Implementing a Critical Care Outreach Team: What difference has it made for nurses?

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Abstract

The aim of this study is to describe the implementation of Critical Care Outreach (CCO) and to understand what difference implementing a Critical Care Outreach Team (CCOT) has made to ward nurses in a secondary level general hospital in New Zealand. A CCOT was established at the study hospital in 2006. The aim was to implement an early warning score, to provide education and to share appropriate intensive care skills from CCOT nurses on the wards. Additionally, patients discharged from the Intensive Care Unit were to be followed up. The difference this made to ward nurses in this hospital was unclear. International studies had reported suboptimal patient care on acute wards and the emergence of CCOTs. Research was warranted to gain an understanding of the impact of the service on ward nurses.

The methodology chosen for the study was case study, and was underpinned by Change Management Theory and elements of whole system reform (Fullan, 2010). Fullan's (2007) Change Management Theory of a three phased approach to change management, initiation, implementation and institutionalisation was selected for the study. Data was collected from a nursing focus group, three interviews, and District Health Board documents related to the CCOT. Interviews and nursing focus group data were analysed by thematic analysis and documents analysed by subject.

Implementing the CCOT facilitated the shift of late recognition/late intervention of patients to early recognition/early intervention. An area of whole hospital reform occurred. The use of an early warning score promoted more timely patient review, communication between nurses and doctors, improved observation frequency and an environment of objectivity developed. Nurses benefited from education, were empowered to escalate patient concerns, improved their assessment and specific clinical skills, and reported that they were supported by the CCOT.

The CCOT has had a positive effect on the early recognition and early intervention of the physiologically unstable patient. The challenge to New Zealand nursing now is to continue to build on the evidence from this study that CCOT has a beneficial impact on ward nurses. The challenge to the District Health Board is to preserve CCOT to ensure that nurses are supported and late recognition/late intervention is truly a phenomenon of the past.

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Abbreviations

ACT	Acute Care Training
ALERT	Acute Life Threatening Events Recognition
CCO	Critical Care Outreach
CCOT	Critical Care Outreach Team
CINAHL	Cumulative Index to Nursing and Allied Health
CNM	Charge Nurse Manager
CNS	Clinical Nurse Specialist
DHB	District Health Board
ECC	Emergency Care Centre
ED	Emergency Department
EWS	Early Warning Score
HDU	High Dependency Unit
ICU	Intensive Care Unit
IHI	Institute for Health Improvement
MERIT	Medical Emergency Response Improvement Team
MET	Medical Emergency Team
EWS	Early Warning Score
NeTP	New Entrant to Practice
NICE	National Institute for Health And Clinical Excellence
NFR	Not For Resuscitation
PAR	Patient At Risk
PART	Patient At Risk Team
PBMA	Programme Budgeting and Marginal Analysis
RMO	Registered Medical Officer
RRT	Rapid Response Team
SMO	Senior Medical Officer
TTS	Track and Trigger Score

Chapter one: Introduction

Introduction

As a Clinical Nurse Specialist (CNS) working in a Critical Care Outreach Team, and completing a masters study programme, the opportunity arose to explore the difference the Critical Care Outreach Team (CCOT) made to ward nurses in a New Zealand (NZ) hospital. I was aware of the existence of a paper trail at the District Health Board (DHB) that documented the establishment of the CCOT. I also worked closely with personnel who were significant participants in the establishment process of the team. During the course of my daily work I was in communication with nurses across the acute wards. It seemed the CCOT made a difference for ward nurses and I wanted to understand more about the nature of and reasons for the difference.

International literature contained several reports of nurses benefiting from CCOTs (Andrews & Waterman, 2005; Baker-McClearn & Carmel, 2008 ; Donohue & Endacott, 2010; Green & Edmonds, 2004). It was timely to conduct a research study. The service had been operational since 2006 with no study investigating the effects of the outreach team on nurses or reviewing the establishment process. Understanding how the CCOT had made a difference to ward nurses would provide insight and guidance for the continuation of the service.

Background

The research study was conducted in a large DHB in NZ with a major hospital and a minor hospital. The study is restricted to acute wards on the major hospital site. The hospital is a secondary level hospital with limited specialty services including a level two general Intensive Care Unit (ICU). Collectively the DHB provides health care services for greater than five hundred thousand people.

In 2005 the DHB and ICU were facing a demand for more ICU beds. Increasing numbers of patients were being admitted and the number of existing ICU beds was inadequate to meet patient demand. Economic demands on the DHB precluded funding further beds during this period.

Senior intensive care doctors complained that physiologically unstable patients were going unrecognised and receiving late intervention on the wards. Lack of identification of deteriorating patients, late intervention and inept care for patients are defining characteristics of suboptimal care (Quirke, Coombs, & McEldowney, 2011). The DHB was challenged to confront the situation of late recognition/late intervention against the backdrop of suboptimal ward care and limited resources.

International evidence was available which suggested that physiologically unstable ward patients were not always being recognised in a timely manner. A four month prospective study as early as 1990 suggested ward patients became physiologically unstable hours before a critical event (Schein, Hazday, Pena, Ruben, & Sprung, 1990). These authors hypothesised that cardiac arrests were preventable provided deterioration was recognised and treated early. Further results from a prospective study by McQuillan et al (1998), an audit by McGloin, Adam and Singer (1999) and a retrospective study by Hillman et al (2001) attributed suboptimal ward care as being the principle cause of unobserved patient deterioration. Other studies identified problems of inadequate supervision, failure to escalate patient treatment or seek senior advice and poor educational preparation of medical and nursing staff as reasons for the failure to recognise the physiologically unstable patient (Bright, Walker, & Bion, 2003; Goldhill, White, & Sumner, 1999; McArthur-Rouse, 2001; National Health Service Modernisation Agency, 2003; Subbe, Kruger, Rutherford, & Gemmell, 2001).

New initiatives had emerged to address these problems. The 'Medical Emergency Team' (MET) originated in Australia (Lee, Bishop, Hillman, & Daffurn, 1995) and the 'Rapid Response Team' (RRT) in the USA (Institute for Healthcare Improvement, 2006; Thomas, Force, Dodd, & Whildin, 2007). 'Critical Care Outreach Teams' and 'Patient at Risk Teams' were developed in response to the recommendations from a United Kingdom Ministry of Health directive (Department of Health, 2000). Despite originating in different countries with differing health care delivery models, new initiatives shared the common goal of shifting late recognition/late intervention to early recognition/early intervention. Medical Emergency Teams and RRT were medically-led whereas the Outreach model and Patient at Risk Teams were nurse-led initiatives. Education and early recognition were key priorities in all models. Education of nurses and junior doctors was seen as central to bringing about change together with the introduction of an early warning scoring system (Andrews & Waterman, 2005; Department of Health, 2000; Subbe, Davies, Williams, Rutherford, & Gemmell, 2003). To address the problems identified at the study hospital a MET was proposed; however, it failed to eventuate. In its place a nurse-led CCOT was implemented in 2006.

The introduction of the CCOT and an Early Warning Score (EWS) impacted primarily on ward nurses. Nurses working twenty-four hours a day, seven days a week are in a position to carry out patient assessments more frequently than any other group of health professionals in a hospital. Using a case study research approach this study explores what difference the new service provided by the CCOT made for nurses.

Aim of research

The aim of this study is to describe the implementation of Critical Care Outreach (CCO) and to understand what difference implementing a Critical Care Outreach Team (CCOT) has made to ward nurses in a secondary level general hospital in New Zealand. The aim of CCOT was to implement an early warning score, to provide education and to share appropriate intensive care skills from CCOT nurses on the wards. This study is one of a very limited number of New Zealand studies investigating a CCOT which specifically focuses on nurses and Outreach. The knowledge gained will contribute to the growing body of NZ nursing knowledge and provide insight and guidance for future strategies to ensure that the CCOT service continues at the hospital.

Change management theory

The research question for this study has been explored using Fullan's Change Management Theory (Fullan, 2007) and the elements of whole system reform (Fullan, 2010). Fullan's theory presents a three phase staged approach to change management: initiation, implementation and institutionalisation (Fullan, 2007). Principles of whole system reform guide the discussion of the study findings. Fullan's theory is straightforward and presented a practical means of presenting the data collected for the case study. The key tasks in each stage are logical and offer guidance for understanding the findings of the study.

Fullan's theory was first developed in the education sector; however, the practicality of the theory led to its successful transference into the health sector. Positive examples of the theory in action are the success of the Ontario whole system education reforms (Levin, Glaze, & Fullan, 2008) and the translation of Fullan's theory to underpin the strategies used to improve hospital emergency departments wait times in London (Fullan, 2006). Entire systems were transformed by using Fullan's (2007) three phased approach to change management and the seven components of whole system reform (Fullan, 2010). The components of whole system reform in the education context are: all children can learn, a small number of key priorities, resolute

leadership, collective capacity, strategies with precision, intelligent accountabilities, and all means all (Fullan, 2010). For the purpose of this research the concepts supporting the principles of change have been translated for use in a health sector context.

Three phases of change management

Fullan (2007) proposed three phases of change to introduce a new innovation: initiation, implementation and institutionalisation, and these are explained next.

Initiation

Initiation of change does not occur in a vacuum. The change should be considered within the contextual framework in which it will occur. The contextual framework for change in a DHB is the hospital management structure and culture and the broader NZ and international context. At the study hospital the changes were imposed indirectly by government funding which limited options to increase ICU bed numbers and impacted on solutions to resolve the problem of late recognition/late intervention. Reports of new innovations to respond to this problem were appearing in international literature from the medical and nursing communities. Pettigrew (1990) describes the contextual framework being ‘outer’ and ‘inner’ to the organisation in which the change is being contemplated. Fullan (2007) recommends considering factors of global networks and international advancements which demonstrate results in the area proposed for change.

Numerous matters require consideration during the initiation phase. They originate from a variety of sources ranging from government mandates to the thoughts of an individual (Fullan, 2007). Further concerns during the initiation phase are determining motivation for change, urgency, pressures, origins of those pressures and making the decision whether to adopt a bureaucratic or a problem solving strategy to enact the proposed change (Fullan, 2007). Recognising the motivation for change is the first step to building collective capacity. These and many more factors are deliberated during the initiation phase.

Strong leadership is vital to facilitate the process of change management and incorporate the entire complement of whole system reform elements in that process (Fullan, 2007). Great achievements are inspired by good leaders (Maccoby, 2010). Fullan (2009, p. 292) determines that leaders who achieve the best results are those who “look, listen and link”. Recruiting leaders with this calibre is a task of the initiation phase.

Collective capacity grows (collective capacity is discussed in following section). During the initiation phase, single or multiple advocates for the innovation will reveal themselves (Fullan, 2007). Exposure of this support base enables the leader to identify potential gatekeepers and change agents who will move the change forward (Fullan, 2007). This is the time where a great deal of energy is expended in the consideration of the many variables which may impinge on the proposed innovation.

Initiation may take days to years to complete. However, planning should not be an alternative to pressing forward and taking action (Levin & Fullan, 2008). During the initiation phase the key priority is established and the direction of the change identified. Initial work is made on Fullan's (2010) strategies with precision; this is expanded on shortly. The implementation phase carries on the process (Fullan, 2007, 2010). The implementation phase is fashioned by the preparatory thought and thoroughness of the initiation phase which will be revisited repeatedly throughout the change process. Each phase in the change management process is interactive and mutually reinforcing.

Implementation

Implementation is the phase where concepts are transformed into reality. Success or failure of this phase is dependent on the interaction of significant variables. Fullan (2007) has identified need, clarity, quality and practicality of the change as the primary variables to be considered.

To accomplish the principle objectives of the change, the ideas and proposed structures from the initiation phase are presented to the wider audience during the implementation phase (Fullan, 2007). Throughout this phase the initial group proposing the change is extended to include all relevant stakeholders and is managed by an administrative leader appointed for the responsibility. Through these activities collective capacity is increased.

Rationale for the proposed change must be clearly articulated if key stakeholders are to be engaged. Stakeholders need to perceive the change as desirable (Fullan, 2007). An understanding of the exact changes to take place from the innovation is crucial to success of the development. Lack of clarity has potential to sabotage a project before implementation (Fullan, 2007). Smyth (2004) cautions that during the implementation phase alternative agendas should be exposed, as dissonance in belief systems of stakeholders may potentially impede the successful implementation of the proposed change.

Means of implementing the new innovation, the aims, methods and expected outcomes must be clearly communicated. The implementation phase is the opportune time to clarify or modify plans in accordance with the values, beliefs and needs of groups affected by the change proposed. This is the period when everyone involved gains an understanding of expectations, process and the organisational learning which needs to occur to ensure a successful outcome. Organisational learning is essential to change and enriches an organisation (Park, 2010).

Quality and practicality of an innovative change interact with need and clarity. The quality of the change must concur with the organisation's overall quality plan, thereby achieving congruence with organisational values. Quality resources need to be easily useable in practice and supported by educational programmes which explain the proposed change (Fullan, 2008). The concept that everyone can learn is integrated into the development of precise strategies during the implementation stage. The goal of education is learning; therefore inclusion of educational programmes in quality resources assumes everyone can learn. Local factors heavily influence the practicality or 'how' the innovation operates in the workplace.

Foundational work during the implementation phase prepares for the effective collaboration of all services and personnel to be partners in ownership and accountability of the change. Neglect of any element of whole system reform will implode on the change management outcome. Fullan uses the term 'all means all' to refer to whole system reform. Shared understandings and commitment from senior management to the most junior nurse on the ward is essential for whole system reform and lasting change management (Fullan, 2007).

Resolution of unanticipated difficulties is achievable during the implementation phase. The implementation phase is underpinned by the initiation phase and moves into the institutionalisation of the change and is fundamental to initiating the realisation of many elements of whole system reform.

Institutionalisation

Institutionalisation is the final phase of Fullan's Change Management Theory. Lewin (1951) defines this stage as refreezing where feedback mechanisms are developed and policy implemented. Fullan (2007) cautions that the process of change is not linear and each phase must be considered at the commencement of the change management process. By considering

each phase at the beginning there is opportunity to develop feedback mechanisms and respond to the results. Feedback was sought from ward nurses in relation to the EWS chart during the implementation phase, whereas in refreezing, this would not have occurred as feedback is not sought until after the change has been implemented. Pettigrew (1990) concurs with Fullan that change is not linear and describes change as requiring a unified holistic and comprehensive approach.

Institutionalisation is the stage where the proposed change is integrated into organisational practices. For this phase to be successful specific conditions are necessary: the change must be supported by policy, have sufficient supporters competent in the change to enact it, power and control issues must have been negotiated, procedures need to be established and, finally, the change must be led by dynamic leaders. The elements of collective capacity, precise strategies and resolute leadership need to have been realised.

Institutionalisation is the phase where intelligent accountability (discussed in next section) becomes apparent. Threats to success in this phase would be lack of interest, a lack of money for resources, lack of organisational support and high staff turnover. A further threat would be failure to include all components of whole system reform. Huberman and Miles (1984) propose the notion that institutionalisation is complete once an innovation appears on an organisational quality review plan for regular review. Institutionalisation is a process which occurs as a result of all the key tasks in initiation and implementation being completed and reflects the mutually reinforcing benefit of all really does mean all (Fullan, 2010).

Key tasks specific to the proposed change are a feature of each stage of Fullan's Theory. Each stage overlaps the preceding and following stages to form cohesive change (Fullan, 2007; Levin & Fullan, 2008). Application of Fullan's phases of Change Management Theory (Fullan, 2007) has facilitated the organisation and interpretation of the study data.

Whole system reform

Lewin (1951) proposed a three step change management process: unfreeze, move, refreeze. Inherent in this model is the assumption that inertia is the major barrier to change and must be unfrozen for change to occur. Fullan (2007) however, takes a broader view of the antecedents for change. Fullan proposes that the barrier to permanent whole system reform is failure to integrate the seven elements. The solution is more complex than simply unfreezing inertia.

Permanent change is the consequence of integrating the elements of whole system reform into the phases of change management.

Whole system reform means that all aspects of an organisational change advance in a cohesive manner to achieve a specific priority (Fullan, 2010). Fullan and Levin (2009) outline the concept of whole system reform : "Whole-system reform means focusing on a small number of core policies and strategies, doing them as a set, and staying the course by not being distracted. It must be politically driven by leaders at the very top..."(p.1). The components of whole system reform are integrated into achievable goals within each stage. The non linear path of change necessitates the use of different approaches at different times during the process.

Remaining steadfast to the 'key priority' is vital for whole system reform (Levin & Fullan, 2008). Deciding the key priority to be met by a change determines strategies which will meet that priority. The key priority for CCOT was driving the change from late recognition/late intervention to early recognition/early intervention. Fullan (2006, 2010) cautions against having an excessive number of priorities in order to concentrate focus and attention on the key priority. Maintaining focus is assisted by 'strategies with precision'.

Strategies with precision are strategies which accurately target behaviours to be changed. An example would be tabling a business case for funding a CCOT. The strategy is specific to gain financial support for the project, and is directed to ultimately achieving the key priority. During the change management process a number of specific strategies are enacted to contribute to a whole system reform.

'Building capacity' is defined as any strategy which increases collective capacity to meet the key priority. This may be achieved through resources, motivation, knowledge and competencies (Levin & Fullan, 2008). Large numbers of people must be motivated for organisational or system changes to occur (Fullan, 2008). Senge (2006) emphasises the importance of nurturing individuals to contribute to the whole. Collective capacity develops through the sharing and development of collective resources and abilities from motivated participants (Fullan, 2008, 2010; Levin & Fullan, 2008). Healthcare cultures that "emphasise group affiliation, teamwork and coordination have been associated with greater implementation of continuous quality improvement practices" (T. Scott, Manion, Davies, & Marshall, 2003, p. 111). Capacity building is directly related to results (Levin & Fullan, 2008). The more people mobilise to make the change, the greater the effect.

‘Resolute leadership’ is another element of whole system reform. A resolute leader is one who forms relationships, consistently reinforces the messages underpinning the change and remains steadfast to the change management process (Fullan, 2010). Good leadership is attentive to leadership at all levels and does not focus solely on named leaders within the organisation (Levin & Fullan, 2008). Collective capacity building develops through resolute leaders (Levin & Fullan, 2008). The resolute leader provides strong leadership, keeping everyone on track to meet the key priority. Hayes (2010) makes the distinction that leaders are predominantly motivators whereas managers are responsible for accomplishing tasks.

‘All means all’ represents cohesive sustainable change where collective capacity has developed to improve the overall capacity of the organisation to change behaviour. Collective capacity is dependent on the successful integration of strategies from all the elements of whole system reform. The inclusion of strategies to enact intelligent accountabilities, for example, measures the effectiveness of a specific strategy such as the EWS through audits. Sustainable change cannot be a piecemeal exercise (Fullan, 2010).

Whole system reform is dependent on realising the notion that ‘everyone can learn’ (Fullan, 2010). Fullan (2008) recommends standardising procedures and teaching people how to use those procedures in a consistent and effective way. When the EWS was introduced to the hospital there was a series of education sessions to enable nurses to learn how to use the tool. The aim of the education sessions was to enable nurses to learn to use the EWS correctly in a consistent and reliable way both as individual practitioners and as a nursing workforce.

