appendices

UNIVERSITY OF CAPE TOWN

Health Sciences Faculty
Human Research Ethics Committee
Room E52-24 Groote Schuur Hospital Old Main Building
Observatory 7925
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22 September 2010

HREC REF: 430/2010

Ms C Bonaconsa
c/o A/Prof M Coetzee
Child Nurse Practice Development Initiative
Department of Paediatrics
Red Cross Children's Hospital

Dear Ms Bonaconsa

PROJECT TITLE: WHAT CONTRIBUTES-TO AND DISTRACTS-FROM STABILISING A CRITICALLY ILL CHILD IN THE MEDICAL EMERGENCY UNIT AT THE RED CROSS WAR MEMORIAL CHILDREN'S HOSPITAL? A DESCRIPTIVE ETHNOGRAPHIC STUDY.

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

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

Approval is granted for one year till the 30th September 2011.

Please submit an annual progress report if the research continues beyond the approval period. Please submit a brief summary of findings if you complete the study within the approval period so that we can close our file.

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

Please quote the REC. REF in all your correspondence.

Yours sincerely

PROFESSOR M BLOCKMAN
CHAIRPERSON, HSF HUMAN ETHICS
Federal Wide Assurance Number: FWA00001637.

S Thomas

Appendix A: Approval from Human Research Ethics Committee, University of Cape Town

To whom it may concern,

RE: What optimises stabilisation of a a critically ill child in the medical emergency unit at the Red Cross War Memorial Children`s Hospital?

I am a first year Masters student in Nursing at the University of Cape Town and intend to conduct research to identify and describe factors which contribute to and distract from stabilising the critically ill child in the medical emergency unit at the Red Cross War Memorial Children`s Hospital. I have obtained approval from the UCT Faculty of Health Sciences Human Research Ethics Committee to conduct the proposed study (REC REF number 430/2010).

What is the study about?

Management of the critically ill child in the medical emergency room is complex. We know that best outcomes are dependent on the early assessment of the child`s condition followed by prioritised treatment and appropriate management with the goal of early stabilisation. Even though this seems simple, these factors are strained by the realities of this complex environment. Following the practice audit carried out in 2009, it became apparent that a child could not be observed in isolation, but the complex nature of “other activities” largely affected the care and outcome of the child observed.

The study aims at providing a different understanding of how safety and best outcomes are achieved in stabilising the critically ill child in the medical emergency unit. The purpose of this study is to:

- observe and describe what happens along the pathway of a critically ill child through the medical emergency room in order to understand the current norms and practices
- identify and describe factors which contribute to stabilising a critically ill child
- identify and describe factors which distract from stabilising a critically ill child
- give a description of system-wide patterns and themes as they occur in this setting.

Why have you been approached?

This study we will give a description of "what happens" rather than "what individuals do", using the child pathway as the unit of analysis. A child pathway refers to the route or course the child takes from admission to discharge. This is where you come in. As a member of staff in the emergency unit, I would like to ask whether you would consent to participate in specific child who you may be caring for directly or indirectly. The study will take place over the next two months during selected day and night shifts.

What will be required of you?

At the given time of observation, I will wait at the front door of the medical emergency unit and follow the first child in who appears to be critically ill. The child`s code will be confirmed in the triage room where the child is coded by trained nurses, or may go straight through to the resuscitation room. I will observe and record all activities happening around this particular child from front door through stabilisation to transfer to the ward. This will mean that if you are involved with the care of the child at any point along this pathway, your activities will contribute to all the others that will be recorded. Please note that all the data will be recorded in such a way that your anonymity as well as confidentiality will be maintained. At no point will you be identified as an individual. Data will be safely stored in a locked drawer and will be destroyed on completion of the study.

What will the risks and benefits of this study?

There are no anticipated risks involved in this observational study. In the unlikely event of a traumatic event which could occur as a part of the care process and not as a result of the research, I will refer you or any other affected staff member to ICAS.

In the event that I observe something that may endanger a child's life, I will alert the attending doctor or senior registered nurse. In the unlikely event that an emergency situation arises where there is no other staff member who is available to intervene, I will be compelled to step in and assist until further help is available. I will not become involved with the care of any child unless there is an emergency, as my primary responsibility is that of observation.

I will inform the team of the research process and progress at regular departmental meetings. A full report will be presented to the hospital, at relevant conferences and will be published in the critical care domain

Voluntary participation

You are being invited to participate in this study. Owing to the nature of the study, no remuneration will be offered for participation. You have the right to leave this study at any point without consequences. At no point will you be identified as all staff members will be categorised according to symbols. There will be no record kept of your details. Please note that you are welcome to see the observation notes at any point. This information is transparent and open to you and I would welcome your interest.

Please feel free to contact me or my or my supervisor if you have any questions.

____

Mrs Candice Bonaconsa

Registered Nurse, Masters Student in Nursing

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____

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____

Professor Mark Blockman

Chairperson of the Faculty of Health Sciences Human Research Committee

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I ___________________________ have read the letter requesting consent. I understand what is required of me and have all my questions answered. I do not feel that I am forced to take part in this study and I am doing so of my own free will. I know that I can withdraw at any time if I so wish and that it will not have bad consequences for me.

Signed:

___________________________________ ______________________________

Participant Date and place

Starting time of observation: 13h25

Finishing time of observation: 17h00

Joy, three years and 11 months old, was brought to the hospital by her mother. She was a familiar little face having previously received a pacemaker in the cardiac unit of this hospital. Now Joy was in cardiac failure and after being triaged as red in the triage room she was sent to the resuscitation room: the cardiologists were immediately notified of her condition. As one of three patients in the resuscitation room, Joy was in distress and presented with central cyanosis. NPO2 was started immediately which improved her saturation levels from 70 t to 90%. She had blood samples taken and was then given medication via an intravenous line. Joy also underwent a chest X-ray and an echocardiography investigation and on return to the resuscitation room she was admitted to the short stay ward for further observation.

Joy's mother showed incredible compassion and remarkable sensitivity to her daughter's needs. She moved Joy into positions to promote her comfort and ease her pain throughout this observation. She displayed enormous emotional strength and Joy often looked up into her mother's eyes for the encouragement and strength she knew she would find there. When asked about her strength, Joy's mother said she had previously cried a great deal but had realised that she could not change her daughter's difficult situation and so, in accepting it, she had found strength to cope.

In this pathway two registrars were allocated to the resuscitation room (the second was from the short stay ward). Furthermore, three professional nurses (including the operational manager) and two additional nurses were allocated to the resuscitation room. During this observation one nurse was a post graduate pediatric intensive care unit nurse while the second was a new professional nurse on a rotational placement. The doctor on duty displayed clear leadership ability and careful planning. All his verbal communication was

to

Appendix C: Pencil Sketch from Pathway 10

and then again when he moved on to the next. This definitive communication of intentions enhanced the easy flow of attending to the patients: both staff and patients alike appeared to feel secure with direction from a leader. The nurses took on supportive roles, assisting where they could although not making any of the decisions. They set up the numerous children who came and went. For example they connected up ECG machines and saturation probes, carried out observations, rotated from bed to bed administering medication and took blood samples.

This observation also saw a precedent being set when a senior professional nursed phoned reception and requested that a folder be sent up to the resuscitation room. Joy's mother was able to remain with her child and finish relaying vital facts regarding Joy's history instead of having to go down to reception to collect a folder. The example set by the professional nurse in requesting a form be sent up, has potential to ease admissions were the cooperation of the clerks to be sought and instituted.

During the course of this observation the phone rang no less than nine times and numerous persons passed through enquiring of doctors or patients who had previously been in the room and were unrelated to any of the individuals currently there. Together the traffic and the phone calls noticeably interrupted and distracted the staff attending to admissions in the room. One professional nurse remained aloof and detached from the activity during this busy observation. She sat at a desk and watched her colleagues work, assisting only when requested to do so. Although she had accompanied one of the patients to echocardiography investigation, alarmingly she was unable to answer basic questions regarding the child.

RED CROSS WAR MEMORIAL CHILDREN'S HOSPITAL MEDICAL EMERGENCY UNIT

NAME:		DATE:			
DOB:		AGE:		SEX:	M F
Address::	Tel:	REFERRED		UNREFERRED	
		TIME SEEN BY:			
FOLDER No: (if available)		Triage Nurse		Print Name:	Sign:

MAIN PROBLEM	RED		ORANGE		GREEN
	Emergency Signs (take to resuscitation immediatly)		Priority Signs		Queue
Airway and Breathing	Not breathing / Apnoea		Respiratory Distress Signs: (if any signs severe = RED)		All other patients (i.e. No Red or Orange signs)
	Obstructed Breathing (snoring noises, can't feel exhaled air at mouth) OR Choking		Fast breathing		
			Nasal Flaring		
			Grunting (=severe)		
	Artificial Airway		Chest indrawing (Recessing)		
	Central Cyanosis or Sats<92%		Noisy breathing - Wheezing		
	Respiratory distress(severe)		Noisy breathing - Strider		
			Drooling and unable to swallow		
Circulation	Cold hands PLUS		**3TPRMOBUD:-**		
	Capillary refill time >2s PLUS		**T** Tiny tot (<3 months)		
	Weak / thready pulse		**T** Temperature (high fever ≥38°C)		
Coma	Severe lethary or reuced LOC : 1. AVPU : responds only to pain (**P**) or Unresponsive(**u**) **or** 2. Confusion		**T** Trauma / Urgent surgical		
			P Severe palmar Pallor or Hb<5		
			P Poisoning / overdose		
			P Pain (severe)		
Convulsions	Now or immediately post ictal and not Alert		**R** Respiratory distress (see above signs)		
			R Restless / Irritable / lethargy (V in AVPU)		
			R Referral Urgent		
Dehydration (severe) / Diarrhoea	Diarrhoea + 2 or more signs: Lethargy		**M** Malnutrition (visible severe wasting)		
	Sunken eyes		**O** Oedema both feet and normal Visidex		
	Skin pinch >2s		**B** Burns (and patient stable)		
	Floppy Infant		**U** Unable to drink / feed OR vomits everything		
Other	Hypoglycaemia (<3 mmol)				
	Purpuric rash		**D** Some Dehydration (only 1 of 3 sgns:- lethargy, sunken eyes, skin patch >2s)		
	Unwell known diabetic-hi blood sugar and ketonuria				
	Uncontrolled haemorrhage		**I** Infectious (e.g Measels, Chicken pox, Mumps - please isolate)		
	Facial / inhalational burns				
	Bulging fontanelle				

For all patients without Emergency signs		Additional Tasks					
WEIGHT	TEMPERATURE	BP		HGT		Hb	
		Sats		Stool		ORF	
		Neb		Urine		PEFR	

Triage Colour		Disposal (please circle)	Resuscitation Room	Acute care	S27	S19	Home	Nearest Clinic

Presenting complaint/ other note		Triage Doctor (please print & sign)
		Name:
		Sign:
		Time:

Appendix D: Red Cross War Memorial Children`s Hospital Emergency Unit: Triage Sheet

Appendix E: Ethnographic Record from Child Pathway 10

Key: Role Players
TN (Triage nurse)
PN_1, PN_2, PN_3 (Professional Nurse)
PNS_1, PNS_2 (Post Graduate Nursing Student)
OM (Nurse Operational Manager)
PM (Paramedic)
DR_1, DR_2, DR_3 (Registrars)
C1 Consultant
Porter
R1, R2 (Radiographer)
Clerk

Nr of Children	Nr of Nurses	Nr of Doctors	Other	Phone	Time	DESCRIPTION OF CHILD PATHWAY 10
					13h25	Child admitted to the resus room. She is brought in by the TN and is assisted by the mother. Unfortunately I *was in the resus room at the time so did not get to see them arriving in the WR. I can deduce from the notes that the child was unreferred and that her weight and temperature were done. A coding sheet was completed which indicated that her arrival time was 13H20. She was coded as red by the TN and the reason for code was CENTRAL CYANOSIS. The sats were 77% in room air. Weight: 12.9kg, Temp 36.4.*
3	3	2			13h26	Child was placed on a bed by PN1, PNS1, PNS2. PNS1 attaches the bp cuff while PNS2 attaches the ecg and sats probes. She is sitting upright and is very distressed.
						There are three other children in the room. A baby with respiratory distress for transfer to PICU and an eight-year-old boy with a "nephrotic" condition and the new admission.
						PN1 phones the admin desk, gives the folder number and requests a folder. This was such a quick and easy way to do it especially considering that the mother did not have to leave. The clerk was not very happy but consented. This was the first time I have seen this and I think that it is a brilliant method. It did however cause the mom to go to the reception desk just before admission to E1 for official admission to the hospital.
					13h28	BP cuff deflates and does not give a reading.
					13h32	PNS2 re-attempts the bp. PN1 + PNS2 walk away from the bed space to attend to the other children - currently no emergencies.
						PNS2 re-looks at the way the sats probe strapped as it is not giving a reading on the cardiac monitor. She re-straps the sats probe and there is a sign of a trace on the monitor.

			1/-1 *		13h33	The clerk comes into the room and collects the folder number of the new child. The staff joke with him about the new way of opening a folder. He lau ghs and walks out of the room.
	1/-1				13h34	TN enters the room. She does not speak to anyone but goes straight to the fridge, collects something and leaves the room again.
					13h35	DR3 is sitting at the desk and asks the mom what is wrong. Unfortunately I cannot hear the details of her response except that she says that her child is a cardiac patient known to Red Cross. DR3 then asks what normal sats are. Mom says around 70%. In the meanwhile the sats monitor has picked up her sats of 70%. DR3 asks PNS2 to please attach NPO2. DR3 goes to the bedside and begins to examine the child. The mother is beside her. The child begins to cry.
					13h37	DR3 asks for her weight- mom replies (can't hear). He looks at code sheet and sees weight documented and says 12.9kg. DR3 then asks about medication and mom replies that the child has received her medication that morning. She said unfortunately when she got ill this morning she was in such a hurry to get her to the hospital that she forgot the medication at home. DR3 asks her how much she was on. I now realise that they are talking about Lasix as DR3 mentions it. The mom replies that her child is on 1.3mg.
						DR3 talks to DR2 who is sitting at the desk and tells what he found on initial examination of the child. Also says that he is writing up 13mg of Lasix and not 1.3mg. DR2 agrees.
3	3	1			13h40	DR3 leaves the room.
						PNS1 and PNS2 are doing an HGT - child is crying.
			1/-1 *		13h41	Porter enters the room and speaks with PN1 about a child who needs to be transferred out to another ward. Leaves the room again.
						PNS2 writes down the observations and the result from the HGT. She does not verbalise her findings. She washes her hands and moves away from the bed. RR 14, pulse 100, temp 35.6, BP 116/92, Sats 73% in RA, HGT 3.9mmol/l, APVU- A.
			1/-1 *			Clerk walks in again and checks the folder number again and then leaves.
		1			13h42	DR3 comes back into room and says that he will do the baseline bloods. DR2 goes to bedside.
			1/-1 *			Porter enters with a folder. Puts it down on the desk and walks out. Does not verbalise it to anyone.
						DR3 collects disposables for bloods and puts them down at the bottom of the bed. DR3 examines the child again - with a specific focus on listening to the heart. Says that it sounds like a PDA.
					13h43	DR3 gloves hands and begins to palpate for an appropriate site for bloods and a drip. DR2 at the bedside assisting.