Policy legitimises a new innovation by embedding it into the organisation. Audit processes measure the results of collective accountability to the change. Audit results provide intelligent data for benchmarking against the key priority. ‘Intelligent accountability’ provides the evidence for sustainable strategies to meet the key priority. Successful change is achieved through the interaction and reciprocal support from the elements of whole system reform with each other (Levin & Fullan, 2008).

In summary, Fullan’s Change Management Theory offers a framework for sustainable change management. Whole system reform is achievable by integrating the elements into the phases of initiation, implementation and institutionalisation. Fullan’s Change Management Theory and

whole system reform underpin this study. Change is one quarter ideas and three quarters planning processes (Fullan, 2007). Fullan's Change Management Theory offers a simple and pragmatic approach to organise and understand the process of implementing the CCOT. The theory and elements of whole system reform support the explication of understandings, interpretations and experience of ward nurses to answer the research question.

Case study design

To understand how a CCOT operates within the geographical confines of the hospital required a methodology which focussed on describing and exploring a contemporary particular phenomenon. Case study research is known as the study of the particular (Stake, 1995). Yin (2003) recommends case study methodology to research contemporary phenomenon. The theory which has developed from studying large scale case studies in the education sector of Canada and the United Kingdom is grounded in case study research (Smyth, 2004). Case study methodology facilitated the collection of data for this study from a variety of sources. Data from interviews, a nursing focus group and documents from the DHB provide the evidence that implementing a CCOT at the hospital made a difference for nurses. Fullan's theory organised the data in a manner that facilitated interpretation and understanding.

Structure of the thesis

The research report has been structured into eight chapters. Chapter one has introduced the context and background to the study, and the theory of change employed. Chapter two presents a literature review of relevant material relating to CCOT to provide a contextual setting for the study within existing knowledge. The chapter outlines the background to CCOT, response to late recognition/late intervention, EWS, implementing a CCOT and impact of CCOT on nurses. Chapter three presents the research method and design for the study. The theoretical perspective, research approach and method used in the study are discussed. Ethical issues, data collection process and data analysis are offered.

Chapter four is the first of three chapters of data findings and analysis. Data findings are organised according to the three phases of Fullan's Change Management Theory: initiation, implementation and institutionalisation. In chapter four findings are organised by the initiation phase. Three themes are identified: increasing demand on resources, late recognition/late intervention and the proposal of a medical emergency team. In chapter five implementation, findings from DHB documents, interviews and nursing focus group were analysed by thematic

analysis to identify four themes: getting started, tools and education, communicating the EWS to wards, and early recognition/early intervention. Chapter six is the final of the chapters presenting data and is organised by Fullan's final phase in the Change Management Theory, institutionalisation. Three themes are identified: becoming permanent, the right team and support for nurses. In chapter seven major findings identified from the study are discussed in relation to the international literature reviewed and Fullan's Change Management Theory. The discussion chapter has been organised by the elements of whole system reform. Chapter eight outlines the conclusions, limitations of the study and provides recommendations for future research.

Chapter Two: Literature Review

Introduction

Critical Care Outreach Teams have been operational internationally for more than a decade. The CCOT was initiated in response to the fact that deteriorating patients on the ward received suboptimal care; there was a high incidence of unplanned admissions to ICU and a high readmission rate of discharged ICU patients. The development of these teams expanded before a critical evaluation of the impact and outcomes could be accurately assessed and researched.

Following the introduction of CCOTs a growing body of literature presenting studies using multiple methodologies has become available and offers valuable insight. Ongoing research is recommended within this literature if there is to be a greater understanding of how CCOT supports and assists the nurse on the ward caring for a deteriorating patient. However, there is a paucity of literature originating from New Zealand. Indeed, only three studies could be sourced. This gap in the literature needs attention if the New Zealand perspective is to be explored and ward nurses are to be given the support and education they require to care for the physiologically unstable patient on busy wards. The following literature review has been organised into six sections: background to CCOT, response to suboptimal care and lack of identification of the physiologically unstable patient on the ward, early warning scores, implementing a CCOT, impact on nurses and a summary of findings from the literature.

Search methods

An electronic literature search was conducted using Blackwell Synergy, Ovid MEDLINE, Science Direct, Scopus, EBSCO and Cumulative Index to Nursing and Allied Health (CINAHL). Additionally, hand searching of reference lists of key articles and key reports occurred. Keywords for data base searching were: “suboptimal care”, “early warning scores”, “critical care outreach”, “medical emergency team”, “rapid response team”, “impact on nurses” and “implementation and critical care outreach and nurse perception”. Searching was limited to English language and a timeframe of 1990-2011. A total of 1761 hits was made. All non critical care related references were excluded leaving one hundred and twenty articles to be retrieved. Eighty two of these were considered the most relevant. The decision to include articles was based on the applicability of the literature to the current study which is: Implementing a CCOT and how has this made a difference for nurses?

Background to Critical Care Outreach

A landmark study was conducted by Schein, Hazday, Pena, Ruben and Sprung (1990) who collected data on patients who proceeded to cardiac arrest in a 1200 bed hospital in the USA over a four month period. Cardiac arrest patients' records for the twenty four hours preceding the arrest were reviewed together with initial presentation to hospital, current medical problems, clinical and laboratory findings, new patient complaints and nursing observations. Results from Schein et al. suggested the possibility of predicting and preventing cardiac arrests if the preceding clinical abnormalities of the patient had been identified and if that patient had received appropriate intervention. Schein et al. hypothesized that cardiac arrest resulted from a cumulative deterioration of physiological stability, not solely a cardiac event. Evidence from this study supported the hypothesis that patients proceeding to cardiac arrest had a trail of physiological instability prior to that event. A total of 84 percent of patients who suffered a cardiac arrest had evidence of clinical deterioration eight hours prior to the arrest. Schein et al. recommended further investigation into the early detection and prevention of cardiopulmonary arrests. The evidence from the Schein study made a major contribution to the awareness of preventable patient deterioration on the ward and spearheaded the way for future innovations such as a CCOT.

A six month audit of hospital deaths in a London teaching hospital by McGloin, Adam and Slinger (1999) determined that potentially avoidable deaths were occurring and patients were receiving suboptimal ward care. Suboptimal care was defined as:

> Non-recognition of an abnormality clearly apparent from physiological recordings and laboratory data, but which had not been identified in the case records or not acted upon with any obvious therapeutic intervention; clearly inappropriate or inadequate treatment, although the case records showed that the abnormality had been identified by nursing or medical staff (p. 256).

In a recently published concept analysis about suboptimal care Quirke, Coombs and McEldowney (2011, p. 1) support McGloin's et al (1999) definition of suboptimal care and also expand the argument to include "patient complexity, healthcare workforce, organisation and education" as precursor elements in the process.

McGloin et al (1999) found increased rates of mortality in patients receiving suboptimal care prior to transfer to intensive care. These authors recommended that medical and nursing staff should be educated in early identification of clinical deterioration and management. A further recommendation was for the formation of a medical emergency team to manage patients who were acutely physiologically unstable. The latter recommendation was issued with a caution that the evidence for success of such a team was not yet validated (McGloin et al., 1999). Results from a prospective inquiry by McQuillan et al. (1998) were verified by the findings from McGloin et al. (1999) and endorsed the recommendations. In addition to McGloin's findings, McQuillan et al. (1998) highlighted the lack of supervision in clinical areas and emphasised that a change in ethos was required with the provision of more senior clinical involvement at an earlier stage. The study also identified that the majority of patients were treated by the most junior personnel. A final recommendation advocated for organisational change and re-evaluation of systems (McQuillan et al., 1998). In a letter published in the British Medical Journal, Garrard and Young (1998) called for the inclusion of nurses in the emergency team, improved training for junior medical staff and for intensive care units to integrate into the mainstream of the hospital.

Each of these studies originated in the northern hemisphere; however, the problems identified were global. An international multicentre prospective observational study, the ACADEMIA study, identified that cardiac arrests following a period of physiological instability of a ward patient were more common in the United Kingdom than in Australia and New Zealand whereas unanticipated ICU admissions were more common in Australia and NZ (Kause et al., 2004). An Australian study by Hillman et al. (2001) reiterated earlier findings that patients who proceeded to a cardiac arrest or unplanned admission to intensive care had physiological abnormalities hours before the event and were often suboptimally treated in the wards. In the study by Goldhill, White and Sumner (1999), evidence verified that intensive care patients with the greatest mortality rates come from the wards. These studies raise the question of whether patients would have had the same outcome if they had been identified earlier. The limited evidence from NZ does not establish whether the situation of suboptimal treatment and lack of identification of the physiologically unstable patient on the ward occurs in NZ. However, the concerns highlighted by Schein, McGloin, McQuillan and the Australian researchers are too important to ignore and, a report from the HDC supported the motivation for change which would reduce delay in care and address systematic issues.

In 1993 the New Zealand health system was subjected to a radical re-engineering based on market competition, generic management and managerialism in an attempt to reduce the

national budget deficit. The long term effects on nursing have seen a reduction in the number of nurses (Department of Labour Executive Summary, 2004) increased nursing workloads, patients with increased care needs, shattered nursing leadership, and senior nurses replaced by new graduates on the wards (McCloskey & Diers, 2005). In the wider political context of the health sector the drive for quality management was escalating with new and innovative systems such as Optimising the Patient Journey, Releasing Time to Care emerging as examples. Within this environment the impetus to address sub-optimal care on wards was occurring and is discussed in the following section.

Response to suboptimal care

Internationally, interest was stimulated to search for ways to redress the problems of how best to respond with timely appropriate management for the patient critically ill on a ward. One innovative initiative that emerged was the Medical Emergency Team (MET). The MET, which has the specific role of identifying and managing at risk patients, is physician led and originated in Australia (Lee et al., 1995; McGaughey, Blackwood, O'Halloran, Trinder, & Porter, 2009). There appears to be strong evidence from studies with large numbers (n= 21,090 n=1510) that hospitals with a MET reduce the unplanned admissions to intensive care and there is a corresponding decrease in hospital wide cardiac arrest rate (Bellomo et al., 2003; Bristow et al., 2000; Buist et al., 2002). These findings were disputed by results from the Medical Emergency Response Improvement Team (MERIT) study which failed to show an effect from MET on rates of cardiac arrest, unexpected death or unplanned admissions to ICU (MERIT Study Investigators, 2005). The MERIT study is a randomised multicentre study which assigned 23 participating hospitals to standard care or care supported by a MET. However, challenges to design methodology, particularly the lack of statistical power, meant the results are inconclusive (Peberdy et al., 2007). In contrast to MERIT, the Institute for Health Improvement (IHI) consider that Rapid Response Teams (RRT), the USA equivalent to MET teams, offer a positive choice for revolutionising the response to the deteriorating patient in the ward (Institute for Healthcare Improvement, 2006).

The question of intensive care discharge mortality was investigated by Wallis, Davies and Shearer (1997). Conclusions from this study established that deaths were from multi factorial causes with suboptimal ward care being a contributory factor. An estimate of cost to the National Health Service in the United Kingdom from preventable patient deterioration and increased use of bed days was £1 billion annually (Vincent, Neale, & Woloshynowych, 2001).

In the year 2000 the United Kingdom Department of Health issued a comprehensive document reviewing adult critical care services (Department of Health, 2000). The lack of intensive care beds nationally per capita and the challenges this situation presented for clinicians caring for unstable patients outside the ICU was acknowledged. This document laid the foundation for the establishment and development of the CCOT in the United Kingdom and presented ICUs with a challenge to disestablish the traditional isolation of intensive care units. The document called for the "breaking down of barriers between specialties and professions" (Department of Health, 2000, p. 3). The vision was for a comprehensive critical care service including an outreach of critical care services to the wards. Three specific goals for the outreach were outlined, namely the prevention of unplanned or preventable admissions to ICUs, continued support for discharged patients from the intensive care services, and the education of ward staff through the sharing of critical care skills and knowledge appropriate to ward situations (Department of Health, 2000). The phrase 'critical care without walls' evolved from the aims for outreach (Coombs & Dillon, 2002). This landmark document opened the doors to a new era in intensive care nursing and medicine in the United Kingdom. Patient need, not specialty, was to become the directive for the future of critical care services (Coombs & Dillon, 2002).

Subsequent to the Critical Care service review, senior critical care nurses embraced the role of developing CCOT or Patient at Risk Teams (PART) (Coombs & Dillon, 2002). Teams developed to meet the needs of the individual hospitals, working across traditional barriers and offering a global view of a hospital not previously experienced by the critical care services (Coombs & Dillon, 2002). There was no uniformity amongst the teams from differing hospitals (National Health Service Modernisation Agency, 2003). Hillman (2003) reiterated the point that local factors played a decisive role in the development of a local CCOT. An emergent field for professional development and career pathways for critical care nurses was created.

In a foreword to the National Health Service Modernisation Agency document (2003), the Chief Nursing Officer for England, Sarah Mullally, made three important points: CCOT has "broken down professional and organisational barriers"; "CCOT assists understanding between levels of patient need and skills and knowledge required by multidisciplinary teams to meet those needs"; and finally "the next step would be to build the evidence that CCOT improves patient care" (National Health Service Modernisation Agency, 2003, p. 3). These statements by Mullally are supported by evidence from other literature identifying organisational problems of inadequate supervision, failure to escalate treatment or seek senior advice, and poor educational preparation of medical and nursing staff as being of significance when caring for the physiologically unstable patient (Bright et al., 2003; Goldhill, McNarry, Mandesloot, & McGinley, 2005;

McArthur-Rouse, 2001; National Health Service Modernisation Agency, 2003; Subbe et al., 2001; Subbe, Williams, Fligelstone, & Gemmell, 2005). Additionally, Bright et al. (2003) identified recruitment and retention of nurses as factors affecting patient care together with the long hours junior doctors were working and the reduction in staffing numbers after hours.

While the MET and the CCOTs were evolving in Australia and the United Kingdom, the Institute for Health Improvement (IHI) was actively promoting RRT in USA hospitals (Thomas et al., 2007). The underlying problems identified as 'failure to rescue' had been acknowledged as the same problems documented in the United Kingdom and Australian literature (Thomas et al., 2007). An increasing body of knowledge was accumulating internationally which had established that there was a significant problem in ward care of the physiologically unstable patient in need of timely appropriate intervention if they were to survive. The evidence for what was the best solution was still evolving but new innovations such as the CCOT, PART, RRT and MET were appearing across the globe.

Early warning scoring systems

A concurrent development with these teams was the introduction of 'Early Warning Systems' or 'Track and Trigger' systems. Timely communication of abnormal vital signs to ensure appropriate management of patient symptoms requires a system that is simple and effective (Cooper & Buist, 2008). Early warning scores (EWS) or track and trigger systems (TTS) fulfil these criteria. The use of a physiological scoring system which draws attention to abnormal vital signs to identify a patient at risk of further deterioration is discussed extensively in the literature (Andrews & Waterman, 2005; Cuthbertson, Massoud, McKie, Aucott, & Prescott, 2007; Duckitt et al., 2007; Goldhill & McNarry, 2004; National Health Service Modernisation Agency, 2003; R. Ryan, Cadman, & Hann, 2004; Schein et al., 1990; Subbe et al., 2003; Subbe et al., 2001; Williams & Wheeler, 2009). Despite the widespread introduction of EWS or TTS there is no uniformity in the parameters to trigger a response from the MET, RRT, CCOT or PART team operating in individual hospitals (G. Smith, Prytherch, Schmidt, Featherstone, & Higgins, 2008). It is important to note that EWS are not evidenced based and individual hospitals develop their own (Gao, McDonnell, et al., 2007; Peberdy et al., 2007). The Australian Commission on Safety and Quality in Healthcare recognised this lack of consensus and has embarked upon a process to rectify the lack of a validated EWS in the Patient at Risk project plan (Australian Commission on Safety and Quality in Healthcare, 2009). The question of how to design an observation chart for maximal effectiveness has also been raised by the Australian

Commission on Safety and Quality in Healthcare as there is no research on this (Australian Commission on Safety and Quality in Healthcare, 2009).

The basis for many EWS comes about by ascribing a numerical value to abnormal blood pressure, heart rate, respiratory rate, level of consciousness, urine output and oxygen saturations. These values are then collated and the sum triggers a graded response from the CCOT and medical team depending on the total. The precise sensitivity and specificity of EWS to predict outcome has not been established (Cretikos et al., 2007). Increased sensitivity will increase the numbers of unwell but not critically ill patients identified to the numbers of critically ill patients, while insufficient sensitivity of a EWS will potentially overlook the target patient group (Gao, McDonnell, et al., 2007; G. Smith et al., 2008). Activation of EWS is dependent upon the recording of patient vital signs and the correct collation of summative scores. Research has determined that respiratory rates are not recorded as frequently as other observations (Cretikos et al., 2008), and EWS are frequently incomplete, and often contain scoring errors (A. Smith & Oakley, 2006). In a small study, Hogan (2006) attempted to identify why nurses did not record patient vital signs. Reasons identified were organisational, such as workload and availability of equipment. Professional issues acknowledged were clinical judgement, educational preparation and skill mix as contributory factors (Hogan, 2006).

Recently published work by DeVita et al. (2010) expands the previous argument and cautions that increased observations are not a replacement for a well educated nursing workforce. The authors challenge hospitals to match resources to patient need. There is no consensus on the ideal interval between recording of vital signs but a personalised monitoring plan is the optimal way to manage individual patient need (DeVita et al., 2010). Nurses need education to use EWS correctly while both nurses and doctors require further education to understand the significance of EWS scores and respond with appropriate and timely nursing and medical interventions (Kisiel & Perkins, 2006; McArthur-Rouse, 2001; Subbe et al., 2005).

Despite the lack of consensus on EWS values and the TTS systems, research continues to advocate for the continuance of such criteria for summoning assistance for the physiologically unstable ward patient (Lighthall, Markar, & Hsiung, 2009). Multifaceted interventions such as EWS, TTS and CCOT may benefit patients who are unstable on the wards (Mitchell et al., 2010). The quantifiable evidence generated by an EWS improves communication between nursing and medical staff and increases nurses' confidence to relay these facts (Andrews & Waterman, 2005). The National Institute for Clinical Excellence (NICE) recommended TTS be

established as a priority in acute hospitals (National Institute for Health and Clinical Excellence, 2007).

Whilst EWS or TTS identify the physiologically unstable patient on the ward, it is important to acknowledge that for some patients, deterioration is an expected terminal event and increasing therapeutic management would not be in the best interest of the patient. For other patients with a history of significant co-morbidities, ICU may never change the outcome of their progressive disease process. According to Williams and Wheeler (2009) clinical decision making after consideration of acute deterioration and chronic health status continues to guide the intensivists judgement call whether to admit a patient to an ICU or not. However, these patients still need to be identified in a timely manner to facilitate apposite decision making; EWS are a way of achieving this goal. Until a validated replacement for EWS becomes available it would appear from the evidence presented that the utilisation of EWS in acute ward settings offers a measure of safety for the physiologically unstable patient on the ward.