		1				DR1 comes into the room. While he is attempting bloods DR3 tells DR1 what he found on examination of the child.
						Drawing blood seems to be tricky on this child. DR3 struggles. He is assisted by both DR1 and DR2. PNS2 goes to the bedside.
-1	-1		1/-1 *			Porter arrives in the room. A child is transferred out to PICU - it is the neonate with respiratory distress. Transferred by porter and PNS1.
					13h45	Still struggling - managing to get small bits of blood at a time. Mom walks away from the bedside. DR3 talks to the child - apologises - she is crying.
					13h47	PN1 goes to the bedside and sorts out the child's documentation. Places stickers where necessary and writes details in Registry.
						DR2 has left bedside.
					13h49	DR3 still battles - assisted by DR1 and PNS2.
					13h50	DR2 phones X-rays to ask for a mobile chest X-ray for O/C.
						Bloods completec and a drip is also in position in the left hand.
				^		Phone rings. DR2 answers - the call is for DR1.
1	1/-1				13h51	A code red is brought in by the WPN. The child is having a seizure. PN1 rushes over to assist them. TN leaves again.
				^		Phone rings. DR2 answers - it is concerning a referral.
					13h52	DR2 completes the blood forms, labels the specimen containers.
					13h54	Mom goes back to the bedside and comforts the child who is sitting up again, She is on NOP2 with sats of 91%
3	2	3			13h55	MO enters the room and discusses a child that she has seen with DR2 and DR3. MO walks out but ask the other two to go with her to see X-rays. Both DR2 and DR3 follow. Both DR2 and Dr3 return shortly.
						CHILDREN IN ROOM: bed 1: seizures (DR1 and PN1); bed 2: observed child (mom); bed 3- boy with neph (mom).
						PNS2 look at the blue board and notices that Lasix 13mg IVI written up. She prepares the Lasix and administers it through the saline locked IV line. On completion, she signs it off on the blue board.
			1/-1 *		13h58	Porter returns stretcher from PICU. Porter leaves the room again.
	1					PNS1 enters the room - returned form PICU.

						Mom asks PNS2 for a bedpan. She brings her one. The mother puts the covered pan under the bed.
						DR3 goes to the bedside, asks the mom what kind of cardiac condition the child has. She says that her daughter has a coarct - with that, DR3 sees the folder on the desk. He says to the mom that this is what he was needing. He picks up the folder, sits down and begins to read (THICK FOLDER)
		1/-1			14h00	MO comes into the room again and asks concerning the patient that she is seeing again. Speaks with DR2 and DR3 and then leaves the room again.
			2 *		14h01	Two radiographers enter the room with the mobile X-ray. DR3 points to the bed. The mom begins to prepare her child for the X-ray by removing the bp cuff. R1 walks towards the bed and helps to prepare the child. She gives the mother a vest and they continue with the X-ray.
				^	14h04	Phone rings. DR3 answers - the call is concerning the child transferred out.
		-1				DR2 leaves the `room.
		1			14h06	DR2 enters the room.
			-2			X-ray complete. R1 and R2 prepare to leave the room.
				^		Phone rings - PN1 answers..
			1/-1		14h09	A doctor enters the room- looking for a child who was in S12 a few days before. PN1 assists by finding the child in the register. Doctor leaves again.
3	3	3	1/-1 *		14h10	Porter enters the room, collects bloods and leaves the room.
		-1				DR2 leaves the room.
	1/-1					OM enters - speaks with PN1 - leaves the room again.
	1					PN2 enters the room.
1	1/-1				14h11	TN enters the room with a baby and mother. PN2 attends to the them. TN says that the baby is lethargic and seems to have a lot of pain. Baby also seems distressed. PNS2 comes to bed space and PN2 asks her to please start FMO2. This was started before the sats were looked at. TN leaves again.
					14h13	Child asks mom for the pan. She urinates in the bedpan - mom covers it and places it under the bed again.
			2		14h15	Two PM enter with a child on a stretcher who seems wide awake. DR3 sees the child and seems to assess that her condition is not severe enough for her to be admitted to the resus room. Dr3 asks them to go via the weighing room. They do not return to the resus room again. Clearly the child was stable.
4						DR3 verbalises to DR1 and clarifies that he is sorting out two patients - points them out - clarifies that DR1 is sorting the other two patients. DR1 agrees.

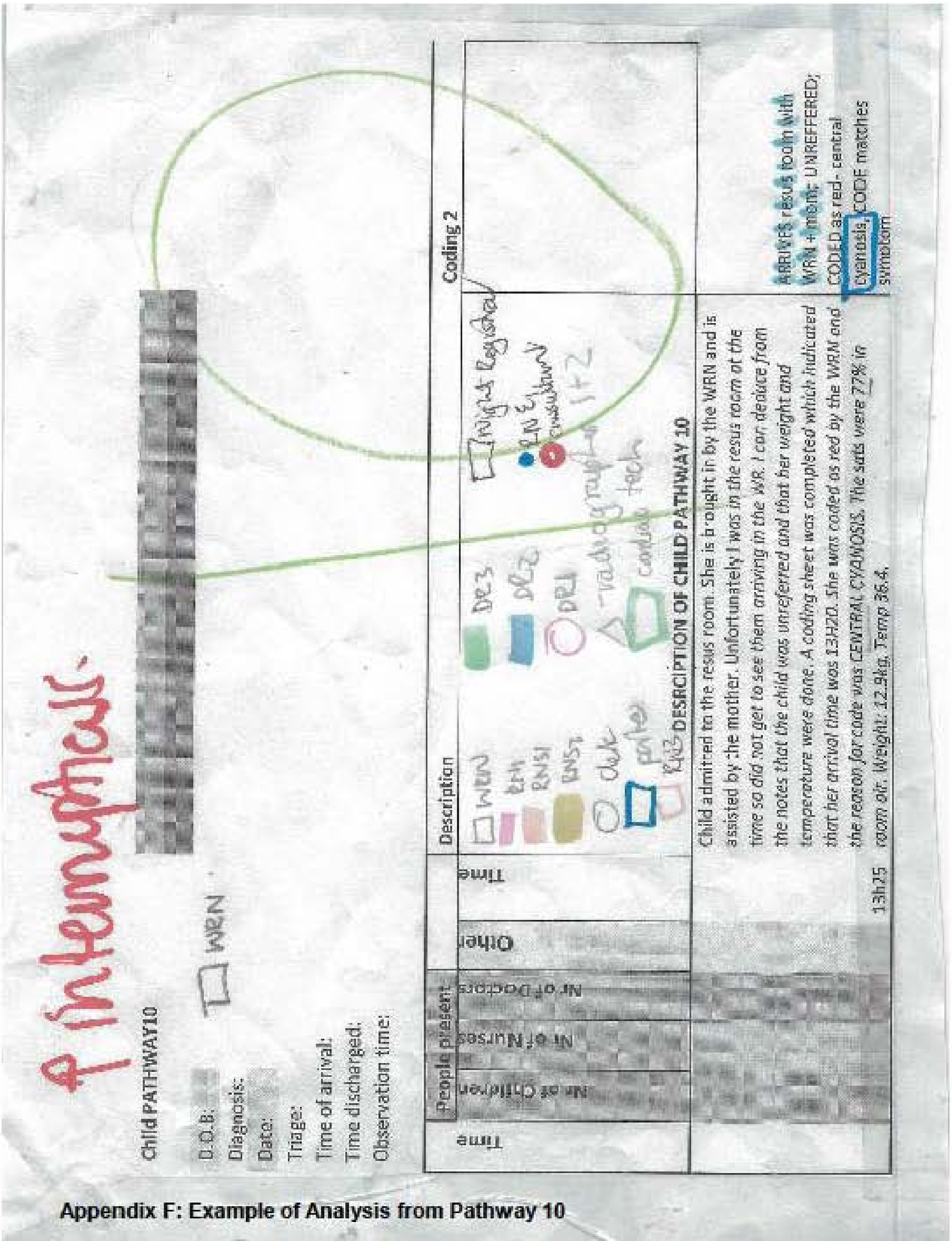
					14h18	DR1 writes notes for OC, DR2 on telephone discussing the boy with nephritic ?
						CHILDREN IN ROOM: bed 1: seizures (awake and with mom); bed 2: observed child (mom); bed 3 - boy with neph (mom) - asleep; bed 4 – distressed baby.
	-2					OM and PN1 leave the room..
					14h22	Child sitting up - mom feeding her yoghurt - sats 93% on NPO2.
4	3	2				PN3 enters the room and sits down at the desk.
	2/-2				14h28	OM enters the room followed by a nurse. Asks PN2 to give nurse a stitch cutter. PN2 agrees. Both OM and nurse leave the room.
	1			^		PNS1 enters the room. Phone rings - researcher takes the call. Referral from Themba Care. Researcher tells DR3 about ?referral.
						At the time: DR3 writing findings and DR1 on phone.
					14h30	Child urinates again.
						Boy in bed 3 prepared for transfer out to S11. PN3 phones to confirm space.
			*		14h32	Housekeeper enters the room and collects dirty linen. Hands are gloved, but carries dirty linen through the room.
		1/-1				DR enters the room - asks for DR2 - DR1 replies that DR2 having quick lunch. Leaves the room again.
			1/-1		14h35	Cleaner enters the room. With gloved hands empties out all the bins. Leaves room.
						DR2 phones cardiologist to discuss observed child. Has a brief conversation and is clearly referred to someone else.
	1/-1				14h37	PN (from other department) enters the room and puts bloods in holder for porters. Leaves room.
			1/-1 *			A mother enters the room, asks for a patient - PN3 assists.
	*			^		Phone rings - PN3 answers. PN3 leaves the room. PN3 comes in again.
	1/-1					PN (from other department) enters the room again and re-adjusts something in the blood bag and leaves again.
					14h39	DR3 makes another phone call and has a conversation with a cardiologist.
	*					PN2 leaves the room and enters within a minute again(* leaves and comes in again).
-1	-2					Child in bed 3 leaves the room as is transferred out to S11 - accompanied by PNS1 and PNS2.
	1/-1					PN1 enters the room, but leaves again.

3	2	2			14h40	DR3 tells DR1 about the conversation with the cardiologist. They have agreed to come and see the child after their clinic is finished. DR3 and DR1 discuss the child.
					14h22	DR3 tells mom about the conversation and conveys the next step to her.
						DR3 verbalises that he has finished sorting the child. He places the folder at the bottom of the bed and says that he will move onto the next patient.
						NOTES
					14h45	Child urinates again.
						DR1 writing as she is trying to complete the documentation concerning the child in bed 1.
						DR3 moves to bed 4.
						Mom takes the urine and leaves the room. The urine is not measured. She returns with a clean bedpan.
						Bed 1: seizures (mom); bed 2: OC on NPO2; bed 4: neonate with resp distress (DR3 and PN2 sorting - busy with bloods and a drip), PN3 is sitting at the desk. She does not appear to be forthcoming in getting involved.
					14h46	She has answered the phone but does not appear interested.
	1				14h48	OM enters the room - speaks to PN3 about an instrument left by a rep to be tested.
						DR1 asks PN3 to please get a bedpan for the child in bed 1. PN3 gets up and does what she is asked.
			1/-1 *		14h51	Housekeeper enters the room and asks OM something - I can't hear. Leaves again'
	2					PNS1 and PNS2 enter the room with the stretcher - retuPN from transferring the child.
	1					PN1 enters the room. PNS1 and PNS2 spray down the stretcher with disinfectant.
	-2					PN1 and OM leave the room.
	-1				14h52	PNS1 leaves the room.
3	3	2	*		14h55	A person enters the room with a sats monitor. She puts it down, says it is from clin tech and leaves the room.
						Currently in room: PNS2, PN2, PN3, DR1, DR3.
					14h56	PN3 goes to OC bedside, looks at the notes. PNS2 comes into the space, disinfects hands and does a set of observations and documents them. RR: 14; HR: 103; TEMP 35.5; BP 58/25, SATS 97% on NPO2.
						PN3 leaves the bed space.
	-1				14h58	PN3 leaves the room and says that she is going to the pharmacy.
			1/-1 *		15h00	Porter enters the room, collects bloods and leaves the room.

						DR1 asks PNS2 whether she could repeat the BP as the child seems impossibly hypotensive. PNS2 agrees and repeats - 88/41 - verbalises the reading to DR1. Writes findings.
			2 *		15h04	Two radiographers enter the roon - child in bed 4.
3	3	2			15h10	PN3 returns from pharmacy.
	-1				15h11	PNS2 leaves the room and tells PN3 that she is going to tea.
1	1/-1					TN enters with a child (enlarged head - ?hydrocephalus) + mom. TN connects sats probe and sats are 61%. PN2 attends to the child. PN2 calls DR3 to look at child. They were both busy with the child in bed 3. TN leaves again.
			-2			PN3 sitting behind desk writing - looks like schedule drug book. Radiographers leave the room when they are done.
				^	15h15	Phone rings - researcher answers - line goes dead
				^		Phone rings - DR1 answers
						Bed 1: seizures (mom) - currently awake and stable; bed 2: OC on NPO2 - awaiting cardiologist; bed 3: RDS - DR1 sorting; bed 4: RDS.
		1			15h18	C1 enters the room. DR3 hands ove - start with OC - diagnosis, Lasix administered and dose, plan.
					15h24	Continues handover. Bed 3: says not sure as the child is new but has RD; bed 4: Resp distress with a displaced apex. Says that the cardiologist must come and see this child too when they come for child in bed 2.
4	2	3			15h25	
			1/-1 *		15H26	An unrelated mother enters the room and says that she needs to bring her child here from milk scan. The child should be seen by one of the MO. Researcher sorts child out with help from DR1. Mother leaves again.
						Child urinates - mom assists.
		-1			15h26	C1 leaves the room.
			1 *		15h27	Interpreter enters the room. Sits down and talks to PN3.
	1					PNS2 enters the room. DR3 calls the interpreter to bedside - clearly he had her called.
						DR1 sorting out new admission (bed 3).
						PN3 sitting and watching.