Implementing a critical care outreach

Healthcare institutions throughout the world reflect their local communities in response to the local population healthcare needs. Therefore it would be expected that CCOT would demonstrate a variety of implementation diversity. However, the disparities in the literature do not demonstrate significantly different approaches for implementing CCOT between countries. The accumulated body of evidence concerning physiologically unstable patients on the wards who are at risk of suboptimal treatment prompted international healthcare institutions to respond by implementing CCOTs, RRTs and METs as measures to rectify the problem. Nevertheless, no protocol existed to guide the decision of which model would best serve a particular institution (Wolfe, 2008) or how to implement the chosen system. It appears from the literature that the nursing profession responded to the opportunity by developing and leading CCOT with nurse consultants, CNS and nurse practitioners contributing leadership (Jenkins & Lindsey, 2010; McDonnell et al., 2007; Schweickert, 2010; Thomas et al., 2007; Watson et al., 2006).

There are differences between the MET and the CCOT and RRT. Fundamentally the MET is a physician led team which has the capabilities of immediate medical intervention, whereas the RRT and CCOT are intermediary systems, often nurse led, which must refer to ICU medical colleagues for further critical care intervention if required (Schweickert, 2010). Despite these differences, all teams share common goals: recognition of the physiologically unstable patient,

timely appropriate intervention and the sharing of critical care skills and support for nursing staff on the ward. Nurse-led teams offer a scope for advanced nursing practice, leadership and educational opportunities. Bedside teaching is a powerful tool during a clinical crisis.

Implementing a CCOT must be a carefully and well-planned process as there are many factors to consider if the team is to be successful (Coombs & Dillon, 2002). Key elements in the process have been identified as administrative, professional, educational and operational, or as Schweickert (2010) suggests, comprised of nurse and physician, chairperson and administrator. Despite Schweickert's omission of education in the list there is a clear call for education in his review of the infrastructure necessary for the RRT. Appointing a leader to take responsibility for the project, open communication with principal stakeholders, and securing management commitment are some administrative tasks (Carter, 2008; Coombs & Dillon, 2002; S. Scott & Elliott, 2009; Wolfe, 2008). Other tasks to be completed are the clarification of resourcing issues, identification of a data collection system, choice of a model and role definition and composition of the team (Watson et al., 2006). Resources are one of the chief determinants of the structure and composition of CCOT (S. Scott & Elliott, 2009). This may explain why there is no uniformity in size, structure, and composition of teams (McDonnell et al., 2007). Schweickert (2010) suggests that there is no ideal number or composition of team members.

Professional considerations

Professional issues are varied. They range from maintaining the balance of senior ICU nurses in ICU by not recruiting too many to CCOT, to establishing rapport with ward nurses and convincing distrustful colleagues of the value of a CCOT (Sharpley & Holden, 2004). Watson et al. (2006) concluded from their cluster randomised study in York Hospital that the calibre of the nurses recruited into CCOT positions was vital to the success of the team. Nurses need to be senior nurses who are clinically astute, capable of making decisions and who have demonstrated the ability to share critical care skills and knowledge with ward nurses (Jamieson, Ferrell, & Rutledge, 2008). Pirret (2008) foresees that there is a potential professional development opportunity for CCOT nurses to advance to the nurse practitioner level. It would be prudent to consider not only the cost implications but the benefits which would arise from having nurse practitioners as members of the CCOT.

Whilst nurses are central to the success of implementing a CCOT, close liaison and collaboration with medical personnel is also vital to successfully escalate care of the physiologically unstable patient in the ward. Critical Care Outreach Teams are usually

supported by ICU registrars and ICU consultants in consultation with the relevant surgeon or physician (Aneman & Parr, 2006; Carter, 2008; Priestley et al., 2004). A priority is to establish a referral pathway and method of communicating with the patient's primary hospital team (Thomas et al., 2007). Provision of a supplementary service while the patient's care remains the responsibility of the primary hospital team is a professional pathway with the potential for tensions. Tensions between specialities may arise when the traditional care delivery model on the wards is challenged (Odell, Victor, & Oliver, 2009). Traditionally the primary hospital team invites a consultation from a different specialty, whereas with the EWS and escalation response from CCOT, another specialty may see a patient unbeknown to the primary hospital team. Communication between teams ensures continuity of care and intra-team co-operation.

Educational considerations

Education to enhance the abilities of ward nurses and junior doctors to accurately assess and escalate care of the physiologically unstable patient on the ward must be addressed if a CCOT is to be effective. Despite the lack of an evidence-base the EWS offers a tool to identify the deteriorating patient and is recommended for use in medical and surgical wards (Andrews & Waterman, 2005; Cuthbertson, Massoud, McKie, Aucott, & Prescott, 2007; Duckitt, et al., 2007; Goldhill & McNarry, 2004; National Health Service Modernisation Agency, 2003; Ryan, Cadman, & Hann, 2004; Schein, et al., 1990; Subbe, Davies, Williams, Rutherford, & Gemmell, 2003; Subbe, et al., 2001; Williams & Wheeler, 2009). Throughout the literature, which is predominantly descriptive and explorative, it is recommended that an EWS is developed during the planning stages of a CCOT (Thomas et al., 2007). The use of an EWS needs training and education (Carter, 2008; Sharpley & Holden, 2004). Concurrent educational packages should include Acute Life Threatening Events, Recognition and Treatment (ALERT) courses for multidiscliplinary professionals. An ALERT course assists the early recognition of and intervention for the critically ill patient and helps bridge any knowledge deficit of ward nurses and multidiscliplinary staff (Robson, 2002; Sharpley & Holden, 2004). Education from a CCOT is not restricted to formal sessions. The effectiveness of informal bedside teaching and support combined with a formal education package to ensure the success of a CCOT was validated by a ward-randomised trial conducted by Priestley et al. (2004). This trial involved four weeks of informal and formal training prior to the introduction of a CCOT. The results from the Priestley study suggested that CCOT reduces mortality in general wards (Priestley et al., 2004). While a short study such as Priestley's contributes to the debate, a more prolonged trial to test the sustainability of the training results is required.

Operational considerations

When introducing a CCOT to a hospital the operational decisions to be made during the implementation stage relate to hours of service provision and how to launch the CCOT in the hospital. Watson et al. (2006) recommend a 24 hour service to cover for senior nurse absences out of hours. However, financial considerations may be influential in the final structure of a CCOT. Conversely, Schweickert (2010) advocates for individual solutions to meet the needs of the individual organisation. Despite the literature being from mainly descriptive or explorative studies there is a consensus from the results which supports a phasing in of CCOT (Carter, 2008; Sharpley & Holden, 2004; Watson et al., 2006; Wolfe, 2008). A CCOT must be adaptive to the operational environment in which it functions as each hospital has a culture and mode of operation unique to that healthcare facility. Resistance should be anticipated but with ongoing support and a high visibility of CCOT nurses, resistance should not hinder the progress of introducing a CCOT (Sharpley & Holden, 2004). Wards with an enthusiastic leader will have a higher level of integration of the CCOT than wards where the leadership is indifferent (Carter, 2008). This suggests that nursing leadership across the institution is a contributing factor to the success of the CCOT. A CCOT evolves in response to institutional policies, operational imperatives and commitment from individual organisations (Coombs & Dillon, 2002). Although further research has been advocated, multiple operational environments render reproducible research challenging (Schweickert, 2010) and the transferability of the existing research questionable.

There is no blueprint for implementing a CCOT. However, current literature offers valuable insights from established CCOTs. With the knowledge from existing studies there is enormous scope to improve and develop a CCOT, tailoring it to the culture of individual hospitals and patient populations. As CCOTs continue to develop, further research will continue to increase the evidence both qualitative and quantitative, to validate the team contribution to early detection and timely appropriate management of the critically ill patient on the ward. While evidence for the efficacy of a CCOT remains equivocal there have been no empirical studies to declare that CCOTs or METs have adverse outcomes (Aneman & Parr, 2006). A key factor in the present study is to consider the impact of CCOT on nurses.

Impact of CCOT on ward nurses

The implementation of CCOT has occurred in many healthcare institutions without pre-testing or pilot schemes. The opportunity to conduct randomised controlled trials has passed, which prompts speculation whether there is an impact from CCOT (Cuthbertson et al., 2007).

Evaluating the impact of CCOT has been approached from a mainly positivist perspective. Quantitative studies produce statistics which management teams utilise to justify expenditure for CCOT and continuity of the service. However, the impact of CCOT is not solely a positivist phenomenon. Indeed, as Baxter (2006) asserts, it is the bedside nurse who is the most important member of the team. This leads to the question of how best to determine the impact of a CCOT on the ward nurse. In this section of the literature review, research from both a quantitative and qualitative perspectives is presented.

Quantitative perspective

The most frequently documented outcome measures for CCOT from a range of systematic reviews, retrospective cohort studies and non-randomised population based studies are rates of mortality, cardiac arrest, unplanned admissions to ICU and number of readmissions to ICU (Baxter, 2006; Chan et al., 2008; Chen et al., 2008; Devita et al., 2006; Esmonde et al., 2006; Gao, Harrison, et al., 2007; Garcea, Thomasset, McClelland, Leslie, & Berry, 2004; Jones, DeVita, & Bellomo, 2011). Results from the MERIT study did not report successful outcomes from MET. However, as previously mentioned, design methodology and loss of statistical power may have impacted on the conclusions (Peberdy et al., 2007).

Generally, results from studies are inconclusive, with frequent use of terminology indicating there was a possibility that mortality rates appear to have decreased or appear to have had an impact on readmissions, or seem to improve patient outcome since the introduction of CCOT (Ball, Kirkby, & Williams, 2003). Be that as it may, throughout the literature there are careful inferences of successful outcomes. An unequivocal statement from Chan, Jain, Nallmothu, Berg and Sasson (2010), who conducted a systematic review and meta-analysis, asserts that there is a decrease in inpatient cardiopulmonary resuscitation but not overall hospital mortality since the introduction of MET. Chen et al. (2008) have established that one in every 12 MET calls resulted in a Not for Resuscitation (NFR) order whereas in non MET hospitals one out of every 33 cardiac arrest calls concluded with a NFR order. The influence from the presence of a MET in a hospital may therefore impact on NFR orders (Chen et al., 2008). The presence of senior medical personnel in the MET may well be the reason for the increase in NFR orders as it is usually the responsibility of senior doctors to be responsible for NFR documentation after consideration of all the issues. Establishing the resuscitation status of a patient assists nurses to care for patient and whanau[1] in the most supportive and therapeutic way. The need of a patient

[1] Whanau; Maori family unit

who has palliative care needs is significantly different from a patient who has rehabilitative care requirements. Nurses must have information to enable an appropriate response.

Further study findings indicate alternative influences from CCOT. In a retrospective analysis of 105 haematology patients results suggest that CCOT and EWS have had a positive effect on outcomes for this group of patients through the early detection of physiological instability and earlier ICU involvement (Bokhari et al., 2009). According to Story, Shelton, Poustie, Colin-Thome and McNicol (2004), CCOTs have been instrumental in the detection of myocardial infarction and reduction of other potentially life threatening conditions. Chen et al. (2009) reported an improvement in the frequency and accuracy of vital sign documentation since the introduction of MET while Schweickert (2010) reflected on the improved feedback mechanism to wards since the introduction of CCOT.

Whilst quantitative studies produce statistical data, the positivist approach does not explore the experience of the ward nurse since the introduction of CCOT. The use of EWS, increased documentation of NFR, availability of CCOT nurses and an increased focus on the requirement for observation of vital signs and early detection of the physiologically unstable patient do impact on ward nurses. Increasingly in the literature, attempts to capture the ward nurse's experience of working in an environment where a CCOT is operational are being published.

Qualitative perspective

Case studies, semi-structured interviews, audit, and exploratory studies are examples of the methodologies used in studies to determine the impact of CCOT on ward nurses. Despite the differences in these methodologies common themes emerged from the results. The CCOT has impacted on ward nurses by offering support in clinically difficult situations. The active participation of CCOT during clinical decision making with the medical teams is perceived to result in more timely care and offers a conclusive outcome for the ward nurse often struggling to obtain a plan of care for patients while caring for several other patients (Baker-McClearn & Carmel, 2008). Ward nurses respect the expertise and leadership that the CCOT bring to the wards and are reassured by their presence and authority (Baker-McClearn & Carmel, 2008 ; Chellel, Higgs, & Scholes, 2006). Outreach nurses are identified as expert communicators and role models who are available and accessible to ward nurses (Athifa et al., 2011; Baker-McClearn & Carmel, 2008). These traits are recognised as empowering for nurses with the consequence of increasing ward nurse confidence. The accessibility of the CCOT nurse is valued for the educational input offered at the bedside particularly when patients with

tracheostomies are transferred to the ward from ICU (Green & Edmonds, 2004). Assessment skills of the CCOT nurses are readily shared and valued by their ward nurse colleagues who confirm improvement in their own skills as a consequence (Chellel et al., 2006; Donohue & Endacott, 2010; Ruth Endacott et al., 2009; Green & Edmonds, 2004; Thomas et al., 2007). In a small qualitative study (n=11), Donohue and Endacott (2010) established that ward nurses enjoyed a greater level of support through CCOTs and the teamwork they facilitate with multidisciplinary teams.

The introduction of EWS has had a significant impact on ward nurses. Ward nurses confirm that medical staff responses are more timely (R. Ryan et al., 2004). A more timely response from doctors suggests that a reduction of anxiety and frustration for the ward nurse may be possible. According to Andrews and Waterman (2005), ward nurses report increased confidence in the use of medical terminology as a result of the EWS and exposure to senior ICU nurses in the CCOT. Patients are prioritised and allocated according to the EWS and frequencies of observations are determined by the EWS as it offers a framework for escalation of patient care understood by both medical and nursing practitioners (Andrews & Waterman, 2005; R. Ryan et al., 2004). In a large United Kingdom hospital it was found by aligning CCOT with clinical governance and incident reporting, an emphasis on monitoring of patients and creating a safe culture has occurred (Heaps, Thorley, & Langley, 2005). The spin off from this is improved patient care and reduction in readmission of patients to ICU (Heaps et al., 2005). Working in a safe culture appears to have a positive influence on ward nursing staff.

Establishment of CCOT has broken down the barriers between ICU and the wards. Ward nurses are positively receptive to opportunities to learn from CCOT and the ALERT course (Baker-McClearn & Carmel, 2008 ; R. Endacott & Chaboyer, 2006). However, concern that ward nurses and junior doctors may become deskilled by CCOT responding to patients in critical condition on the wards has been documented (Chaboyer, Gillespie, Foster, & Kendall, 2004). Despite this apprehension it would appear from the literature that, rather than de-skilling nurses, a CCOT builds confidence, improves communication, and presents opportunities for learning and professional development.

The presence of CCOT in hospitals has made a significant impact on care for the physiologically unstable patient and nurses caring for these patients. While overall mortality of patients has not declined, unplanned admissions and readmissions to ICU have been reduced (Esmonde et al., 2006). Sustaining a CCOT requires resources which, in the fiscally driven

climate of healthcare delivery, are finite. Outreach will only survive if it is underpinned by research and found to contribute value to patient outcomes and to support existing systems.

Summary

The literature presented very clearly establishes the justification for instituting a CCOT and utilising a EWS. A phased approach to the introduction of a CCOT is also recommended regardless of the fact that there are no specific guidelines to stipulate an ideal team composition or mandate. Existing studies recommend further research which explores the impact of CCOTs and advocate for further studies to explore and evaluate more specifically how ward nurses are affected by CCOT. The studies in this literature review have furnished valuable evidence for the impact of CCOT on mortality, cardiac arrest rates and unplanned admissions to ICU and readmissions to ICU. Further studies have offered explanations that CCOT supports, empowers, educates, offers professional role modelling, increases confidence, improves communication and provides a system to escalate the care of the physiologically unstable patient for ward nurses. What the literature does not determine is the impact a CCOT launched in a NZ hospital would have on ward nurses in that environment.

Internationally, CCOTs have developed to meet individual healthcare institutional needs. Inherent in this phenomena is the premise that different healthcare systems have different understandings and care delivery strategies. This presupposes that CCOT would be understood in many varied ways. Because the NZ healthcare environment also has a unique culture, the generalisability of existing study results is challenged within the NZ context. There is a paucity of NZ generated literature; only three studies were sourced: the ACADEMIA study (2004), the study by Pirret (2008) which measures the effectiveness of a nurse practitioner led CCOT service and the concept analysis of suboptimal care by Quirke et al (2011). Clearly it is imperative to explore the untapped reservoir of nursing knowledge and understandings which will focus the continuing direction of CCOT in the hospital and assist other CCOTs in NZ.

Exposition of local understandings will go some way to redress what Endacott and Chaboyer (2006, p. 94) describe as “cross-fertilisation of evidence, from Australia and United Kingdom” and advance the unique perspective of the NZ experience. Local appreciation of the impact of CCOTs on ward nurses will be valuable to meet the ongoing needs of those nurses caring for patients on the ward. Maintaining the momentum for early detection and identification of the physiologically unstable patient requires an understanding of how a CCOT impacts on ward nurses in a constantly changing healthcare environment. Research is highly recommended if the

ongoing support needs of ward nurses are to be understood and met. It is only by meeting these needs that the physiologically unstable patient will continue to be safe on the ward and a situation of suboptimal care does not continue and proliferate. The present study will contribute to the NZ literature by exploring the implementation of a CCOT and the difference it has made to nurses on the acute wards of a NZ hospital.

Chapter Three: Methodology and method

Introduction

This chapter presents the theoretical perspective, methodology, and method of data collection and data analysis process for the study. Case study was chosen for its suitability to answer the research question: What difference has CCOT made to nurses? Ethical issues and approvals are presented. Interviews, a nursing focus group and DHB documents provided data for the study. Participants were recruited by purposive sampling. A five-step approach underpinned by Fullan's Change Management theory guided the data analysis process.

Theoretical perspective

The theoretical perspective for the study is guided from an interpretative paradigm. The major assumptions of the interpretative paradigm are that reality is subjective. People construct and deconstruct their worlds. Knowledge is created through an interpretative interactive process. The law of cause and effect is forfeited to the subjective experiences and interpretations of reality brought to the research from the researcher (Denzin & Lincoln, 2000). Multiple realities and understandings and complex interactions occur in a hospital. Rich contextual information is bound within these realities and understandings. Explicating information requires the researcher to interact and focus on the subjective and nonquantifiable to understand the phenomena being studied (Denzin & Lincoln, 2000). The interpretative paradigm facilitates a holistic approach to answering the study question.

Acknowledgement by the researcher that knowledge from the positivist paradigm is valid contributes to the bricolage of data. A bricolage is "a complex array of data derived from many sources and using a variety of methods" (Polit & Beck, 2008, p. 219). While limited quantitative data has been included in the study, positivism, which separates the researcher from the process and "stems from the conviction that scientific knowledge is both accurate and certain" (Crotty, 1998, p. 29) serves only to support the realities of the participants. Therefore positivism is not an appropriate paradigm to dominate this study. The study seeks an in-depth understanding of information embedded in a highly contextualised environment where interpretation, not scientific accuracy, is valued. Understandings and knowledge will emerge through an interpretative approach to answer the research question.

Methodology for individual studies is determined by the research question. The research question submitted for this study requires methodology that is flexible. Capacity to accommodate both interpretive and limited quantitative data to answer the question of 'Has Critical Care Outreach made a difference for nurses?' must be a component of the methodology. Luck, Jackson and Usher (2006) suggest that case study research offers a bridge across paradigms, making it an appropriate methodology to answer the research question. Case study research supports the investigation of a contemporary contextualised phenomenon over which the researcher has no control and may include both qualitative and quantitative methods (Yin, 2003).