			1/-1 *			Person from records enters the room and drops a folder off on the desk - leaves the room again. PN3 picks up the folder and places it at bed 3.
		1			15h28	DR2 enters the room - asks how can assist. DR3 replies that all the children have been tended to.
			1 *		15h30	Porter enters the room with a stretcher and oxygen. PN3 assists. The porter is there to collect the OC for an ECHO - unfortunately I don't know when that was organised - can only assume that it was arranged by the cardiologist.
	1				15h31	OM enters the room.
						Child transferred onto stretcher. NPO2 started. Transported by PN3, mom, porter and researcher.
					15h35	Arrive at echo - have to wait outside for a few minutes. While waiting outside cardiac tech comes out and asks what is wrong with the child and what needs to be checked. The PN3 cannot answer any of the questions. Replies that she is unsure.
					15h36	Transferred over to bed, oxygen connected. ECHO commenced.
	ECHO				15h40	
					15h41	Child needs to urinate. Researcher fetcher bedpan from B1. Urine discarded, not measured.
					15h55	
					16h05	ECHO finished.
					16h06	Mom picks child up and places her on stretcher, PN3 re-connects oxygen. They take the child back to S11. Researcher agrees to stay and wait for report and folder.
					16h10	
3	0	2			16h20	Researcher gets back to the ward - child is back on her bed - sitting up and is eating and drinking. Sats 90% on NPO2. No nurses in room (three children).
						DR3 says to DR1 that there is space in E1 for the child. Mom arrives the room.
			1 *			Porter arrives in room with stretcher to transport a child to ward.
		1				C1 enters the room (DR1, DR3, C1).
				^		Phone rings - PN1 answers. Phone rings, no-one answers.
		-1				DR3 asks for a nurse to take a child to B2. C1 leaves the room.
						Researcher agrees to look for a nurse. Goes to WR - no one there either. Goes to S11 and finds PN1 and OM carrying medication towards S12.
3	0	2			16h25	

	2					Researcher asks them if there is anyone to help. PN1 + OM come into the room.
		-2			16h30	DR3 and DR1 leave the room but just before leaving DR1 says to PN1 that child can go to E1 but mom must admit the child via reception.
	-1					OM leaves the room.
	1				16h32	PNS1 and baby return from X-ray.
-1						Child in bed 1 leaves to B2 with PN1.
						On leaving, PN1 asks PNS1 to please give mom a pink slip for admission. PNS1 agrees, gives the slip and sends the mom out.
		1/-1			16h35	DR3 comes back and asks who is the dr of the day as he has to go (not sure if he is doing ward round somewhere else). No one answers. DR3 leaves the room.
						Currently in room are: PN1, PNS1 and 2 admissions.
2	2	0			16h40	
						Waiting for mom to return.
					16h50	Researcher goes out and finds her at the end of the queue. Speaks to clerk and asks whether she could be prioritised as the child must go to the ward.
		1	*		16h55	Registrar for night enters the room. Mom walks in simultaneously.
					16h56	PN1 phones the porter and asks for a stretcher + oxygen.
						PNS1 prepares the child for transfer. Cleans out urinal and documents finding.
-1	-1		1 *			Porter arrived. Child was transferred onto stretcher. Transferred out by PNS1 + porter + mother . Arrived in E1- received by a PN. Child was transferred onto a bed. Oxygen was connected. PNC1 did a brief handover - known child, admitted with resp distress went for ECH, had X-ray and received Lasix 13 mg.



♀ interruptions.

Child PATHWAY10 [redacted]

D.O.B.: [redacted]
Diagnosis:
Date: [redacted]
Triage:
Time of arrival:
Time discharged:
Observation time:

☐ WRN

Time	People present				Time	Description	Coding 2
	Nr of Children	Nr of Nurses	Nr of Doctors	Other		☐ WRN, RN, RNS1, RNS2, ◯ clerk, ☐ porter, ☐ RN3, DR3, DR2, ◯ DR1, △ radiographer, cardiac tech, ☐ Night Registrar, ● RN E, ● consultant 1+2	
	[redacted]	[redacted]	[redacted]	[redacted]	13h25	**DESRCIPTION OF CHILD PATHWAY 10** Child admitted to the resus room. She is brought in by the WRN and is assisted by the mother. *Unfortunately I was in the resus room at the time so did not get to see them arriving in the WR. I can deduce from the notes that the child was unreferred and that her weight and temperature were done. A coding sheet was completed which indicated that her arrival time was 13H20. She was coded as red by the WRN and the reason for code was CENTRAL CYANOSIS. The sats were 77% in room air. Weight: 12.9kg, Temp 36.4.*	ARRIVES resus room with WRN + mom; UNREFFERED; CODED as red- central cyanosis. CODE matches symptom

Appendix F: Example of Analysis from Pathway 10

<u>Appendix F: Example of Analysis from Pathway 10</u>

Appendix F: Example of Analysis from Pathway 10

Time	Observation	Analysis
13h26	Child was placec on a bed by RN1, RNS1, RNS2. RNS1 attaches the bp cuff while RNS2 attaches the ecg and sats probes. She is sitting upright and is very distressed.	PLACED on bed; ATTACHES 1 (RNS1); ATTACHES 2 (RNS2); SYMPTOM- distressed
	There are three other children in the room. A baby with respiratory distress for transfer to PICU and an eight year old boy with a " nephrotic" condition and the new admission.	
	RN1 phones the admin desk, gives the folder number and requests a folder. This was such a quick and easy way to do it especially considering that the mother did not have to leave. The clerk was not very happy but consented. This was the first time I have seen think that it is a brilliant method. It did however cause the mom to go to the receptiondesk just before admission to E1 for official admission to the hospital.	PHONES reception-ASKS folder (RN1); AGREES (clerk)
13h28	BP cuff deflates and does not give a reading	UNSUCCESFUL-NO reading (bp cuff)
13h32	RNS2 re- attempts the bp. RN1 + RNS2 walk away from the bedspace to attend to the other children- currently no emergencies.	RETRIES bp (RNS2); LEAVE bedspace (RN1+RNS2)
	RNS2 re-looks at the way the sats probe strapped as it is not giving a reading on the cardiac monitor. She re-straps the sats probe and there is a sign of a trace on the monitor.	UNSUCCESFUL -NO sats reading. RE-STRAPS (RNS2)
13h33	The clerk comes into the room and collects the folder number of the new child. The staff joke with him about the new way of oepning a folder. He laughs and walks out of the room.	COMES IN (clerk); GETS folder number; GOES OUT
13h34	WRN enters the room. She does not speak to anyone but goes straight to the fridge, collects something and leaves the room again.	COMES IN (WRN); COLLECTS something; GOES OUT
13h35	DR3 is sitting at the desk and asks the mom what is wrong. Unfortunately I cannot hear the details of her response except that she says that her child is a cardiac patient known to Red Cross. DR3 then asks what normal sats are. Mom says around 70%. In the meanwhile the sats monitor has picked up her sats of 70%. DR3 asks RNS2 to please attach NPO2. DR3 goes to the bedside and begins to examine the child. The mother is beside her. The child begins to cry.	ASKS problem (DR3-mom); SAYS known cardiac child; ASKS normal sats (DR3-mom) REPLIES value; VALUE on monitor- 70%; ASKS to start NPO2 (DR3-RNS2) AGREES; EXAMINES child (DR3)