The ability to use both quantitative and qualitative data in case study methodology sat well with my ontological position as a critical care nurse. As a member of the CCOT with a background in critical care nursing the ontological realities of my practice are guided by both medical and nursing perspectives. The medical model is based on scientific objectivism, whereas nursing hermeneutics holds "that the lived experience is inherently an interpretative process" (Polit & Beck, 2008, p. 229).

Critical care nurses and CCOT nurses experience both positivist and interpretive paradigms in practice when assessing patients. They value the objective data of vital signs, blood test results and other quantifiable evidence. However, past knowledge and clinical experience augment the objective data and bring another level of interpretation to the clinical facts. Data interpreted in conjunction with other possibilities drawn from experience enhances assessment of often physiologically unstable patients. Thus my ontological position, my way of being in practice, is a combination of positivist and interpretivist paradigms.

Epistemology, or the relationship between the researcher and those being researched (Polit & Beck, 2008; Schwandt, 2000), can be defined from both positivist and interpretivist paradigms. The positivist asserts that "the inquirer is independent from those being researched and findings are not influenced by the researcher" (Polit & Beck, 2008, p. 14), whereas the interpretivist asserts that there is an interactive process occurring between the researcher and researched and "findings are a creation of the interactive process" (Polit & Beck, 2008, p. 14). The interpretative process requires the researcher to understand what meaning the research participant has ascribed to an action (Schwandt, 2000).

Data for the study is from multiple sources, documents, interviews and one nursing focus group. Content in documents is derived from DHB policies, decision papers and a collection of records related to CCOT and supplemented by statistics generated from records events and admission rates. These documents are a collection of related evidence, facts and figures generated independently of the researcher, whereas the findings from interviews and the nursing focus group are the product of an interpretivist process. Data findings from documents, interviews and nursing focus group are triangulated during the data analysis process. Triangulation of study data leads to results which are validated from multiple sources (Denzin & Lincoln, 2000; Polit & Beck, 2008). This case study therefore employs both positivist and interpretivist epistemologies.

Case study methodology

The two main theorists of case study methodology informing this study are Yin (2003) and Stake (1995). Stake (1995) proposes that there are three forms of case study: intrinsic, where the case is studied for its own sake; instrumental, where the case is studied from an epistemological perspective to understand related issues and from an ontolological perspective to study phenomena of interest; collective, where the single case (either intrinsic or instrumental) is extended to include many cases. Yin (2003, p. 1) recommends case study when "the focus is on a contemporary phenomena" and the research seeks to determine the "how" of a situation.

Case study research is distinct from the instructive case study found in educational forums. The educational case study is used as a learning aid when an individual is presenting health problems (Darke, Shanks, & Broadbent, 1998). The objective of a teaching case is to effectively demonstrate a point, whereas case study research answers a research question. Results emerge from data analysis and interpretation (Darke et al., 1998) and the veracity of findings is not manipulated.

Using Stake's (1995) definitions, this study is instrumental. The aim of this study is to describe the implementation of Critical Care Outreach (CCO) and to understand what difference implementing a Critical Care Outreach Team (CCOT) has made to ward nurses in a secondary level general hospital in New Zealand. Instrumental case study methodology promotes the explication of underlying issues which the research question has been designed to explore (Bergen & While, 2000).

Case study research is known as the study of the particular (Stake, 1995). Luck, Jackson and Usher (2006) suggest that case study research has particular boundaries within a geographically defined context. The boundaries for this case are well defined and limited to the hospital. The geographical area for this study is the acute wards and the context is the hospital. Consequently, case study methodology, which is restricted to the 'particular', and is confined to a geographically limited context, is suitable to answer the research question.

Yin (2003) lists five components to case study research: the research question, propositions, unit of analysis, logic linking to propositions and criteria for findings (Yin, 2003). The research question is 'Has Critical Care Outreach made a difference for nurses?' Propositions were developed prior to the commencement of the study and are discussed in the following section. Critical Care Outreach is the unit of analysis.

Propositions

The concept of "comparison" of propositions as suggested by Stake (1995, p. 8) has been substituted as an alternative to "logic linking propositions" (Yin, 2003, p. 21). When Yin (2003) refers to logic in the context of case study the reference relates to deductive logic.

Propositions are directional in a case study whereas hypotheses are predictive in quantitative studies. Yin (2003) recommends that propositions are specified prior to commencement of data collection. They are not included formally in the case study write-up but are instrumental in guiding the researcher's search for data and directing the research (Gangeness & Yurkovich, 2006). Examples of propositions used in this study and derived from the literature are: CCOT has impacted positively on nurses; a knowledge deficit exists on wards in relation to assessing critically ill patients; CCOT supports ward nurses through sharing of critical care skills and education; CCOT deskills wards nurses; and a nurse-led CCOT is as effective as a medically-led MET. From these propositions exploration trails evolve which either uphold or discredit them. Discredited propositions lead to consideration of new options for research from the information gathered and offer points of comparison for research findings (Zucker, 2001). Propositions are similar to themes and during the process of analysing data in this study are confirmed or discredited.

Reflexivity

In a qualitative study the researcher interacts with participants ((Denzin & Lincoln, 2000; Polit & Beck, 2008). Reflexivity is the relationship and reaction to and with participants (Polit & Beck, 2008). Reinharz (1997), cited in Lincoln and Guba (2000), suggests that the researcher brings three dimensions of self to the process of research: research based self, brought self and situational self. The 'researcher self' I brought was that of a novice embarking on her first research study. The 'brought self' are the components of self, values and beliefs that have shaped me into who I am. Finally the 'situational self' is the position of the researcher which in this study had the potential to skew the study findings through my interaction with participants and my work in the service of CCOT. Often, prior to commencement of a qualitative research study, the researcher would suspend beliefs, biases and assumptions about the experience, a process known as reduction (Mays & Pope, 2000). However, in case study research, beliefs, biases and assumptions are made transparent within propositions which are upheld or disproved by the study findings (Yin, 2003). Rather than suspending beliefs and biases the researcher in a case study research employs them to initially direct the study inquiry.

As an employee of a DHB and a member of the CCOT I was acutely aware of my potential to influence the participants in the study, particularly the nurses. The method chosen for recruitment, interviewing and data analysis demonstrates my commitment to presenting the most reliable study results possible by a researcher who is part of the team and process that is the subject of the research.

The researcher's ability to influence the direction of the study, or bias (Polit & Beck, 2008) is evident in the propositions. Bias is thus made explicit and overtly addresses the question of researcher reflexivity. To minimise the impact of researcher influence the researcher must have an awareness of their own expectations. By stating and acknowledging researcher views before the research is commenced, an opportunity exists to put strategies into place which will minimise the effects of those views. Adjunctive strategies for managing bias in the study were the employment of a research assistant to facilitate the nursing focus group, return of transcriptions to interview participants for verification of transcript, triangulation of data and continued awareness by the researcher of her own biases.

Rationale for choosing case study methodology

Case study methodology has been selected for the following reasons: It has the capacity to present a holistic picture of CCOT by capturing the interactions of nurses, doctors and organisational processes which impact on the early recognition of the physiologically unstable patient; it allows complex issues to be studied in context (Anthony & Jack, 2009); it facilitates understanding of the broader issues faced by the DHB in relation to provision of ICU/HDU beds in a fiscally challenging environment; and most importantly, it presents fruitful possibilities to explore whether CCOT has made a difference for nurses.

Case study research methodology is ideally suited for contextual cases which are unsuitable to be studied by positivist methodologies such as experimental designs. The quality of case study research contributes highly contextualised information to the body of nursing knowledge (Stoecker, 1991). Case study facilitates answering the research question from both qualitative and limited quantitative data. Specification of propositions prior to the commencement of the study confronts issues of researcher bias and identifies the direction for study (Darke et al., 1998). The capacity for collection of data from multiple sources enables triangulation of data.

The procedural steps in case study methodology lend themselves to being illustrated in schematic form which exposes an auditable trail (Rosenberg & Yates, 2007). A schematic adapted from Rosenberg and Yates (2007) (Figure 1) has been developed and is used in this study. Research question, underpinning theory, context, phenomena, and components of CCOT, case study approach, data sources, data analysis strategies and linkage of themes to stages of Fullan's theory are shown in the schematic.

Design Schematic

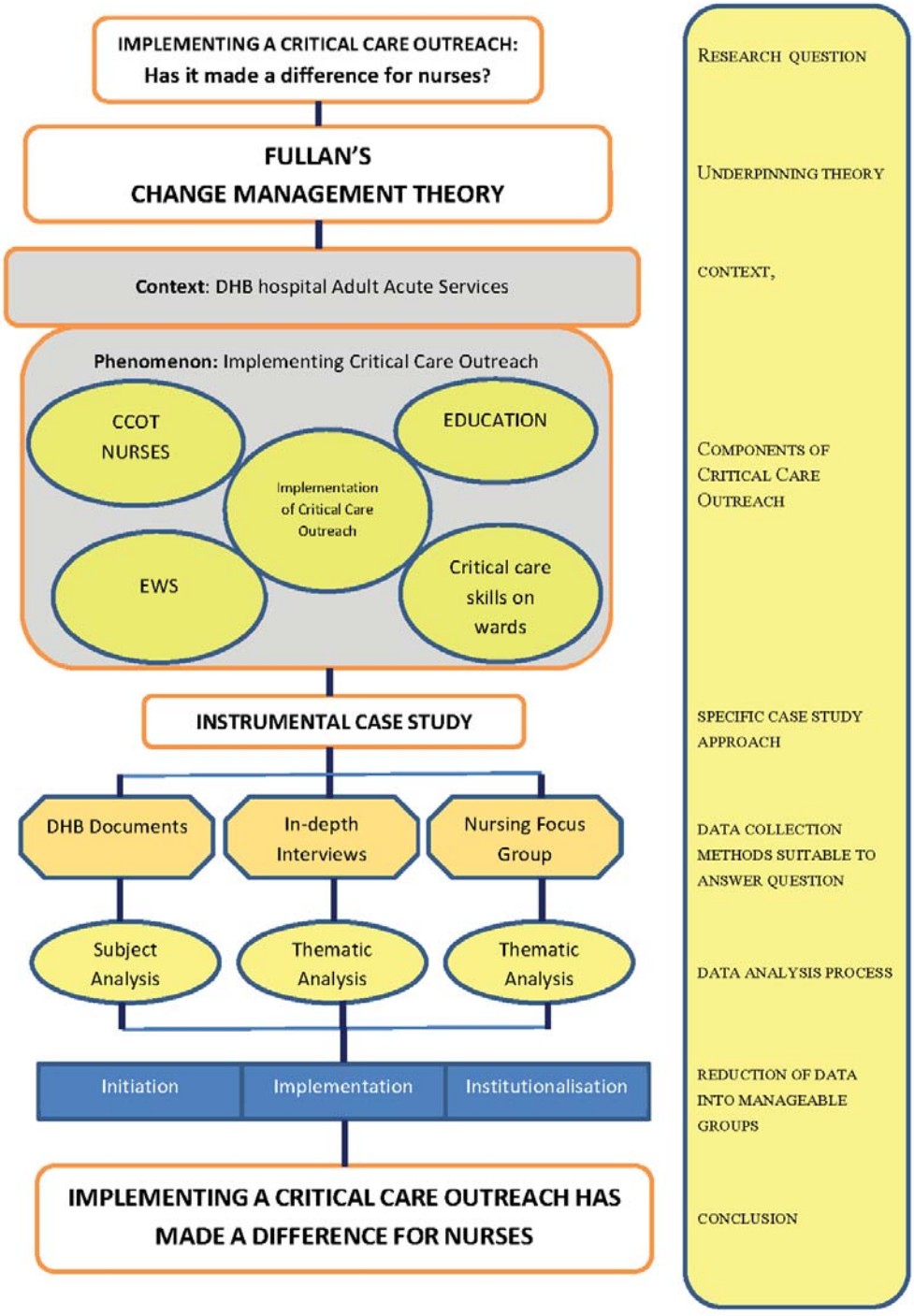

***Figure 1*. Design Schematic. Adopted from Rosenberg and Yates, 2007.**

Method

Methods are tools, procedures or techniques researchers utilise to collect and analyse data (Polit & Beck, 2008). Sampling methods used for data collection were determined by the research question, methodological paradigm and the context of the research environment.

Ethics

The DHB Intensive Care Management Team approved the study 17 April 2010. This was an expedited review process and ethical approval was granted by the Northern X Regional Ethics Committee, Health and Ethics Disability Committee, 29 July 2010 (Appendix 1). Massey University ethics committee was notified when Health and Ethics Disability Committee approval was obtained. The study was endorsed by the DHB Nga Kai Tataki Maori Research Review Committee, 6 September 2010 and permission from the DHB was granted.

Ethical issues identified were the usual informed consent and maintaining confidentiality. Maintaining anonymity of the hospital was not totally achievable as all the documents sourced for the study are referenced to the hospital and the DHB; many are a matter of public record. Ensuring the anonymity was not guaranteed but every effort has been made to avoid naming the hospital directly and identifying participating staff members. In addition however, were those issues which could arise from the power differential which existed between the principal researcher, and the nursing focus group participants. The researcher was more senior to the nursing focus group participants and was in a role whereby she interacted with participants and their seniors on a regular basis during the course of her work as a CCOT nurse.

Informed consent (Appendix 4) was obtained prior to interviews and the focus group after participants had an opportunity to read an Information Sheet (Appendix 2 and 3) and discuss any concerns. Participants were informed of how their information would be stored and confidentiality preserved. Interview participants were informed that there was no absolute guarantee of anonymity before signing the consent form but confidentiality was assured. Interviews and focus group were audio recorded. Recordings were downloaded to the researcher's computer and copied to a memory stick which was sent to a professional transcriptionist who signed a confidentiality agreement. Transcriptions were returned to interview participants none of whom requested any changes. Transcriptions of the focus group were not returned to individual participants. The transcript of the nursing focus group was listened to by the research assistant to confirm the accuracy of transcription.

The issue of potential harm to nursing focus group participants through the perceived power differential was mitigated by the employment of a research assistant. The potential problem of social desirability (Fisher, 1993) in which a person will answer what they think the person interviewing them wants to hear in an attempt to please that person was also mitigated by having a research assistant. Social desirability was a real threat as the researcher interacted with nursing focus group participants regularly in the course of her work. The research assistant signed a confidentiality agreement (Appendix 5). To facilitate timely data collection, interviews, document collection and the focus group occurred concurrently.

Interviews

The relationship between the researcher an interviewee group presented a seniority difference in reverse to the researcher and nursing focus group. The Senior Nurse was the immediate senior nurse to the researcher, while the Senior Medical Officers were both in more senior positions than the researcher. A well-established professional relationship and rapport existed between the researcher and her seniors and facilitated a smooth interview process.

Interviews were one method of data collection widely used for case study research. Darke et al. (1998, p. 283) have defined them as the "primary data source" for interpretative case study research. From the interviews, valid, contextual and historical information contributed to the study an understanding of the present and the events leading to the present. The advantages of interviewing are the revelation and verbalization of deeply held beliefs and nuances which may be unlikely to emerge when employing a quantitative methodology (Park, 2010). Therefore the inclusion of interviews as a data source was an appropriate choice for the study.

There are disadvantages to interviews. Participants have a potential to deviate from the topic (Fontana & Frey, 2000). As recommended by Patton (2002), an interview guide was used to avoid deviation from the topic and to provide structure to facilitate the exploration of issues. The risks of interviewer effect, where participants consciously or subconsciously modify their responses, were minimal in this study as the interviewees are senior to the researcher and were co-operative and keen to share their knowledge. Major costs associated with interviews are time, organizing the interview, the actual interview, transcription, verification of data and analysis. Lack of anonymity for participants and opportunity for interviewer bias are further

disadvantages to interviews. However, despite these disadvantages, the interviews undertaken for this study provided rich meaningful data that would have been inaccessible by other means.

Participants were invited for interview through purposive sampling which is a sampling method whereby participants with knowledge of the phenomenon are invited to participate in the study. The expectation is that the participants will have an understanding of the research question (Polit & Beck, 2008). For this study the researcher invited participation from a Senior Nurse and two Senior Medical Officers. For the purposes of this study these are the titles chosen for participants, Clinical Director ICU, ICU Consultant, and Clinical Nurse Specialist (CNS). Inviting participants who were influential figures in the implementation of CCOT provided extensive data.

Semi–structured interviews were conducted to assist the exploration of the topic through the use of open-ended questions (Appendix 6). Questions were generated to explore the research question and promote participant interpretation of the subject. To enable the exploration of the research question and adherence to case study research constructs, questions were organised using Fullan's theory which underpins the study. Embedded within the questions were the propositions for the study which provoked participants to consider the propositions and either refute or endorse them. For example, embedded within this question is the proposition that CCOT deskills wards nurses: "Explain to me if having senior critical care nurses through the CCOT coming on your wards has changed things for ward nurses". The biases explicit in this proposition were that the practice of CCOT nurses "coming on your wards" assessing "your" physiologically unstable patients deskilled ward nurses, as CCOT nurses "took over" the patient and transferred them to ICU/HDU, whereas previously the patient was cared for on the ward by the nurses without any such intervention.

When conducting interviews several issues are important. It is important the participant is relaxed and comfortable. The interviewer must be fully conversant with the topic and possess excellent listening skills (Polit & Beck, 2008). Before the interviews I familiarised myself with the content of as many documents as possible. A total of three interviews was completed. Aside from some logistical issues to do with busy schedules, the interviews went as planned.

Focus groups

Purposive sampling was also the chosen method of recruitment for the nursing focus group. It ensured participants were knowledgeable about the key constructs and were experienced nurses. The sampling method was enacted by restricting participants to those nurses who met the strict eligibility criteria for participation in the study. To participate in the study nurses had to have been employed on the acute wards of the hospital before the introduction of CCOT and still be employed on an acute ward. Seven experienced nurses met the criteria and participated in the group.

Recruitment of nursing focus group participants was achieved in several steps. Firstly, an email invitation (Appendix 7) was sent to all CNMs of adult acute wards in the hospital four weeks prior to the date of the focus group. The time for the group discussion was decided upon after a suitable time was discussed. Secondly, colleagues in the CCOT were asked to ensure the initial invitation had been distributed to the ward nurses and drawn to their attention. Thirdly, a further reminder was sent three days before the focus group date. At this time I also replied to any enquiries from potential participants and hand delivered the Information Sheets to wards.

A week before the focus group meeting was to take place the research assistant was supplied with a copy of the Information Sheet, Consent Form and literature review included in this work. After she had familiarised herself with the literature, time was spent ensuring that she had an understanding of the study question and what was being asked of the nursing focus group participants. A trial using the recorder also took place. The booking for the interview room was checked and the consent forms and the principles of informed consent were discussed as the research assistant would be gaining consent from the group members. The focus group participants on the day were anonymous to me. It was unknown how many or who would attend the group. Afternoon tea was provided. A total of seven nurses participated in the focus group.