To access folder RN

To do vitals

To ask Hx

To start NPO2

D To do physical assessment

Appendix F: Example of Analysis from Pathway 10

	Time	Observation	Coding	
continues HL; (A) to give lasix	13h37	DR3 asks for her weight- mom replies (cant hear).He looks at code sheet and sees weight documented and says 12.9kg. DR3 then asks about medication and mom replies that the child has received her medication that morning. She said unfortunately when she got ill this morning she was in such a hurry to get her to the hospital that she forgot the medication at home. DR3 asks her how much she was on. I now realise that they are talking about Lasix as DR3 mentions it. The mom replies that her child is on 1.3mg.	ASKS weight (DR3-mom) REPLIES-cant hear; SEES weight on code sheet. ASKS about medication (DR3-mom); REPLIES that administered; ASKS dose; REPLIES dose.	
		DR3 talks to DR2 who is sitting at the desk and tells what he found on initial examintaion of the child. Also says that he is writing up 13mg of Lasix and not 1.3mg. DR2 agrees.	TELLS finding of examination (DR3-DR2); SAYS writing up medication; AGREES (DR2-DR3) WRITES LASIX	(D) To give Lasix
3 1	13h40	DR3 leaves the room.	GOES OUT (DR3)	
		RNS1 and RNS2 are doing an HGT- child is crying.	CHECKS HGT (RNS1 RNS2)	(D) To check HGT
1/- 1	13h41	Porter enters the room and speaks with RN1 about a child who needs to be transferred out to another ward. Leaves the room again.	COMES IN (Porter); TALKS to RN1; GOES OUT	
		RNS2 writes down the observations and the result from the HGT. She does not verbalise her findings. She washes her hands and moves away from the bed. RR 14, Pulse 100, temp 35.6, BP 116/92, Sats 73% in RA, HGT 3.9mmol/l, APVU- A	WRITES observations + HGT value (RNS2)-written but not said; WASHES hands; LEAVES bedspace	(D) = To do vitals
1/- 1		Clerk walks in again and checks the folder number again and then leaves.		
1	13h42	DR3 comes back into room and says that will do the baseline bloods. DR2 goes to bedside.	SAYS will do bloods (DR3-DR2)	(D) To do bloods
1/ 1		Porter enters with a folder. Puts it down on the desk and walks out. Does not verbalise it to anyone.	COMES IN (Porter)- puts folder down; GOES OUT	
DR3 EX		DR3 collects disposables for bloods and puts them down at the bottom of the bed. DR3 examines the child again- with a spcific focus on listening to the heart- Says that it sounds like a PDA.	PREPARES to do bloods (DR3); EXAMINES child again (DR3); SAYS-sounds like PDA	

Appendix F: Example of Analysis from Pathway 10

13h43	DR3 gloves hands and begins to palpate for an appropriate site for bloods and a drip. DR2 at the bedside assisting.	GLOVES hands, selects site, disinfects area (DR3); ASSISTING (DR2)
	DR1 comes into the room. While he is attempting bloods DR3 tells DR1 what he found on examintaion of the child.	COMES IN (DR1); SAYS findings of examination (DR3-DR1)
	Drawing blood seems to be tricky on this child. DR3 struggles. He is assisted by both DR1 and Dr2. RNS2 goes to the bedside.	STRUGGLES; ASSISTS (DR1+DR2 +RNS2)
	Porter arrives in the room.A child is transferred out to PICU-it is the neonate with respiratory distress. Transferred by porter and RNS1.	COMES IN(porter); TRANSFERRED to PICU-other child
13h45	Still struggling- managing to get small bits of blood at a time. Mom walks away from the bedside. DR3 talks to the child- apologises- she is crying.	STRUGGLES; TALKS to child (Dr3); LEAVES bedspace-mom
13h47	RN1 goes to the bedside and sorts out the childs documetation. Places stickers where necessary and writes details in Registry.	SORTS documents (RN1); ENTERS in register
	DR2 has left bedside.	LEAVES bedside (DR2)
13h49	DR3 still battles- assisted by DR1 and RNS2.	STRUGGLES- bloods
13h50	DR2 phones x-rays to ask for a mobile chest x-ray for O/C	PHONES x-rays; orders mobile (DR2)
	Bloods completed and a drip is also in position in the left hand.	COMPLETED-bloods + drip
	Phone rings_ DR2 answers- the call is for DR1	PHONE RINGS, answers (DR2)
13h51	A code red is brought in by the WRN. The child is having a seizure. The RN1 rushes over to assist them.WRN leaves again	COMES IN- new admission +WRN+ Mom- SEIZURES; GOES OUT-WRN
	Phone rings_ DR2 answers-it is concerning a referral.	PHONE RINGS, answers (DR2)
13h52	DR2 completes the blood forms, labels the specimen containers	WRITES blood forms
13h54	Mom goes back to the bedside and comforts the child who is sitting up again, She is on NOP2 with sats of 91%.	ENTERS bedpsace (mom)

1/- 1 -1 -1

Blank

1/- 1 1-

To enter into register

To do

Admission number	Referred	Gender	Date of birth	Date of admission	Admission diagnosis	Time of admission	Time of discharge	Date of discharge
1	y	Male	7/23/2009	7/1/2010	Respiratory distress	0:10	2:00	07/01/10
2	n	Male	2/19/2002	7/1/2010	LRTI	1:25	2:45	7/1/2010
3	n	Female	6/8/2009	7/1/2010	Chesty	1:20	3:00	7/1/2010
4	n	Female	8/4/2007	7/1/2010	Gastro/UTI	1:33	4:00	7/1/2010
5	n	Male	2/4/2010	7/1/2010	Blocked nose	2:45	4:45	7/1/2010
6	y	Male	9/19/2009	7/1/2010	Gastro	10:00	17:15	7/1/2010
7	y	Male	9/20/2006	7/1/2010	Seizures, hemiplegic, iron deficiency anaemia	1::20	14:20	7/1/2010
8	y	Male	5/29/2001	7/1/2010	Chickenpox, pancytopenia	15:20	15:00	7/1/2010
9	y	Male	4/16/2010	7/1/2010	Seizures	16:00	16:50	7/1/2010
10	y	Female	5/25/2008	7/1/2010	Cardiac	17:25	21:15	7/1/2010
11	y	Male	7/23/2009	7/1/2010	PAO recurrent chest problem	17:45	22:05	7/1/2010
12	y	Male	3/25/2009	7/1/2010	Seizures	16:30	21:20	7/1/2010
13	y	Male	6/7/2005	7/1/2010	Seizures	2::00	23:55	7/1/2010
14	y	Female	9/4/2009	7/1/2010	Severe eczema	23:00		7/1/2010
15	y	Female	3/9/2008	7/1/2010	Coughing	23:30	1:45	7/2/2010
16	y	Male	4/9/2010	7/1/2010	Pneumonia sepsis	2::40	1:00	7/2/2010
17	y	Male	8/7/2009	7/2/2010	Fever	1:35	2:30	7/2/2010
18	y	Male	3/14/2002	7/2/2010	Pneumonia	0:30	3:15	7/2/2010
19	n	Male	8/5/2009	7/2/2010	Gastro, seizures	8:20	12:00	7/2/2010
20	y	Female	2/17/2010	7/2/2010	Myocarditis	9:00	14:36	7/2/2010
21	y	Male	1/17/2007	7/2/2010	Meningitis	1::40		7/2/2010
22	y	Male	3/13/2007	7/2/2010	TB, meningitis	13:00	18:40	7/2/2010
23	y	Female	4/13/2010	7/2/2010	Pneumonia	15:00	17:00	7/2/2010
24	n	Female	7/30/2003	7/2/2010	Cystic fibrosis	16:20	20:00	7/2/2010
25	y	Female	7/15/2006	7/2/2010	Seizures	16:30	19:25	7/2/2010
26		Female	4/25/2010	7/2/2010	-	19:20		
27		Male	4/7/2008	7/2/2010	Pneumothorax	19:15	22:30	7/2/2010
28	y	Male	1/17/2009	7/2/2010	Viral LRTI	22:45	1:40	7/3/2010
29	y	Male	6/3/2010	7/2/2010	Vomiting	2::30	4:00	7/3/2010
30	y	Female	9/21/1999	7/2/2010	-	23:20	1:30	7/3/2010
31	y	Female	12/14/2009	7/2/2010	UTI	19:15	2:45	7/3/2010