Convening the nursing focus group had the disadvantage of being-time consuming and logistically challenging in a hospital where invited participants work rotational shift rosters. However, this method had the advantage of ensuring that participants had experience and understanding of the subject under study. Focus groups may stimulate conversation which results in emerging themes after analysis of discussion (Bradbury-Jones, Sambrook, & Irvine,

2009). The focus group of nurses yielded sufficient data for analysis. In contrast to other exclusively qualitative methods, the findings from case study research are merged with results from all sources of data collection in the study when data is triangulated with theory (Bergen & While, 2000). The nursing focus group contributed data pivotal to validating, interpreting and elucidating data from interviews and documents. The study would be incomplete without data from the nursing focus group.

Documents

Documents collected for this research were gathered from DHB sources. Documents were collected in this manner to protect the identity of the DHB and hospital. The criteria for inclusion into the study were that they contained information directly relating to CCOT which would make a meaningful contribution to the study. Personal and email contact with managers and other DHB personnel were made to explain the study and request relevant documents. Both managers and the others were keen to assist and displayed a genuine interest in the study. The Operations Manager of ICU produced the business plan for the original CCOT, and the minutes of the Development Group meetings, and offered assistance to locate any further documents which might be considered of value to the study. No further documents were located from this source. All documents sourced were included in the study. Appendix eight lists the documents included for subject content and analysis.

Resuscitation statistics for the DHB were obtained from the Resuscitation Co-ordinator for the DHB. Numbers of patients discharged from the hospital acute services were accessed from the case management officer of the DHB through email and telephone contact. Policies and documents available on the intranet to all DHB personnel were accessed directly. The CNS for ICU/CCOT supplied many documents. These included minutes from meetings, job descriptions for CCOT nurses, newsletters, annual reports, survey results, audit results, ACT schedules, and programme and presentation material presented at board level in the very early stages of introducing CCOT. Statistics of CCOT referrals were accessed directly from the CCOT database. Permission to access these documents was obtained as part of the ethics application.

Data analysis process

The methods of data analysis for the study were thematic analysis of interviews and nursing focus group data and subject analysis of documents. Documents were studied for useful subject content, recurring phrases and key ideas. The process was influenced by Boyatris (1998) to make sense of themes, Ryan and Bernard (2010) who suggest paying attention to language or repetitive words, and Roper and Shapira (2000) who guided me to consider identifying persistent themes from the data.

Five step process:

1. Sensing themes
2. Identifying themes
3. Merging themes from interviews, nursing focus group and DHB documents
4. Rechecking data
5. Categorising themes to Fullan's stages of Change Management, initiation, implementation and institutionalisation

Figure two illustrates the keys tasks for each step of the data analysis process.

Sensing themes

Audio tapes were listened to before transcripts were read in order to gain an overall sense of the tone, attitudes and areas of emphasis not easily discernable from the written word (Boyatris, 1998). The transcripts were then read and reread with a view to concentrating on different data categories individually. I did not progress to the next data source until I was satisfied with the overall sense of what was being said or not said. With the DHB documents I read and reread them several times, again to understand what was being conveyed.

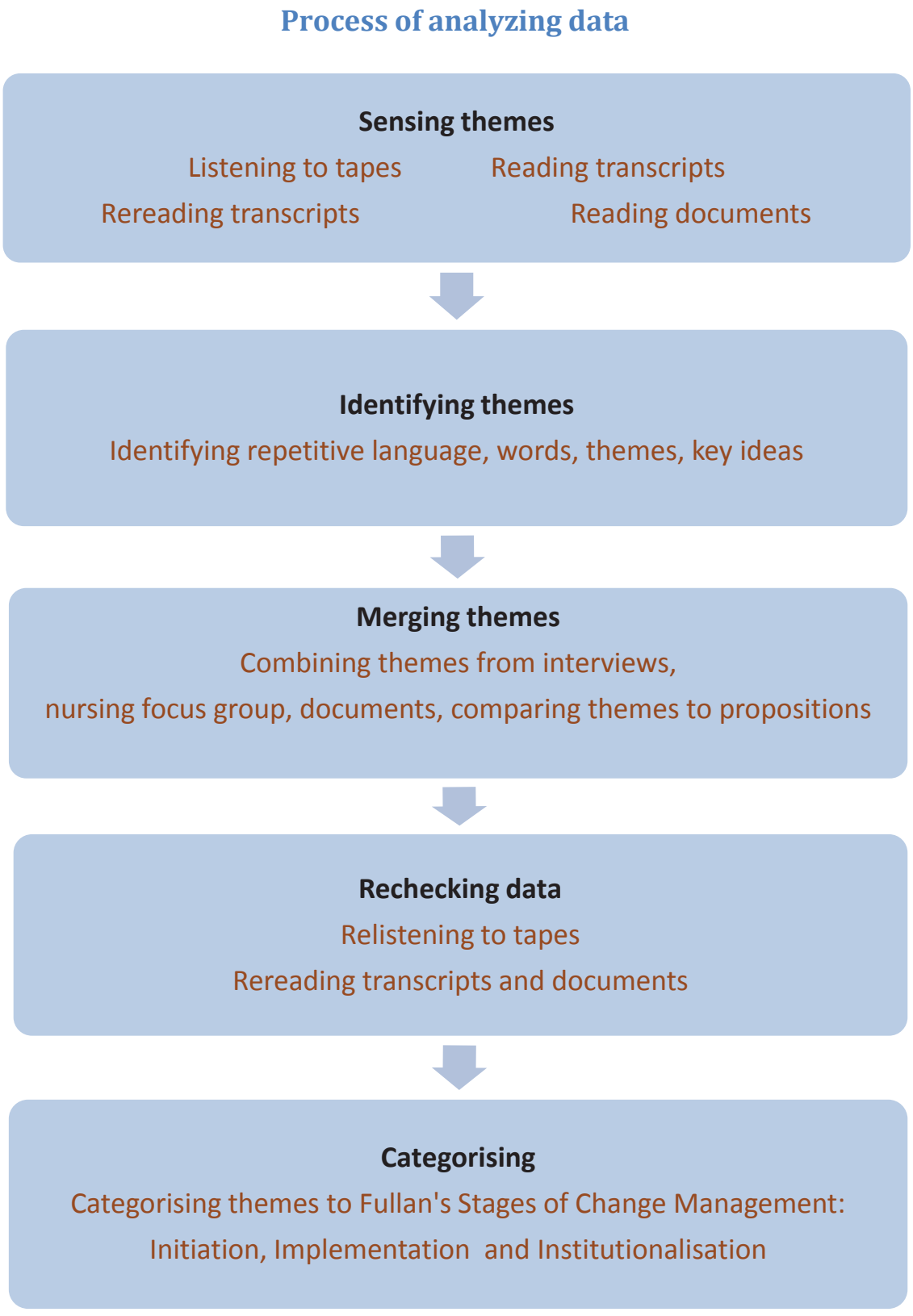

Figure 2. **Process of analysing data.**

Identifying themes

Themes were identified by noting repetitive use of words and phrases as suggested by Ryan and Bernard (2010). Each theme was related to the concepts of initiation, implementation and institutionalisation. Fullan's Change Management Stages allowed for the inclusion of all themes identified.

Themes were highlighted in the text and transcribed by hand with the source and page number onto small pieces of pad paper. Each piece of information was assigned to one of three files labelled with the stages of Fullan's theory. A theme which did not appear to correlate to the stages was put into a file labelled 'other' for later analysis. I repeated this system with each transcript. Eventually all the themes were incorporated into Fullan's theory.

Documents from the DHB were studied for subject. I noted whom they were written for and the date also. Many of the documents were not dated. I went back to the authors if they were still employed with the DHB and asked them if they had recollection of the date of the document. Little was achieved by this action. Following the same process as the transcripts, subjects were highlighted and allocated to the appropriate stage of Fullan's Change Management and the 'other' file.

Merging themes

The next step after identification of themes was to merge themes from all sources of data. Merging themes or triangulation of data is an important step in the research process (Polit & Beck, 2008). For the study results to be considered free from bias, results from each data source needed to validate the findings from the other sources. The themes and key ideas from each file were manually collated by spreading them out on a board and using a mind mapping system of linking key ideas to the stages of Fullan's theory. If a theme could not be validated by one other source of data, it was discarded. Themes from the 'other' file were linked to the three stages of change management by the same process of mind-mapping. Propositions were compared to themes at this stage; one proved to be uncorroborated. This simple act of comparison exposed erroneous preconceived ideas.

Rereading data

A second listen and reading of transcripts and documents took place. No further themes were identified. In total eleven themes were identified and are presented in the data analysis chapters.

Categorising

Throughout the data analysis, themes were identified and categorised to the three stages of Fullan's Change Management Theory of initiation, implementation and institutionalisation.

Criteria for establishing trustworthiness

Trustworthiness of the study is confirmed through appropriate selection of case study methodology with supportive methods of establishing the relevant population, sampling data collection and data analysis. The criteria for establishing trustworthiness of a case study is determined by the principal paradigm for data collection (Payne, Field, Rolls, Hawker, & Kerr, 2006). Data from interviews, nursing focus group and DHB documents was analysed by thematic and subject analysis (Boyatris, 1998), an appropriate method of data analysis, confirming that this is a predominantly qualitative study. Therefore, the criterion for determining trustworthiness is informed by an interpretivist position.

Lincoln and Guba (1985) and Zucker (2001) recommend credibility, confirmability, dependability and transferability as suitable criteria for establishing trustworthiness of a qualitative study. Credibility, or the genuineness of data and interpretation of that data (Polit & Beck, 2008) is established by a systematic well-argued case with a detailed research design (Darke et al., 1998; Rosenberg & Yates, 2007).

Confirmability and objectivity of data analysis findings are dependent on good methodology (Huberman & Miles, 2002). Theoretical support from Fullan's theory, multiple data sources, thematic and subject analysis of data and triangulation of results confirm the faithfulness of the study findings (Huberman & Miles, 2002). Confirmability is further endorsed by specification of propositions a priori. Biases and subjectivity are explicit in the propositions. By exposing biases in propositions a criterion was established against which interpretation of study data findings could be compared for congruence or divergence.

Dependability or the ability to replicate the results at a different time is influenced by researcher and participant interaction. When studying a complex contextual real-life phenomenon situated in a dynamic environment such as a hospital, dependability will not be attained if guided by the principle that identical data may be replicated at another time (Casey, 2006). Due to the unique

interaction of researcher and study participant no interview can be wholly replicated. However, the process may be dependably replicated.

The goal of transferability is to generalise findings to populations (Polit & Beck, 2008); however, case study research findings are generalised to a theory, not populations (Yin, 2003). Generalisation is the goal of the positivist quantitative paradigm and is not appropriate for a qualitative case study methodology. Unlike other qualitative methodologies such as grounded theory where theory is inductively generated, case studies commence with a theory which underpins the research (Yin, 2003). Results are generalised to Fullan's Change Management theory and structured to Fullan's three stages of initiation, implementation and institutionalisation.

Summary

This chapter has presented the theoretical perspective from an interpretive paradigm, case study methodology and method for the study. Case study methodology has the capacity to accommodate both qualitative and quantitative data making it suitable for the study question. Trustworthiness of the study is established by the study methodology meeting the criteria of credibility, confirmability, dependability and transferability. A five-step process of analysing data is presented. Results from case study are generalised to theory, in this case Fullan's Change Management theory.

The next chapters present the analysis of the collected data organised using Fullan's theory of initiation, implementation and institutionalisation.

Chapter Four: Initiation

Introduction

Serious problems had been identified at the hospital. Physiologically unstable patient on wards went unrecognised, increased numbers of acute orthopaedic patients were being admitted to the hospital in an operationally tight fiscal environment. National nursing shortages affecting nursing recruitment and retention were a reality. This chapter presents the data drawn from the interviews and DHB documents which offer insight into the situation at the hospital and the initiation of a system to recognise the problem of the physiologically unstable patient on the ward. As presented in the Ethics section of this study for the purposes of the study participants have been given the title of ICU Clinical Director, ICU Consultant and Clinical Nurse Specialist. The three data analysis chapters are organised using Fullan's Change Management theoretical stages of initiation, implementation and institutionalisation. The initiation chapter presents the themes: 'Increasing demands on resources', 'Late recognition/late intervention', 'The proposal of a medical emergency team' and 'Nurse led Outreach'.

Increasing demands on resources

There are many complex issues for DHBs providing healthcare for the population of New Zealand. Retaining and recruiting nursing staff, prudent fiscal management and safely meeting the healthcare requirements of an expanding patient population are examples of challenges facing DHBs. Additionally, New Zealand has an aging population with the accompanying increases for health care services which impacts on all DHBs. The Clinical Director ICU positions the need for a CCOT within the context of the New Zealand health system:

> **ICU Clinical Director:** *I think really that in a very real way the need for them* [Outreach] *has arisen through the context of what's occurred in the NZ health system; an aging population, the lack of experienced or otherwise medical and nursing staff, such that the void that that creates needs to be addressed somehow (p.14).*

The DHB had a relative shortfall in Intensive Care Unit (ICU) beds per head of population compared to other large New Zealand DHBs. Table 1 compares ICU beds to population ratio for large DHBs for 2002.

Despite the need for a solution to resolve the shortage of available ICU beds, a business case to develop a High Dependency Unit at the hospital was declined in November 2004 by the DHB on fiscal grounds (Development of Critical Care Outreach Service Project, 2005). The hospital's nursing staff was under pressure from a lack of specialised beds for the very ill patient. The situation presented considerable challenges for ward nurses not specialised in the care of the critically ill patient.

Table 1. Comparison of ICU beds to population for large DHBs for 2002.

Selected DHBs	**Beds/100,000 (2002)**
Auckland	8.7
Counties Manukau	2.5
Waitemata	0.9
Auckland Average	***4.0***
Bay of Plenty	3.2
Canterbury	4.0
Capital and Coast	5.4
Hawkes Bay	7.4
Northland	4.8
Otago	4.5
Waikato	4.2
Large DHBs' Average	***4.8***
Select DHBs' Average	***4.6***

. (Source: Decision Paper, p.2).

With the shortage of ICU beds there was significant clinical risk in the hospital. Clinical risk in wards is defined as the residual risk for patients after application of assessment and management methods to mitigate that risk. When a risk such as late recognition of the physiologically unstable patient exists, and there are insufficient systems to minimise that risk, clinical risk is increased. Intensifying the clinical risk profile was a predicted potential increase in orthopaedic and general surgical patients for the DHB in 2005. An excerpt from a Decision Paper prepared by the General Manager for the DHB in 2005 explains how increased demands on resources effects clinical risk:

(Source: Decision Paper, p.2)

Decision Paper*: In November 2004, the DHB declined a Business Case to develop a HDU at ...due to the poor financial performance of the hospital. Although this was a fiscally prudent decision the level of clinical risk at the hospital has escalated. This is primarily driven by the growth of 48% in acute surgery as a consequence of acute orthopaedics transferring to the hospital* [from another DHB]. *This issue has been rated as a significant clinical risk by the Clinical Board, the Senior Medical Advisory Committee and the Clinical Collaboration Forum of the hospital* (p.1).

Acute orthopaedic patients previously admitted to the tertiary hospital in an adjacent DHB were to be admitted to the hospital from the beginning of 2005. An estimated increase of forty eight percent (48%) in orthopaedic and surgical patients would be treated. The boost from 8113 patients in 2004 to 10774 in 2005 increased demands on the hospital resources. Table 2 presents the escalating number of patient discharges from Acute General Surgery and Acute Orthopaedics:

Table 2 Patient discharges 2004-2006.

	Acute General Surgical Discharges		
Years	**2004**	**2005**	**2006**
Patient numbers	**6020**	**6184**	**6132**
	Acute Orthopaedic Discharges		
	2004	**2005**	**2006**
Patient Numbers	**2093**	**4590**	**4642**
Total	**8113**	**10774**	**10774**

Source: (DHB Information Analyst, Medicine).

Further exacerbating the problem of increased numbers of patients at the hospital was a national shortage of registered nurses to care for these patients. The Department of Labour Executive (2004) summary outlined the problem:

> **Department of Labour, Registered Nurse Occupational Skill Shortage Assessment, Executive Summary:** *Results from the 2004 Survey of Employers who have recently advertised indicate that Employers have difficulty filling vacancies for registered nurses in New Zealand. Only 63% of vacancies were filled within eight to ten weeks of advertising and there was an average of only 1.1 suitable applicants for each vacancy* (p.1).

The rejected business case for eight HDU Beds in 2004, would have increased capacity at the hospital to provide service to the critically ill patient. The hospital was confronted with a growing patient population (DHB Information Analyst, Medicine) a shortage of nurses (Department of Labour Executive Summary, 2004), a fiscally tight environment and an increase in patient acuity.

Late recognition/late intervention

Patients who were physiologically unstable in the acute wards of the hospital often went unrecognised until they were in a critical condition. Physiologically stable patients are admitted to the hospital wards under the care of a hospital primary team led by a specialty consultant doctor. Overall responsibility for that patient's treatment during their stay as an in-patient is accepted by the hospital primary team consultant. Specialty consultants, also known as Senior Medical Officers (SMO), are supported by a registrar, house officer and trainee intern (presented in descending order of seniority).

In the study hospital physiologically unstable or critically ill patients are normally cared for in HDU or ICU by ICU consultants and registrars. When an ICU consultant admits a patient into ICU that patient will be cared for by the ICU team until transferred back to the ward and the care of the hospital primary team. Prior to the introduction of CCOT, physiologically unstable ward patients were often referred to the ICU team for assessment and possible admission to ICU once the patient had reached a critical stage of illness. Late recognition of the physiologically unstable patient on a ward disadvantaged the patient for early specialist ICU critical care assessment, increasing the likelihood of morbidity or mortality. The earlier a patient's

deterioration is recognised, the more likelihood there is that deterioration may be minimised. Clinical deterioration is identifiable when patients are assessed regularly and findings are interpreted and acted on appropriately.

Conscious that late recognition of the physiologically unstable patient led to delayed patient referrals to ICU, the Clinical Director of ICU was prompted to search for an alternative system. There was a consensus by the ICU Clinical Director, ICU Consultants and CNS that late recognition of the physiologically unstable patient impacted on critically ill patients. The following statements outline their concerns:

> **ICU Clinical Director:** *Of the cases we were getting in ICU, a significant number of them had late diagnosis of deterioration, late management of deterioration, late investigation...that the investigation through radiology and blood tests was later than it needed to be and I wanted to go and bring about some system that would improve this* (p.1).

> **Clinical Nurse Specialist:** *Because patients were suffering and deteriorating on the wards, they were coming to intensive care late and their condition was either irretrievable by the time they got there or was significantly compromised by the delay (p.1).*

> **Consultant ICU:** *I think a lot of clinicians in ICU felt that there were times where it was obvious to see the patients had had a rough deal from the care that they'd received on the ward* (p.1).

The DHB managers were also aware that late recognition of physiologically unstable patients was avoidable and had a significant impact on patients' progress. An excerpt from a Decision Paper prepared for the DHB in 2005 advanced this as a reason to consider High Dependency beds for the hospital:

> **Decision paper:** *To mitigate the significant and avoidable clinical risk to seriously ill inpatients receiving care at* [the hospital] (p.1).

Organisational systems did not support nurses and doctors in the wards. Nurses and junior medical doctors had difficulty accessing senior medical assistance out of hours, which further contributed to late recognition of the physiologically unstable patient. At all levels within the organisation (governance, management, nurses, doctors, ICU staff) there was acknowledgement that patients who were deteriorating were not being recognised in a timely way. The problem was exacerbated by the inexperience of junior house staff. The Clinical Director identified the concerns at that time:

> **ICU Clinical Director:** *That the nursing staff might not be able to find junior medical staff in the out of hours periods to go and express their concerns to. There weren't any senior medical staff around, apart from the ICU and that often those messages that the patient was getting worse would not go and turn up until the patient was very very ill indeed* (p.3).

Clearly the situation could not be allowed to continue.

The proposal of a medical emergency team

Commitment to improve patient care by eliminating late recognition of clinical deterioration motivated the Clinical Director ICU to search for ways to reduce the likelihood of harm on the wards at the hospital. A Medical Emergency Team (MET) was one possibility and was developing in Australia with variable success rates. A literature review was carried out by the ICU Clinical Director and a protocol created illustrating how a MET team might improve patient care and reduce clinical risk at the hospital. The protocol was presented for discussion to ICU consultants and Medical and Surgical Department Directors[2]. Specialty boundaries for patient care often become blurred between medical, surgical and ICU when one specialist believes the patient should be under the care of another specialty. Discussion and debate are common. Intensive Care consultants were in the complicated position of not knowing about the condition of a ward patient until a referral. Late referral of an unstable patient denied the patient critical care assessment at an earlier stage of the illness progression. A MET team would respond to patients who were physiologically very unstable.

Inclusion of other specialties in the initial discussion beyond ICU was a diplomatic strategy by the ICU Clinical Director. Despite knowledge of established clinical risk for physiologically

[2] Medical and Surgical Department Directors are specialty consultants who lead their specialty consultant teams. A specialty may have several consultant teams.

unstable ward patients the response from ICU colleagues was unsupportive of the MET proposal. Two ICU consultants from a group of four staffing the ICU, however, unenthusiastically agreed that they could support a MET team. Reasons for the lack of support from the team ICU consultants on the team were:

> **ICU Clinical Director:** *They (Consultants staffing ICU) weren't very happy because the typical reason quoted was they said "awww, those medics, it is their problem, why should we get involved in their problem? If we get involved in their problem it will become our problem and who's going to run after these things? And in the night times. That means that we are going to have to stay there because we're going to get called all the time. We don't want to go and be part of that and be called all the time"* (p.2).

The limited enthusiasm of two ICU consultants who could 'live with' a MET together with an albeit unenthusiastic response from the Medical and Surgical Directors, offered a small ray of hope for the search for a system to reduce the likelihood of harm to patients. Reducing clinical risk across the organisation required co-operation from ICU consultants and other specialty consultants. Consultants retain the power to admit a patient, and are the gatekeepers for referrals to a specialty service such as ICU. Lack of opposition to the proposed MET team implied a measure of support, but no engagement. To be successful across the organisation, consultant doctors' buy-in is essential. The ICU Clinical Director offers a memory of the surgical and medical director's response:

> **ICU Clinical Director:** *Well yes, ok, well yes, well I suppose we could go and have this. Well I don't object to it if you're thinking of doing i*t (p.2).

The response from the ICU consultants, Medical and Surgical Directors can only be described as "disinterest" (Clinical Director, ICU, p.4). There was an indifference, which really translated into a general reluctance to look for solutions to a serious problem. Senior clinicians from both the medical and surgical specialties (except for the clinical director of ICU) appeared to be immersed within their own scope of practice and specialties to the exclusion of the broader picture. It was as if they could not see beyond their own specialties to what was a hospital wide problem, not a speciality problem. There appeared to be a lack of organisational wide insight. At interview the Clinical Director described the frustration of trying to gain support to improve patient care and promote interest in a system to identify deteriorating patients:

ICU Clinical Director: *What am I doing here? Nobody seems to realise it's a problem* (p.4).

A nurse-led model

Difficulty securing adequate medical staff for the ICU dictated a temporary change in focus for the ICU Clinical Director. Consequently, it was almost two years after the preliminary overtures were made that the subject of lack of recognition of the physiologically unstable ward patient and reducing clinical risk on the wards was formally revisited. The majority of the original ICU specialty consultant team who were consulted about the formation of a MET team had left. The problem, however, had not gone away; indeed, the situation was intensified by a shortage of ICU or HDU beds at the hospital compared with the national average and an increase in the number of surgical patients, especially orthopaedic patients.

Rejection by the DHB in 2004 of the proposal to develop a HDU at the hospital and increased numbers of patients being treated by orthopaedic and surgical services at the hospital (Table 2) contributed to a worsening clinical risk picture. The physiologically unstable patient was continuing to go unrecognised until at a critical stage, and a system to reduce this problem had not eventuated. Recognising the urgency of the situation the Clinical Director ICU sought the assistance of the Charge Nurse Manager (CNM) ICU in the search for solutions to the dilemma.

In the meantime a specialty consultant had been recruited to the ICU from elsewhere. Both the CNM and the new specialty consultant for the ICU had experience of a nurse-led outreach (not medically-led MET). The Clinical Director ICU finally had the support needed from the ICU specialty consultants. A nurse-led outreach model offered an alternative to the medically-led MET team which had been originally considered. The specialty consultant explained how the situation appeared at the time:

ICU Consultant: *To be told at the end of November that it* [HDU] *was not happening and knowing by then the problems that we were having on the ward we sort of said "well this isn't acceptable, we can't do nothing because there are people out there who we need to know about who we might be able to at least help with ward directed care with some support from us and if they get to a certain level of sickness we need to bring them in house". So the option…it was a case of the absolute spur was to be told no, you don't have an HDU to put these sicker patients in and then that mobilised us to say,*

well, if you're saying 'no' to that then we've got to do something in the meantime. Let's develop the outreach service.

An Outreach would reduce clinical risk by introducing an Early Warning Score (EWS) system and a team of ICU Outreach nurses would respond to physiologically unstable patients with high EWS. Intensive Care Outreach nurses share their specialised critical care skills with ward staff and are responsible for co-ordinating the response to the EWS. They are a key component in the response algorithms calculated in the EWS which escalates care for the physiologically unstable patient.

The combination of ICU management, nursing and medical representation was the breakthrough needed to find a way to redress the problem of suboptimal care on the wards in an environment with limited ICU resources. Although the ICU Clinical Director had championed a MET team, without the support of the ICU specialty consultants group it did not happen. A new way to approach the problem was determined. The new approach involved collaboration between ICU medical team, nursing and management. The new ICU specialty consultant was committed to the establishment of an EWS and the CNM was supportive of a nurse-led outreach model. There was a shared belief that education was an essential element for any system. A nurse-led outreach team in conjunction with two HDU beds as a solution gathered momentum and was propelled into the DHB arena by a Decision Paper, 2005, prepared by the General Manager of the hospital. The Decision Paper contained the following recommendation and options:

Decision Paper: *That the Board support the senior management team to implement the Interim High Dependency Care Strategy for* [the hospital] *to mitigate the significant and avoidable clinical risk to seriously ill in patients receiving care at* [the hospital] (p.1).

Three options which had been seriously considered by the Clinical Directors and Managers of the hospital were included. These options are:

1. *Eight Bed High Dependency Unit.*
2. *Two Bed HDU & Critical Care Outreach*
3. *Ward Based High Dependency Nursing* (p.4).

Option One was the preferred option but had been rejected by the DHB on financial grounds in 2004. Option Two was accepted in July 2005 for implementation by the DHB. Option Two offered the most comprehensive services from the least amount of expenditure with a focus on patient safety not patient locality. Outreach promised the sharing of critical care skills to the wards. Offering critical care skills beyond the confines of the ICU began a new era for ward nurses and ICU. Option Three was not acceptable as it would have exacerbated the existing ward situation.

Supporting the Decision Paper to the Board was a PowerPoint presentation by ICU management to the DHB Senior Management Team entitled: HDU and Critical Care Outreach, Plans for the future. This presentation clearly outlined the scope of the decision paper prepared by management, the history and clinical frustration surrounding the project, the range of options and the supported option, Option Two. A slide outlined research evidence from Gamil and Fanning (1991) which suggested better outcomes for surgical patients cared for in HDU, reduction in mortality in at risk patients having earlier clinical intervention and quality issues related to cancelled surgical interventions. Evidence from the hospital Quality Committee of repeated delays between charting of abnormal physiological parameters and clinical action was produced. The presentation offered compelling reasons to approve two HDU beds and set up a CCOT. Presenting these facts to the Senior Management Team prior to the presentation to the Board ensured Senior Management was conversant and supportive of the content of Option Two. The rationale for the choice of Option Two over Option One is explained in the following excerpt from the Decision Paper 2005, prepared for the DHB:

> **Decision Paper**: *Option two: The "Two Bed HDU and Critical Care Outreach" ($475k) option provides a balance of inpatient capacity, rapid response to prevent avoidable adverse outcomes in the general ward setting and a training environment for ward nurses. This option is considered the most likely to mitigate patient risk at a reasonable level of investment. It also specifically targets skill development and cross hospital systems that focus on patient safety rather than patient location.*

The DHB agreed to Option Two.

The acceptance of a nurse-led model was a fundamental paradigmatic shift for the Clinical Director of ICU who had experience only of medically-led MET teams. The shift also demonstrated cautious willingness to trust nurses in what was considered a traditional medical role. A CNS for ICU outreach was successfully recruited and CCOT had a nurse leader to take

the project into the next stage. The Clinical Director reflects on the Clinical Nurse Specialist recruitment:

> **ICU Clinical Director:** *After X* [Clinical Nurse Specialist] *came*[I realised] *that the Outreach was rather different particularly in the sense that this would be Outreach as Outreach being nurse-run not doctor-run which was the model of the MET team I'd been used to at* xxx [XXX Hospital]. *Therefore at the interview of* [Clinical Nurse Specialist] *I tried to make sure as much as I can that the person was somebody who I could reside trust in because with the nurse-run Outreach clearly it's something that if the nurse members of the team running it are not suited to the task, terrible things can happen* (p.6).

During the interview for this study the CNS explained that the focus of early recognition of patient deterioration and nurses sharing critical care skills on wards makes Outreach different from a medically-led Medical Emergency Team revealing why there had to be a paradigmatic shift if Outreach were to be successful:

> **Clinical Nurse Specialist:** *There are three elements to an Outreach service and this is what makes it different from a Medical Emergency Team, or a crisis team, or a Rapid Response Team. The idea of Outreach is to PREVENT people getting sick and going to Intensive Care. If we are picking them up because they have collapsed and they're going to intensive care, in a way we've failed, and that is where we have to look at three things. The first one is identifying who is sick and that is where our EWSs* [Early Warning Score] *come in. Facilitating rapid good treatment and that is where the EWS CCO* [Critical Care Outreach] *service, strong algorithms and the ACT* [Acute Care Training] *course come in. That when people arrive, they don't just arrive, but they arrive and do the right thing. And the third thing is going back really a long way ago to what happened with comprehensive critical care in the United Kingdom is the idea of sharing critical care skills* (p.16).

Preventing admissions to Intensive Care, sharing critical care skills by nurses in a non-critical care environment, assuming a position of responsibility at the beginning of the downward spiral of critical illness were major steps away from the critical care nursing and medical model previously in place. Ward nurses would be given the tools and support to identify earlier when a

patient was deteriorating and reduce their likelihood of harm. Buy-in from other specialties had been achieved, albeit with indifference. Management had supported the formation of a nurse-led CCOT with resources and nursing, and ICU specialty consultants' leadership had been secured. There was recognition that education for nurses and medical staff would be an important component of the nurse-led CCOT. The ICU Consultant acknowledged the commitment of the DHB to redress the problems which contributed to an unacceptable clinical risk situation:

> **ICU Consultant:** *You know, one of the things that we appreciated here was that there was an admission from management that we need the HDU, there was an admission that the status quo of just four ICU beds couldn't last and so they at least came to the party and said well, we'll give you the Outreach service (p.14).*

The initiation stage prepared the way for a nurse-led CCOT to get started. Preliminary work of securing buy-in from stakeholders, namely other specialties, and management at all levels had been accomplished. A guarantee of funding for a nurse-led CCOT from the DHB, support from senior management and ICU medical consultants, and recruitment of a nurse leader had been secured, and a steering group of the Critical Care Development Group had been established. Intensive Care management accepted responsibility for project management of the implementation of CCOT. The Project Plan (July 2005) prepared by the CNM ICU and General Manager Surgical Services for the DHB clearly established who would be responsible for sponsoring a CCOT:

> **Project Plan:** *The project will be sponsored by the ICU with project management provided by the* [the hospital] *management team* (p.3).

Establishing ownership in a project is important when there are multiple stakeholders. To progress a project in a large organisation, project management is essential. Support from the DHB and all relevant stakeholders and the establishment of a steering group enabled the transformation of the concept of nurse-led Outreach into a reality during the implementation stage. An excerpt from the Project Plan outlines the level of DHB and ICU commitment to the implementation of an outreach:

> **Project Plan 2005:** *The Board has agreed to the two bed HDU* [CCOT] *and CCOT option. This will create a continuum of care that includes high level ward based care*

with skilled nursing support, rapid response services, CCOT beds and Intensive Care Unit beds. This provides for a minimum level of resource and skill in all areas of the critical care continuum enabling [the hospital] *to provide safer care for its patients* (p.2).

The ICU management decided that the role of leading the CCOT would be the responsibility of a CNS. The minimum level of resource was sufficient to support the recruitment of one senior nurse. An advertisement for the Senior Nurse position was widely circulated and stated clearly that the CNS would be responsible for establishing CCOT:

Advertisement for Senior CCOT Nurse: *An excellent opportunity exists within our organisation for an innovative, proactive critical care nurse to provide leadership and expertise in the development and introduction of a CCOT Service. A significant part of this role will involve expert liaison and development of relationships with both the Intensive care and ward interdisciplinary teams caring for the at risk patients. The role is primarily clinical and involves managing the case load of the sicker ward patient with regular sessions on the Intensive Care Unit to maintain critical care skills.*

If you are a senior critical care nurse who has the ability to motivate and lead a dedicated team, then this opportunity is one you should definitely consider.

Reporting directly to the Charge Nurse Manager of the Intensive Care Unit.

The advertisement made the nursing reporting lines clear and, the challenge explicit. The CNS was responsible to make CCOT operational and effective. The Critical Care Outreach Team was to be nurse-led.

A period of approximately two years had elapsed since the Clinical Director ICU had first considered the concept of a ICU led team as an option to manage physiologically unstable patients on the wards. Once the DHB approved the proposal for a CCOT the priority was to get started. The CNS explains:

CNS: *They were in such a hurry to get the service we should have, we didn't do what we should have done which was probably four months of really vigorous audit of what was happening now, but that wasn't part of my task and to be honest, I was told just to get it started* (p.3).

A formal pre-audit of unplanned admissions to ICU, abnormal physiological observations recorded and not acted on, cardiac arrest calls which may have been avoided and examples of ward nurses and junior doctors being unable to escalate care for a patient, would have provided information which could be audited against at a later date. Using the same criteria in a future audit would determine the effectiveness of Outreach in these areas. More importantly, by not conducting a thorough assessment of all the possibilities contributing to the situation at the hospital, the opportunity to create an Outreach specific to hospital requirements and what impact that had on the ward nurses was lost.

Summary

This chapter, Initiation, presents the findings from a thematic analysis of data collected from interviews, focus group and documents. There had been a serious problem at this hospital where patients who were physiologically unstable were going unrecognised on the wards. Lack of recognition of patient deterioration contributed to the clinical risk profile of the hospital. The Clinical Director of the ICU was keen to redress the problems by implementing a system to improve patient care. Senior Medical Officer ICU colleagues were initially unsupportive, relegating the problems to other specialties in the hospital. Traditional admission procedures whereby patient admissions were structured into specialty teams made specialty consultants gatekeepers for any system which traversed an individual specialty.

Financial constraints of the DHB led to the acceptance of a two-bed HDU and an Outreach service. Acceptance of a Nurse-led Outreach was a paradigmatic shift from a medical model to a nurse model of care delivery. Collaboration between the ICU Nurse Manager, ICU Senior Medical Officer and Service management was the combination of resources needed to bring about the initiation of a CCOT. The vision to find a system to reduce clinical risk and improve patient outcomes was accomplished during the initiation stage. The ICU involvement with the physiologically unstable ward patient was established.

The themes of getting started, tools and education, communicating the EWS to wards and early recognition/early intervention are presented in the following chapter, which describes the implementation phase of the nurse-led CCOT.

Chapter Five: Implementation

Introduction

This chapter presents data from interviews, a nursing focus group and DHB documents. It is organised into four themes: Getting started, tools and education, communicating the EWS to wards and early recognition/early intervention. The data is organised by Fullan's theoretical concept of implementation. Data, as previously explained, was analysed by thematic analysis where individual themes are presented. The previous chapter presented Fullan's initiation stage. This chapter, implementation, offers insight into the issues and tasks to be completed during implementation of a nurse-led CCOT at the hospital.

Many tasks were achieved during the implementation stage: creation of a EWS, design of an Acute Care Training Course (ACT), creation of a six week Acute care training modular programme and the introduction of Outreach to the wards. Concurrent with accomplishing these tasks was attention to and procurement of buy-in from stake-holders in the hospital who would be affected by the introduction of a nurse-led CCOT service.

Getting started

The next phase to implement the CCOT resembled a well-run military operation. A presentation, "Implementation of CCOT" to Senior Management in 2008/2009 by the ICU Management group summarised the process by which the nurse-led CCOT was introduced into the hospital. Approval from Senior Management had been secured and the resources were available which enabled the implementation of the nurse-led CCOT.

Several presentations were made to Management in the 2006-2009 periods. Figure three is an example:

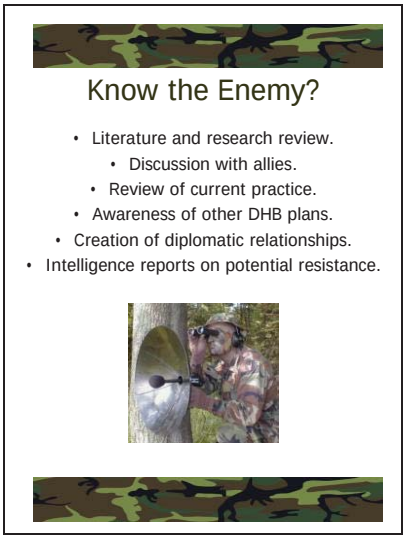

Figure 3. **Presentation to Senior Management.**

(Note the military metaphor used in the presentation)

The chairperson of the Critical Care Development Group managed the work-load by allocating specific people to a job. Weekly documented meetings of the core group took place. Action points, time frames and updates from uncompleted targets were discussed for barriers and resolution to problems encountered. The minutes present a very business-like approach to setting up the nurse-led CCOT. An excerpt from the minutes illustrates how efficiently the meetings were run:

Table 2. Critical Care Development Group, Minutes December 1 2005.