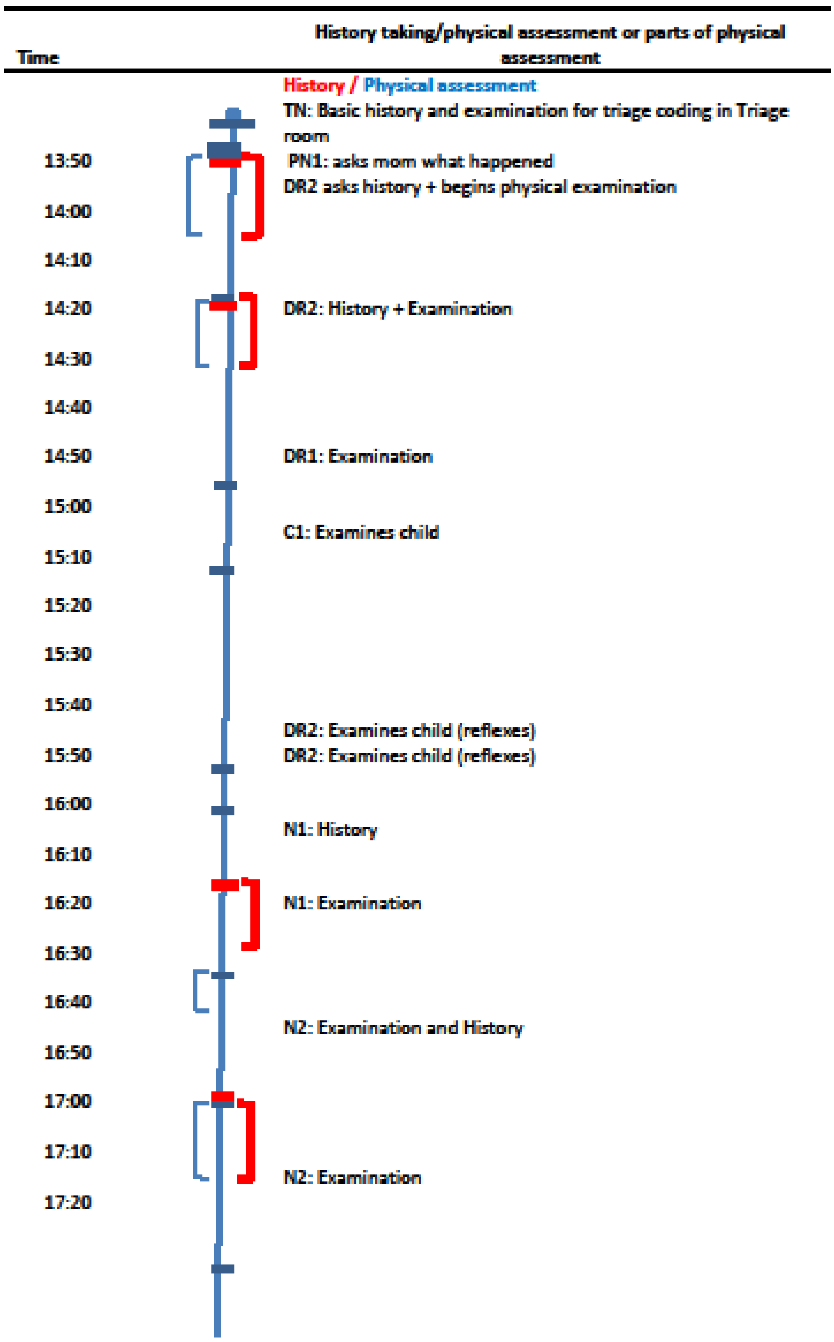
Appendix G: Example of demographic data from the Resuscitation Room Child Register

Code	Definition
AGREES	agrees to carry out what was asked
ARRIVES	enters for first time
ASKS	communication attempting to elicit information or requesting the initiation of an action (verbal)- e.g. meds etc.
ASKS	
ASSISTS	the process by which one health worker or mother will assist in a planned procedure
ATTACHES 1	action of positioning the bp cuff in order to get a reading
ATTACHES 2	the action of connecting the ECG and saturation probe to the child
ATTEMPTS EXPLANATION	the process by which someone tries to verbalise an explanation but is clearly struggling to articulate reasoning (as picked up by the observer)
ATTENDS TO	sees to, pays attention to
CALCULATES	the method by which the fluids are calculated
CHECKS	action of looking/ measuring symptoms/ observation, etc.
CODES	the process by which a child is allocated a code according to the acuity of their condition
COMES IN	action of entering the room
DRAWS BLOODS	The procedure of actually drawing bloods. This does not include the preparation. This will always include cleaning the site with antiseptic. It will however be clearly stated whether or not gloves were used.
DRAWS UP	the process by which medication is prepared before administration
ENTERS BEDSPACE	person who is in the room comes into the observed child's bed space
EXAMINES	The process by which a doctor or possibly a nurse would physically examine the child. It does not necessarily refer to a full examination but may include focused aspects of an examination, e.g.: testing reflexes or an ocular examination.

FINISH	refers to when that which is being administered is completed (meds, nebulisers, etc.)
FRUSTRATED	the description given to obvious frustration displayed by a person
GIVES	the action carried out or not carried out to complete the process of administration
GIVES	the active response to when something is asked for
GOES OUT	when an individual leaves the room
HANDS OVER	Exchanges information with regard to handing over a patient, transferring care. This would refer specifically when a patient is brought in by the paramedics, nurses' handover before going to tea as well as a transfer to the ward.
HELP	This refers to what a health worker does when an unexpected event happens - and usually refers to the support given to the child or mother.
HESITATES	This refers to a noted physical hesitation by a health worker to continue what they are doing. It is demonstrated through a change of direction in what they were doing.
HESITATES CODE	when the person coding is unsure
INSERTED	refers to what was in position when the child arrived at the hospital, e.g. nasogastric tube, intra-osseous line, etc.
INSERTS DRIP	the procedure describing the insertion of an intravenous catheter, attached to a short extension set
INTERJECTS	the process of interruption during a communication exchange where one person interrupts the response of another
INTERPRETS	language interpretation
LEAVES BEDSPACE	the intentional action of moving away from the observed child's bed space
LOOKS FOR	attempts to find something specific required for mx/ testing
NOT GIVEN	
NOT OBTAINED	when a procedure fails to get the results it sets out to achieve
OBSERVE	to watch without getting involved - usually associated with learning
PHONE RINGS	this indicates that the phone is ringing and helps to see how many times outside calls come through

PHONES	This defines when someone makes a telephone call out. It is followed by the reason for the call.
PLANS	the withholding of a decision due to accessing counsel to make a decision
PREPARES	refers to the action of preparing to do a specific procedure - the details of what is done and how is not always included
QUESTIONS CODE	the process by which a health worker questions what a child was coded - usually in disagreement with the choice or may require more evidence to substantiate code
READS	the simple process of reading a document, notes, etc.
REPLIES	the verbal response to an ASK
RERERRED/ UNREFERRED	pertains to whether the child was referred or not
RESPONDS with action	the non-verbal action response to the ASK
RE-TRIES	refers to a second or third attempt
SAFETY	refers to an intervention which is carried out to obviously protect the child from harm, e.g. bedsides
SAYS	to state an opinion, to state a value, in order to inform other health workers
SEEN BUT NOT SAID	when an individual knows information and does not hand it over
SORTS	a process of organising around the bed space
SORTS BLOODS	the process by which the doctor who drew the bloods labels the tubes and completes the forms
STARTS	refers to when medication (antibiotics) infusion is started
SUCCESFULL/UNSUCCESFUL	refers to the outcome
SUCTIONS	refers to nasopharyngeal suctioning
SUGGESTS	the attempt to make a recommendation for action
SYMPTOM	this refers to a specific symptom seen in the child
TALKS TO	refers to having a conversation - refers more to direction than content
TEACHES	the process whereby one health worker is educating another on either a procedure or diagnosis, etc.
TELLS	communication to convey a specific message (to inform, to order)

TRANSFER	action of moving the child from one surface to another
UNABLE TO LINK SITUATION WITH CODE	this is a possible reason for code hesitation
WITHDRAWS	an emotional response conveyed through a physical withdrawal from interaction - usually caused by an offence
WRITES	the action of documentation
WRITES - OTHER TIME	where the observed administration time is different from documented time



Appendix I: Frequency and duration of assessment and history in a triage code green child in the resuscitation room before 23h00.

N2	N1	C1	DR4	DR3	DR2	DR1	TIME	TN	PN1	PN2	PN3	R 1	S11 Nurse
							13:50	TN	PN1	PN2			
					DR2				PN1	PN2			
					DR2		14:00		PN1	PN2			
					DR2				PN1	PN2			
					DR2		14:10		PN1	PN2			
					DR2				PN1	PN2			
					DR2		14:20						
					DR2								
					DR2		14:30		PN1				
					DR2								
							14:40						
							14:50						
					DR2	DR1							
			DR4		DR2	DR1	15:00						
			DR4			DR1							
		C1					15:10						
		C1									PN3		
		C1					15:20			PN2	PN3		
												R 1	
							15:30					R 1	
					DR2		15:40				PN3		
		C1			DR2	DR1							
							15:50						
		C1			DR2								
							16:00						
	N1												
	N1						16:10						
	N1												
	N1					DR1	16:20						
	N1					DR1							
	N1					DR1	16:30						
					DR2	DR1							
N2	N1						16:40						
N2	N1				DR2	DR1							
N2							16:50						
N2					DR2								
N2	N1				DR2		17:00						
N2													
N2	N1				DR2		17:10		PN1	PN2			
N2													
							17:20						
N2						DR1							
		C1				DR1	17:30						
		C1				DR1							
							17:40						
											PN3		
							17:50				PN3		
											PN3		S11 Nurse

Appendix J: Number and categories of staff involved in the care of a child with triage code green in the resuscitation room

Appendix K: Reflection on data collection methods used in the study: Participant observation

	Strengths	Weaknesses	Contribution to the study	What would I do differently
Participant observations	• Assisted in identifying and recording a thick description of actions, activities and conversations around child pathway on a timeline • Enabled counting the number of children, doctors and nurses in the room every 15 minutes throughout individual pathway. • Attempted capturing data on people moving through the room, telephone and interruptions with varied success. • The researcher gained an insider perspective. • Provided details related to staffing over 24 hours.	• Data related to interruptions and other people entering into the room was inconsistent and was often dependent on how much was happening around the specific child pathway. It became difficult to observe on multiple levels at the same time, by one observer with increased activity around the bedside. Therefore, it was mentioned in the findings, but sufficient data to show-the impact on stabilisation was lacking. • Initially specific	• This data provided a comprehensive description of what happens around a particular child (micro). • Through this description, system wide patterns (macro) were identified as well as the culture and norms of practice that interplay with stabilisation.	In a similar and following study, I will limit the observation of other activites in the room and be explicit as to how these are collected. I would include: • 15-minute count of children, nurses, doctors in the room (done). • Clearly define the difference between interruptions and distractions and make mention of these along the timeline by using a symbol followed by a short description of how it affected the child pathway.

	details of conversations were recorded. However, this took a lot of time and often the rate at which things happened superseded the ability to capture them and so important activities could be missed. A decision was made to capture the essence of a conversation. • Pathways were selected according to who arrived first. No scenario was captured through a child pathway where cardiopulmonary resuscitation was necessary. .	• Count the number of telephone calls and only make notes if they interrupt or distract from the child pathway. • Be explicit about mentioning who else enters the room (using symbols) but only add a short description if it impacts on the observed child.

Appendix K: Reflection on data collection methods used in the study: Participant observation

	Strengths	Weaknesses	Contribution to the study	What would I do differently
Field notes	• Provided initial data (prior to participant observations) on aspects of care, i.e. how things worked in different parts of the Unit. • Assisted planning and formulating ways of looking and what to look for. • Used to further investigate aspects raised from participant observations or Register data. • Confirmed staffing patterns over 24 hours	• It was a complementary data source and there were no obvious weaknesses in the way the data collection was applied.	• Initial tracking of how things happened (flow, communication, triage). • Later it was used to gather data to further investigate aspects from observational data or statistical data (i.e. tracking how Resuscitation Room Child Register completed).	• Nothing

Appendix K: Reflection on data collection methods used in the study: Field notes

Appendix K: Reflection on data collection methods used in the study: Clinical notes

	Strengths	Weaknesses	Contribution to the study	What would I do differently
Clinical Notes	• Enabled tracking of documentation recorded by people involved in the care of children. • Added clinical details to observational data. • Highlighted when and how often vital signs and other physiological parameters were measured. • Enhanced understanding on communication and clinical actions (what was written , what was said and what was done). • Provided written data (Metro ambulance notes/ referral letters) which were compared to verbal data in handovers. • Provided comparative data with observational data to see when therapy was prescribed (observational + written), when it was given (observed) and when it was signed off (written).	• Some of the data was missing. • Provided excessive clinical details that were time-consuming to process, and which were not all necessary.	• Provided comprehensive picture adding clinical details to observational data. • Tracking record keeping.	• Be clear about what details will assist answering the research question and extract selectively.

Appendix K: Reflection on data collection methods used in the study: Informal interviews

	Strengths	Weaknesses	Contribution to the study	What would I do differently
Informal interviews	• Provided additional data to confirm or challenge observational data. • Clarified aspects of culture, tradition and practice norms. • Provided insights into how people experience the setting. • Assisted in dispelling researcher bias or premature conclusions drawn during observations.	• They were topic specific and researcher may have controlled outcomes by asking leading questions.	• Additional data to clarify findings. • Explanatory data on wider aspects of culture, tradition and practice norms.	

Appendix K: Reflection on data collection methods used in the study (Register)

	Strengths	Weaknesses	Contribution to the study	What would I do differently
Data from Child Register	• Added comprehensive demographic data of children seen in triage room. • Indicated patient load in resuscitation room. • Provided perspective on patient flow when comparing it to hospital statistics (number of children triaged on arrival at hospital). • Reflected novel data for Unit: length of stay; triage data over 24-hour period; monthly ratio of triage codes over 7 months	• Collected data for 7 months (reflected two seasons and one seasonal change). Ideally, 12 months would have given a comprehensive picture, but limited resources and time for detailed data collection.	• Clear demographic description of children seen in the resuscitation room. • Clear picture of patient flow.	• Collected statistics over 12-month period.