TOPIC	*DISCUSSION*	*OUTCOME*
Project timeline	*Updated plan tabled. Discussion re proposed dates for rolling out outreach on wards.*	*Short meeting to be arranged for tomorrow to discuss timeline as not all key players present* *[Manager] to amend timeline and circulate*

Database	*Information required includes demographics, follow-up data on what happened to the patient, target data and audit times for medical staff to meet*	[CNS] *and* [SPECIALTY CONSULTANTS] *to present more information re this at the next meeting* [CNS] *to talk to* [Manager] *about existing databases within the DHB*

Source: (DHB minutes).

Initially the core team was from ICU personnel. As the project developed it extended to all levels of nursing and multidisciplinary clinicians and some Management. The core development group was very clear about the scope of the project and the tasks to be achieved. The CNS who was a key member of the Critical Care Development Group appointed to set up CCOT reflected on those meetings:

> ***CNS:*** *We* [core group] *gave ourselves very, very strict time lines that were non-negotiable because what we felt, that in the introduction, if we drifted...if we drift by one week at the beginning, by the end of year it would be a month, two months, so we had to be very strict on that* (p.8).

> ***CNS:*** *We were very clear that they* [objectives] *had to be achieved, so a meeting with Charge Nurses, meeting with the consultants. And so, therefore, meetings with the consultant group,* [the Consultant] *may lead that but I would be there to support him. Meetings, um, meetings about training, that may be* [Nurse Educator] *and myself going to those. Um, meetings about resources of course* [Charge Nurse Manager] *and myself may go. But the idea was that we all gave ourselves jobs and we were very close. And that "we" became a much bigger group and I like to think that that "we" still exists even though we have a team of outreach nurses. The "we" also includes the Charge Nurses on the wards and it also includes many of the consultants. It involves some of the managers, it involves pharmacists, it involves physiotherapists. The "we" is the people who are interested in what's best for the patient* (p.8).

The CNS was emphatic that there needed to be a consistent approach to Outreach throughout the hospital. Acknowledging the importance of trust, he determined that getting 'buy-in' from that extended core team was an essential task during the implementation period. He explains:

> ***CNS*****:** *I think....I think the key task was to get buy-in from everyone. I think the one thing that I was very clear on was that we couldn't have a service which consultant A accepted but Consultant B didn't. Ward X had, but ward Y didn't have. It had to be, if it was for the patient, it had to be across the board. So I think the first consideration was that everyone had to recognise what this was about and the thing is, when you actually put outreach down on a bit of paper, that is what we did at XXXX, it was a win/win situation for everyone* (p.2*).*

> ***CNS*****:** *One of the key tasks was to get people's trust* (p.3).

The concept of a CCOT which crossed all specialties was new to the organisation. Establishing trust with key stakeholders would contribute to a smooth implementation of Outreach and add to organisational wide communication and buy-in.

With participants of the Critical Care Development Group each taking responsibility for tasks from their area of expertise, the project continued to progress. Development of an EWS, a six week modular ward nurse education programme, a new observation chart, Acute Care Study course material, administration responsibilities and continued liaison with other medical and surgical specialties advanced to the point where content development, tools and education packages could be finalised.

Tools and education

There were two key objectives which had to be achieved when creating the CCOT: create the system and provide a tool to enable identification of potentially critically ill patients, and education for nurses and junior doctors in use of the system and tool. By creating a system and tool, the situation of physiologically unstable patients going unrecognised would be reduced. The EWS and escalation algorithm was the tool, and would clearly outline when and to whom patient concerns needed to be referred.

By educating nurses and doctors to recognise critically ill patients, patients would be treated rapidly and effectively, referred appropriately and deterioration would be recognised early. To get the CCOT started needed an approach whereby the system and tools could be created and at the same time the education dimension developed. The hospital CCO service is composed of three components: CCOT nurses with a link to ICU registrars and consultants, a EWS tool to direct the escalation of patient care, and finally an education package for nurses, doctors and other multidisciplinary teams. In addition, patients newly discharged from ICU are followed up on the ward and assessed by an Outreach nurse.

Outreach philosophy reflects the commitment to the wider core team link. It informed the development of the tools and education package of CCOT. It was hoped that by having clearly stated aims and commitment to a philosophy in a project with multiple stakeholders would reduce the chance of confusion occurring or alternative agendas. This also offers measurable criteria for auditing. Figure four shows the philosophy presented to Management DHB Board by ICU in 2006.

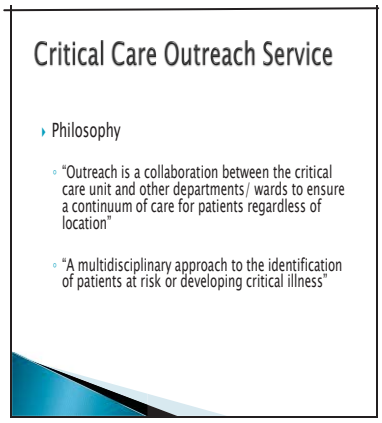

Figure 4. **Management Presentation.**

Creating the early warning score

Clearly any tool devised must be acceptable to both nurses and junior doctors, the users of the tool. The CNS had experience with an early warning scoring tool, the Clinical Director ICU had experience with using Medical Emergency Team (MET) criteria and the ICU Senior Medical Officer had experience with a surveillance system which had no defined parameters. There was consensus among these three that the tool must be clear, have definite parameters and be acceptable to everyone in the core group. There was a strong commitment to simplicity by the Critical Care Development Group, as it was thought that compliance would be higher if the tool

was simple and choices removed. Previous to the introduction of Outreach, doctors had the choice of responding quickly or in a more leisurely fashion to nurse ward calls. Ward nurses had the choice whether to make that call. No definitive guidelines with timeframes existed to assist nurses in determining which patient conditions needed urgent attention versus conditions which could safely be dealt with a little later. Ward nurses participating in the focus group summed up the problems experienced before the advent of a EWS:

> **Focus group:** *So we probably did recognise them* [patients at risk] *but we weren't always able to get that over to the medical staff as saying actually...* (p.6).

Nurses perceived they were making accurate clinical judgements; however, no system existed to support communication of those judgements in a form that interpreted the urgency to junior doctors and other nurses. Nurses lacked the communication tool to communicate clinical concerns to junior doctors and junior doctors lacked the interpretive skills to assess the communication that did take place.

> **Focus group:** *We would ring on the gut feeling...we knew that they* [patient] *looked unwell and maybe one parameter was out but you didn't know how to sort of explain it in ways that would get attention* (p.5).

> **Focus group:** *Well, even if you did explain it they* [house officer] *didn't necessarily listen to you or believe you or come quickly and assess the patient* (p.5).

The CNS explained the concerns during the development of the EWS:

> **CNS:** *What I was really worried about was that straight down the line it has to be totally understandable by the nurse who walks in on a bureau shift who doesn't work there normally. The doctor who is looking at the algorithm has to be able to make total sense of it immediately and there should only be...the house officer that you are going to call normally or the registrar or the consultant and one other number. We can't have people having to make choices* (p.4).

The algorithm provided a formal escalation process. Nursing and junior medical staff now had a pathway to follow for referral to more senior staff.

The study participants perceived that poor communication between disciplines, the changing and increasing acuity of hospital patients and the skill mix of nursing and junior medical staff all contributed to suboptimal patient ward care. Furthermore, the DHB was experiencing a shortage of registered nurses and junior medical staff in 2006-2007.A reduction in the number of senior ward nursing staff increased pressure on the remaining senior nurses who then struggled to meet patient and junior nursing staff needs. Nurses who participated in the focus group remembered how it was:

> **Focus group:** *There's a lot more junior staff now, the skill mix isn't the same as it was in previous years where quite often you would get three or four senior nurses on, on a shift where now you don't and when you are co-ordinating and you're trying to oversee the whole ward as well as staffing, and nine times out of ten are taking the sicker patient loads* (p.4).

> **Focus group:** *A lot of the house surgeons don't get as much help from their registrars as they should or they're too frightened to ask the registrars when they don't know what they're doing* (p.3).

> **Focus group:** *The house surgeons* [junior doctors] *didn't have anything to, in their inexperience, they didn't have anything to hang anything on to, to ask the registrar to step in, you know the patient wasn't sort of "moribund "yet, so...* (p.6).

Ward nurses recognised that previous to Outreach, communicating patient assessment findings to medical staff was difficult. The lack of a framework to prioritise the urgency of findings which was readily understood by both medical and nursing staff contributed to junior doctors being uncertain when to escalate patient concerns to senior doctors.

Compounding the lack of a framework to assist the communication of clinical concerns was the changing face of the New Zealand nursing workforce from a more senior nursing force to more mixed skill levels. Traditionally in NZ hospitals more junior staff with developing ability to interpret variation in physiological recordings were closely monitored by senior ward nursing

staff. With the advent of fewer senior staff and increased numbers of junior staff the ability of seniors to continue close monitoring had been jeopardised.

For EWS to be effective it firstly required that physiological observations be assessed and secondly, that a full set of observations be recorded. Recording of respiratory rate, heart rate, blood pressure, oxygen saturation, neurological status, and if catheterised, an hourly urine output is necessary to complete a full set of patient observations. The principle of a EWS is that numbers are awarded to physiological observations, normal observation parameters being a zero and abnormal parameters one to three. The scores are added together to get a total score (refer Table 3). Once a EWS has been assessed, an algorithm on the reverse side of the chart directs the nurse or junior doctor to the escalation protocol (Appendix 9).

Developing the EWS came with challenges. The determination for frequency of recording observations had previously been at the discretion of registered nurses. These intervals were random and often not related to patient condition. No guidelines existed to direct nurses and junior doctors on the suitable frequency for normal observations to be assessed or an appropriate action to take should abnormal readings be recorded. An additional issue was how to encourage nurses to complete a full set of observations. A complete set of patient physiological observations was essential for a EWS to be effective. The challenges were to change these behaviours and lack of systems. During interview the ICU Consultant confirmed that observation frequency was an issue:

> **ICU Consultant:** *Observations* [of vital signs] *were somewhat irregular and incomplete* (p.2).

Irregular observation frequency contributed to a lack of recognition of the physiologically unstable patient. Abnormal physiological observations are indicative of a patient being unwell, ranging from mildly unwell to critically ill. Physiological observations are a simple convenient way to partially assess a patient's condition.

The CNS for CCOT shared the concerns in regard to the challenges of developing the hospital EWS:

> **Clinical Nurse Specialist:** *Now the EWS came with some challenges in itself. The first thing was to tell nurses that they had to do a full set of observations and for* [the hospital] *that was a particular problem at the beginning that people didn't necessarily do respiratory rate, when they did saturations* [oxygen] *they didn't write how much oxygen they were on, nobody really did neuro-status* [neurological] *on anyone who wasn't a neurological patient. So those were the sort of big issues at the very beginning* (p.4).

The challenge of random observations was dealt with by having prescriptive time intervals for repeat patient observations incorporated into the EWS chart. The existing nursing behaviour of assessing some, but not all, of patient physiological observations was altered by removing all other observation charts from ward areas except for the Glascow Coma Scale[3]. Piloting the EWS chart on a ward with educational support determined that using it should encourage nurse observation behaviour.

Table 3. Early Warning Score.

EWS SCORE	3	2	1	0	1	2	3
Resp rate	<8			9 to 18	19 to 24	25 to 29	>30
SPO_2 / O_2	<90%				40%	50%	15 litres
HR	<40		41 to 49	50-99	100 -129		>130
Systolic BP	<90		90 to 100	101-199		>200	
CNS Score			Confusion	Alert	Voice response	Pain response	No response
Av urine / hr (over 4 hrs)				> 30ml/hr	<30ml/hr		<10ml/hr

Source: (EWS chart DHB).

Advancing the EWS from an agreed principle to a tangible tool where it could be put into operation was a collaborative assignment. Nurses gave their input into what format the EWS

[3] This is a neurological assessment tool which offers a more comprehensive assessment than the neurological scale on the EWS chart.

should take to make it a useful convenient tool, while ICU Consultants offered their advice in relation to parameters for observations. The EWS tool was initially trialled for four weeks on two surgical wards, reviewed and trialled again on the same two wards. The same trial and review process followed for two orthopaedic wards:

> **CNS:** *EWS was probably the primary...getting that right was our primary driver in the early days. We trialled that on wards four and eight, for four weeks then we reviewed it. We trialled it again for a further 8 weeks on those same two wards and then reviewed it. Then it went into orthopaedics; we trialled it with them as well and I think it had nine versions in all. Always we used the information that the nurses gave us* (p.5).

Incorporating feedback from ward nurses into the design of the EWS chart ensured the chart was easily useable and acceptable to nurses. The process of acquiring feedback also offered an opportunity to engage with ward nurses and gain their collaboration.

Despite the challenges, a EWS chart was finalised. To reach this final stage several charts were piloted on the wards. Nurses' input had been sought and recommendations acted upon. The nurses favoured an A4 gatefold chart which is still in use today. Parameters for each element of patient observations and the algorithm to escalate patient care which had been agreed upon by the nursing and ICU medical staff were part of the observation chart.

Ward nurses were kept informed of EWS and the progress of Outreach through two weekly newsletters. With the large numbers of nurses in the wards it was not possible to speak with everyone individually. Newsletters were one way to include nurses in the process of introducing Outreach and encourage buy-in. The following newsletter excerpt is an example:

> **Outreach Newsletter February 2006:**
>
> *EWSs: An Explanation.*
>
> *We will be calling our system here at..., .EWS. An early warning system is used to identify and highlight those patients who are deteriorating and those at risk of deterioration. Using an early warning system ensures all observations are undertaken, as a complete score can only be achieved if a whole set* [of vital signs] *are completed, including respiratory rate, neurological status and SpO2* [oxygen saturations].

Newsletters were an effective mode of communication to use and ensured all nurses had the opportunity to keep themselves informed of the progress of the CCOT.

Medical buy-in for EWS was gained by presenting other specialty consultants with a system and tools which would aid their practice. The offer of assistance from CCOT, improved observation frequency and an algorithm for escalation of patient care without any extra time outlay from the specialty was a powerful incentive to participate. An ICU Consultant reflected on communicating the EWS to other specialties:

> **ICU Consultant:** *Look, this is what's happening in your wards to your patients that we're taking in. We believe that there is room for observation improvements. This is a warning score to help you look at your patients and assess your patients. You have the right to change that score, that's absolutely fine. If you believe somebody doesn't need our care then the consultant or his delegated sort of person, the registrar, can change those scores in discussion so you keep control of your patients. But if you score we will come up and give you some support"* (p.4).

> **ICU Consultant:** *And the surgeons really took it quite well and they said "well, that's good because we actually want to know when our patients are deteriorating". The physicians were a more 'less-concerned' group I think* (p.5).

Nurses were quick to grasp the benefits of the EWS and the safety net it offered them when unsure of the appropriate action to take. Participants in the focus group had this to say:

> **Focus group:** *The EWS score is there in black and white, as to what to do next. When it's not their* [junior doctor] *interpretation or a senior nurses interpretation of what to do it's...there* (p. 4).

> **Focus group:** *Because it's* [EWS]) *a very definitive pathway for a junior nurse to follow (p.5).*

During this period it became apparent that EWS would need the support of a DHB policy to uphold the principle of early recognition/early intervention. Policy would hold nurses and

doctors accountable to follow the EWS algorithm. Further discussion of 'policy' is presented in the next chapter: Institutionalisation.

Rationale for education

The Critical Care Development Group was adamant that an education strategy to develop nurses and junior doctors was an important component of the Outreach package. Teaching colleagues what good practice was and why it was good practice prepared nurses and junior doctors to do the right thing. An educational strategy was developed and offered a variety of educational formats. These included formal teaching at orientation days for staff new to the organisation, six week modular acute care training opportunity for ward nurses in the ICU, medical education sessions for house officers and registrars, one-off education sessions, constant bedside teaching and the ACT course. Management supported the commitment for education. In a Decision Paper presented to the DHB the importance of education as an adjunct to sharing critical care skills is documented. An excerpt from the Decision Paper written by the General Manager illustrates the support:

> **Decision Paper:** *The effectively managed HDU beds and Outreach/Rapid Response Service will: Share critical care skills and expertise through an educational partnership with the wards which will ensure patients receive optimum timely care* (p.8).

The ICU Consultants' and the CNS's experience of retrieving ward patients who had received suboptimal care related to a lack of knowledge from medical and nursing professionals made them realise that there was a necessity for education. They were committed to education. The Clinical Director and CNS nurse shared their experiences:

> **Clinical Director:** *I have seen more than enough cases where there has been no medical understanding*[of the critical condition] *or there has been no nursing understanding*[of the critical condition] *or there has been both no medical and nursing understanding so that is why I always felt that an education system had to be part of it* [outreach] (p.14).

> **CNS:** *If you don't have an educational training program, when your junior doctor arrives rapidly as...he'll still do or she'll still do the wrong thing and if you don't have a safety net which is the outreach team, patients will be discharged from your intensive*

> *care, the nurses will look blankly at the tracheostomy, the dopamine infusion, the strange horrible cavity dressing on the neck and get it wrong because they don't have the guidance* (p.18).

Recognition of the lack of knowledge of nurses and doctors encountering critically ill patients or patients with devices and conditions not usually seen on the wards motivated the commitment to include an education package in CCOT service. Ensuring patients received optimal care on the wards inspired all aspects of Outreach.

Communicating the aims and content of the CCOT education strategy to the wider hospital community, management, nursing and the DHB was a key task during the implementation stage of Outreach. Multiple presentations were made to specialty management groups at Senior Management meetings, senior doctors at the Grand Round and senior and junior nurses at the Nursing Grand Round by the CNS CCOT in 2006-2007. Joint presentations to senior doctors by the CNS and an ICU Consultant also occurred. Historically, senior doctors are known to be more responsive to their peers than other disciplines. Figures five and six describe how nurses and doctors would be trained to recognise the physiologically unstable patient on the ward and formulate a plan of care:

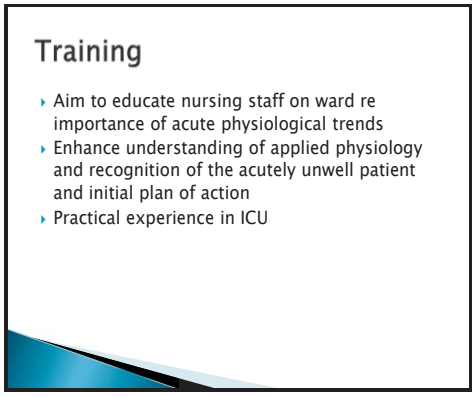

Figure 5. **Critical Care Education Strategy.**

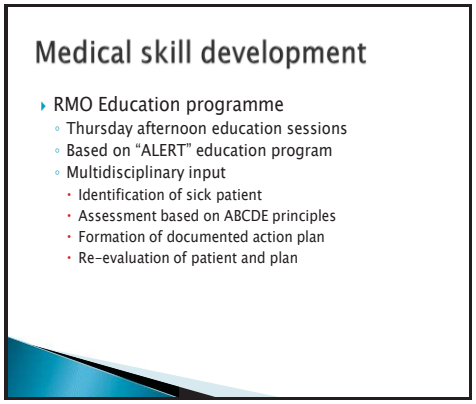

Figure 6. **Critical Care Outreach Strategy.**

The messages were transparent and readily understood. To be effective and improve patient care, nursing and medical staff required education to assess, intervene and plan care for the ward patient to prevent further deterioration.

Designing the ACT Course

Both the CNS and ICU Consultant had been instructors on the Acute Life Threatening Events Recognition (ALERT) previously and recognised the value of establishing a course at this hospital. This course taught multidisciplinary health personnel how to identify physiologically unstable patients and the initial interventions to keep the patient safe until more definitive treatment could follow. Scenario-based sessions were supplemented by lectures on pathophysiology. Funding allocation, however, did not stretch to support buying ALERT, as the course was subject to copyright and was expensive. In response to this situation the clinicians and nurse educator on the Critical Care Development Group designed and wrote a new course, the ACT, to fulfil the same purpose as an ALERT course. It was New Zealand and hospital specific and met the need of CCOT to educate nurses and doctors to recognise the physiologically unstable patient and respond appropriately. The CNS explained how being specific to the local environment made the ACT course more suitable to hospital processes:

> **Clinical Nurse Specialist:** *Both myself and* [Senior medical officer] *felt that this is New Zealand and it has to be NZ specific so whether that be implications for Maori, whether it be that we do not have big hospitals just down the road, that we can send people to when we're busy, that we have very, very specific NZ problems that we needed to address. And some of the things are very different. But the other thing that we wanted to get across is local need for us at that point. If a person had cardiogenic shock, and needed angioplasty, they had to go to* [another hospital]. *So it was no good having a*

lecture that said "send to cath-lab, urgent angioplasty." What we had to talk about was transferring that patient to another hospital and the implications of that (p.10).

Clinical Nurse Specialist: *The ACT course is about acting proactively, rapidly and involving your seniors. We run that course ten times a year now, sorry eleven times a year and that has junior doctors, physiotherapists, and nurses and we've done nearly...I think over 1000 people now* (p.11).

The ACT course was set up and is facilitated by the CNS for Outreach in the DHB Simulation Centre eleven times a year. Booking, advertising and some administration was negotiated with the Learning and Development Department. Since the ACT course was established content has evolved to reflect feedback from course participants. Focus group participants commented on the advantages of ACT being multidisciplinary:

Focus group: *It was good that it was multi...well the one that I went to was multidisciplinary, you know, with the physiotherapists* [physiotherapists] *and I forget who else. And that was useful too because we could work off skills that they had in dealing with the critical patient as well as...*(p.13).

Focus group: *We get a lot of pancreatitis so, you know, the third spacing and all that sort of thing so it was, you know, very helpful having a better handle on the physiology of that...*(p.13).

Junior doctors and nurses did the same course. The ACT contributed to nurses and doctors having more understanding of both the physiology of critical illness and appropriate actions to initiate when confronted with a critically ill patient. By both doctors and nurses attending the same ACT courses, real or supposed communication barriers between each group are broken down.

Six week modular training

Further to ACT, a six week modular training course was established and offered to level three and four nurses on the Professional Development Recognition Programme. The course was an opportunity to develop critical nursing skills and knowledge transferable to the ward.

Information outlining conditions for application and a reminder to apply was circulated in the two weekly Outreach Newsletter:

> **Outreach EWSletter February 2006:**
>
> *Six Week Secondment to ICU Reminder!*
>
> *The six week secondment for all level three and four nurses across the DHB on ICU* ***is running all year****. If you haven't got your application in yet, or know someone who is interested please contact* [CNS] *or* [Clinical Nurse Educator] *on the ICU. This 6 week programme has weekly tutorials, a structured education package, allocated mentor in practice, a valuable addition to any nurse's portfolio.*

Advertising in the CCOT newsletter provided ward nurses with information. Having named people in ICU to contact also allowed for enquiries to be made directly. Many ward nurses took the opportunity to ask questions directly before committing themselves to the secondment.

The ACT Six Week Education Programme specifically targeted assessment, monitoring of acutely ill patients, respiratory management, shock and fluid and electrolyte management. The modules were competency based and nurses had to demonstrate competency in respiratory assessment, neurological assessment, cardiovascular assessment, and arterial blood analysis, ward level of airway management and recognition of signs and symptoms of shock. Selection of these topics was deliberate; the topics would meet the knowledge deficits relating to recognition of the physiologically unstable patient. Table four clearly outlines the content, time allocated to topics and the expectations of participants seconded to the course:

Table 4. Acute Care Training Six Week Education Programme.

Acute Care Training Six Week Education Programme

Week	Module	Tutorial (Monday 0900-1100)	Tasks
1	Unit Orientation **Module 1:** Patient Assessment	4 Hours	
2		2 Hours: Patient Assessment	Completion of patient assessment module
3	**Module 2:** Monitoring of the acutely ill patient	2 Hours: Monitoring	Completion of monitoring the acutely ill patient module
4	**Module 3:** Respiratory Management	2 Hours: Respiratory Management	Completion of respiratory management module
5	**Module 4:** Shock	2 Hours: Shock	
6	**Module 5:** Fluid and Electrolyte Management	2 Hours: Fluid and Electrolyte Management	Completion of Shock + Fluid and Electrolyte Management modules

The six week ACT Programme for nurses, the ACT Course and registered medical officer (RMO) sessions provided the training required to prepare nurses and junior doctors to identify the deteriorating ward patient and intervene appropriately. However, the six week programme has been in abeyance since 2009 owing to nursing staffing shortages on both ICU/HDU and the wards. The reinstatement of the programme will require a needs analysis to determine the necessity for restarting this programme. Supplementing these educational formats was a package of general education experiences discussed in the following section.

General education

During the implementation stage a permanent slot in the DHB Corporate Orientation programme for new multidisciplinary staff to the organisation was secured. New staff were introduced to Outreach and the EWS at these sessions. New graduates on the New Entry to Practice Programme (NeTP) were also introduced to Outreach. Corporate Orientation and new graduate orientation provided an opportunity for staff to become acquainted with Outreach nurses and processes, and the expectations of the organisation:

> **CNS:** *We did a lot of teaching, not necessarily just about Outreach and its introduction, but other things, so for the nurses we may do observations, we may do the importance*

> *of fluid balance, we may do fluids, but the idea was that to just get our face seen, to be out there* (p.3).

Prior the establishment of Outreach, ICU nurses and ward nurses had very little interaction. Teaching sessions provided information for ward nurses and gave the CCOT nurses an opportunity to build relationships with them. Establishing relationships with ward nurses was essential to the success of Outreach. As with the senior medical staff, trust had to be won. Trust is built on relationships.

During the early phase of the Implementation stage many tasks were accomplished: A CNS to lead Outreach was appointed, a EWS chart was created, education programmes were designed, consultant specialists' cooperation was secured, and advertising for Outreach had been disseminated. The next phase of Implementation was launching CCOT to the wider hospital.

Communicating the EWS to wards

With the majority of key tasks completed, Outreach was introduced to the wards in a staged manner over an eight week period. First surgical wards and then medical wards made the transition from using the old system to using the EWS chart and algorithm. Weekly audits of EWS charts were made for the first four weeks to determine the use and accuracy of the EWS. Results were fed back to staff at handover times and a formal report was emailed to the CNM of the wards. The Emergency Department and the obstetrics unit did not participate in Outreach:

> **Consultant ICU:** *We weren't planning to take it into ED* [Emergency Department] *because they said they didn't need it in the emergency dept and I'm quite specific about that. That was an answer we had from the ED, although in the ED there were both medical, surgical and ED patients. The other place we didn't take it into was obstetrics and gynaecology* (p.5).

Obstetric patients have differing physiological parameters during labour and the immediate post-natal period. The EWS score parameters were a general non-specific tool not applicable to the labouring woman. An obstetric EWS would have had to have different parameters to escalate care delivery. However, since 2010 the postnatal ward has started to use EWS for physiologically unstable women with medical problems.

A presentation to Senior Management in 2007 (Figure seven) presented a summary of how Outreach was launched on the wards: (note again the military metaphor used in the presentation).

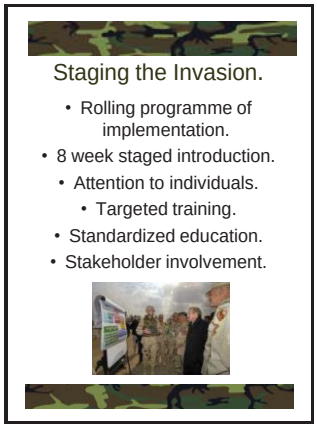

Figure 7. **Presentation to Senior Management.**

Introducing Outreach to the wards was a complex operation. Individual tasks listed on Figure seven were equally important. To have omitted any of these would have jeopardised the whole project.

Early recognition/early intervention

Outreach represented a radical change in practice and thinking on the wards. The EWS chart was prescriptive and directed the escalation of patient care, obliging doctors and nurses to follow the Outreach algorithm. Any uncertainty about whether to report changes in a patient's condition had been removed for nurses. Likewise, choosing whether to discuss a patient's condition with a more senior medical officer was no longer an option for junior medical staff.

Patients newly discharged from ICU were also followed up by an ICU Outreach nurse. The CNS CCOT expressed the opinion that some nurses felt they were 'being policed' when Outreach was initially introduced to the wards:

> **Clinical Nurse Specialist:** *There was very little resistance and what resistance there was, was ill-informed. People were feeling that they were being policed and checked up on. People feeling that...and that was strangely enough, the more experienced nurses. The main area of resistance for the nursing side was the idea that they had to call a*

doctor if the observations were out of the ordinary, even if they felt the patient was fine (p.13).

Individual nurses may not have needed an Outreach service to assist them with early recognition of the physiologically unstable patient. There was, however, a collective problem at the hospital of patients' deterioration being unrecognised. Outreach and EWS were created to support the nurses and doctors who do not have the requisite skills. In a large organisation such as the DHB to have made an exemption for even a single ward nurse would have compromised the entire system.

Communication between ward nurses and junior medical practitioners improved. Where previously nurses had difficulty communicating concerns about patients to junior medical doctors, the nurses now reported that they were being listened to:

Focus group: *And it* [EWS**]** *gives you some sort of credence as well, they* [doctors] *listen. The medical staff seems to listen to you more if you've been in touch with Outreach and they're coming to assess them* [patient] *and I think it helps them also, not just the nursing staff* (p.3).

Once nurses began to use EWS they could see the benefits it added to communicating with junior doctors. Observations of vital signs, use of the algorithm and initiation of treatment for the physiologically unstable patient all improved:

Consultant ICU: *Some of the observation charts have improved, and the education about why we needed the observation charts and the fact that they need to fill them in has improved no end from when I arrived here and the standard of recording observations has improved significantly... and now at collapses very often people have done the glucose before we have arrived as being part of...and sometimes blood sugar has been low and people start the appropriate therapy. I am mainly talking about nursing staff* (p.7).

Clinical Director: *It is unusual now to go and get a near-death patient be presented to the Unit* [ICU] *without being aware of their existence from the wards* (p.7).

The effect of Outreach on early recognition/early intervention made a significant impact on ward patients and Outreach nurse capacity. The significance to patients is reflected in a statement within the Programme Budgeting and Marginal Analysis (PBMA) bid to the DHB (2007). The bid was a service bid prepared by the general manager of ICU and the Charge Nurse Manager. The need to petition for funding to extend the initial nursing component of Outreach by a further 1.8 full time equivalent Outreach nurses was brought about by the level of response to the service. Outreach was extended from a weekday 0730-1630 service to a seven day a week service. More nurses were needed to support the service.

Adult Health Services PBMA bid abstract 2007-08

- *Patients are being referred to Intensive Care on average in four hours instead of fifteen hours previously. This has resulted in reduced cardiac arrest calls for this group of patients as a consequence of earlier intervention. The total number of true cardiac arrest calls across all of the services covered has reduced in absolute terms by 50%. This has a direct, but not yet quantified, effect on mortality and morbidity for these patients. The number of emergency calls has remained static but they are used for patients who are deteriorating prior to cardiac arrest.*

- *Patients admitted to ICU/HDU are less likely to require immediate resuscitation and have a shorter ICU/HDU length of stay and general ward stay.*

Communicating the EWS to wards and extending ICU expertise through Outreach nurses had a significant effect on ward nurses and patients.

Summary

Implementing the CCOT in a complex organisation such as the hospital required many tasks to be completed in a co-ordinated and systematic way. After funding had been granted by the DHB, ICU sponsored the CCOT. The service was nurse-led and so recruitment of a CNS who would be responsible for making Outreach operational and effective followed. Making Outreach operational was achieved with the assistance of the Critical Care Development group who were allocated specific tasks to be completed within a timeframe.

An education package and a EWS tool for both nurses and junior doctors were key components of Outreach. The EWS was created with input from ward nurses. The ACT Course, Six Week Acute Care Training Programme, session within the RMO continuing education programme, Orientation to DHB programme, new graduate programme and many specific teaching sessions made up the education package. Newsletters were one way in which ward nurses were kept informed about the composition of the team, the EWS, the Six Week Modular course and progress updates.

Outreach was introduced to wards using a staged approach. Throughout this process there was careful attention to gaining buy-in from key stakeholders as the new service crossed specialty boundaries not previously crossed in this way. Finally, Outreach was available to ward nurses and other multidisciplinary staff. The emphasis had moved from late recognition of the physiologically unstable patient as presented in the former chapter (Initiation) to facilitating early recognition/early intervention for ward patients.

Four themes: Getting started, development of tools and education strategy, delivering the EWS to wards and shifting late recognition/late intervention to early recognition/early intervention have been presented in this Implementation chapter. Key tasks within each theme illustrated the complex and well organised approach which provided the foundation for implementing CCOT. How implementation of Outreach progressed at the hospital is made transparent by organising it by Fullan's theoretical concept of implementation which followed from Initiation and leads to the final stage, Institutionalisation, in the following chapter.

Chapter Six: Institutionalisation

Introduction

This chapter presents data from interviews, a nursing focus group and DHB documents including the ICU Outreach database, information case management data, DHB Policies, the DHB resuscitation statistics and ICU Outreach audits. The data is organised according to Fullan's final stage of change management, institutionalisation. Three themes are recognised: Becoming permanent, the right team, and support for nurses.

This chapter shows how institutionalisation progressed from preceding work achieved in the initiation and implementation stages. For change to become permanent it must be embedded into the organisational psyche. A nurse-led CCOT achieved recognition as a permanent service in the DHB during 2007-2009. Integral to permanence is policy, and so policies were created to guide, audits to evaluate and processes provided to escalate care for the physiologically unstable patient on the ward. Nurses benefited from development of nursing assessment, decision making and intervention skills. Fewer patients deteriorated. Junior doctors benefited from educational input, practical support and the increased safety of the clinical environment. Critical Care Outreach Team composition and skill level continued to sustain Outreach as an important service of the DHB.

Becoming permanent

The theme, becoming permanent, is demonstrated through policy, education, trust and co-operation. The process of the nurse-led CCOT reaching permanence was achieved from 2007 to 2009. Permanence ensured continuity of CCOT for the DHB hospital service and consumers. The service and EWS policies were integrated into DHB official policy. Support for Outreach from senior medical, nursing and management groups continued with dynamic leadership from the ICU CNS and Outreach nurses.

Policy

Specific policy was needed to set the standards for guiding behaviour in the hospital to ensure patient safety. Three policies were introduced: the CCOT Service Policy, the Early Warning System policy, and the Patient Observation Frequency policy. The CCOT Service policy and the

Early Warning System policy provide comprehensive overviews of the service and the following policy excerpts demonstrate how the operation of the CCOT is defined:

> **CCOT Service Policy:** *The CCOT Service policy aims to give a clear concise overview of the purpose, functions, roles, management, staffing, referral process and audit activity related to this service* (p.1).
>
> *The primary role of the CCOT Service includes:*
>
> *a) Clinical support for the ward based patient requiring critical care assessment and/or interventions*
>
> *b) Education and support of all staff managing such patients*
>
> *c) Supporting the ICU/HDU by monitoring patients following their discharge from intensive and high dependency care* (p.6).

Introduction of the CCOT Early Warning Score System policy supported change in practice by holding staff accountable for following the prescribed response times, minimum vital sign observations and escalation algorithm (Appendix 9) for care of the physiologically unstable patient on the ward. The policy is specific and applies to all staff:

> **Policy, Early Warning System:**
>
> *Principles of the Early Warning System (EWS)*
>
> - *All staff within EWS active departments must ensure that patient observations and EWS scores are recorded as per the EWS chart*
> - *The EWS algorithm should be adhered to at all times (appendix C) unless signed off by the patient's own consultant*
> - *All staff responsible for patient care working in EWS active departments must receive training and updates in the use of this tool. This applies to permanent and temporary staff* (p.4).

Early recognition of the physiologically unstable patient is dependent on observations recorded at intervals appropriate to the individual patient. As discussed previously, frequency of vital sign observations had been at the discretion of the registered nurse. The Patient Observation Frequency policy prescribes the frequency for assessing patient vital signs during the in-patient journey.

Prior to the introduction of the EWS the decision whether to report alterations in patient physiological status had been optional. Response time by doctors had not been mandatory. The senior CNS reflected on the need for policy:

> **Clinical Nurse Specialist:** *The policy holds the whole thing* [Outreach] *together. I think the first thing to say is the EWS had to be policy driven. The policies are clear but the more important thing is that they give guidelines for the people who are working with them* (p.5)

When a patient scores three or more, the EWS escalation algorithm requires ward nurses to contact the junior doctor of the patient's team and to page the CCOT nurse. The Outreach pager is carried by the Outreach nurse during the day and the co-ordinator of ICU at night. The information sent by the ward nurse is the latest EWS score and the observations made of blood pressure, heart rate, oxygen saturation, respiratory rate, urine output (if available), and level of consciousness. From this information the CCOT nurse assesses the urgency of the situation and decides whether to respond immediately or within the thirty minute timeframe dictated by the EWS policy. Likewise the junior doctor paged must assess the patient within the thirty minute interval. Outreach nurses regularly escalate care needs to specialty consultants and ICU consultants after they have assessed a patient. After hours the ICU coordinator responds to the EWS trigger by phone. Referrals that require further investigation are communicated to the night ICU registrar to follow-up. Response to a EWS of three or more is mandatory for junior doctors. The Clinical Nurse specialist explained why the policy is important:

> **Clinical Nurse Specialist:** *The nurses can insist that "I'm really sorry, I have to call you* [doctor] *because it* [EWS] *says..." and particularly for junior doctors it* [policy] *says "this is not negotiable". You can't decide not to come. So I think that the policy is really important* (p.6).

The success of policy is dependent on staff adhering to the directives within the policy. Policy is then audited for compliance. The EWS Policy outlines the commitment CCOT has to continuous quality improvement through ongoing auditing and feedback:

Early Warning System Policy:

- *Each EWS active department will be internally audited to monitor early warning score compliance. The audit programme is co-ordinated by the Clinical Nurse Specialist (Critical Care)*

- *Audit results and recommendations will support Nurse Educators/ Clinical Coaches in determining the training needs of EWS active clinical areas. Meetings with department Clinical Nurse Educators and Clinical Coaches will be facilitated to ensure these audits support and inform the training needs of individual departments* (p.7).

The introduction of these policies together with the continued efforts of the Outreach team and staff acceptance of the total package endorsed Outreach integration into the organization. Incorporation of EWS by ward staff into practice is reflected in the sustained increase in numbers of referrals made annually. The following graph illustrates the continual growth since Outreach started:

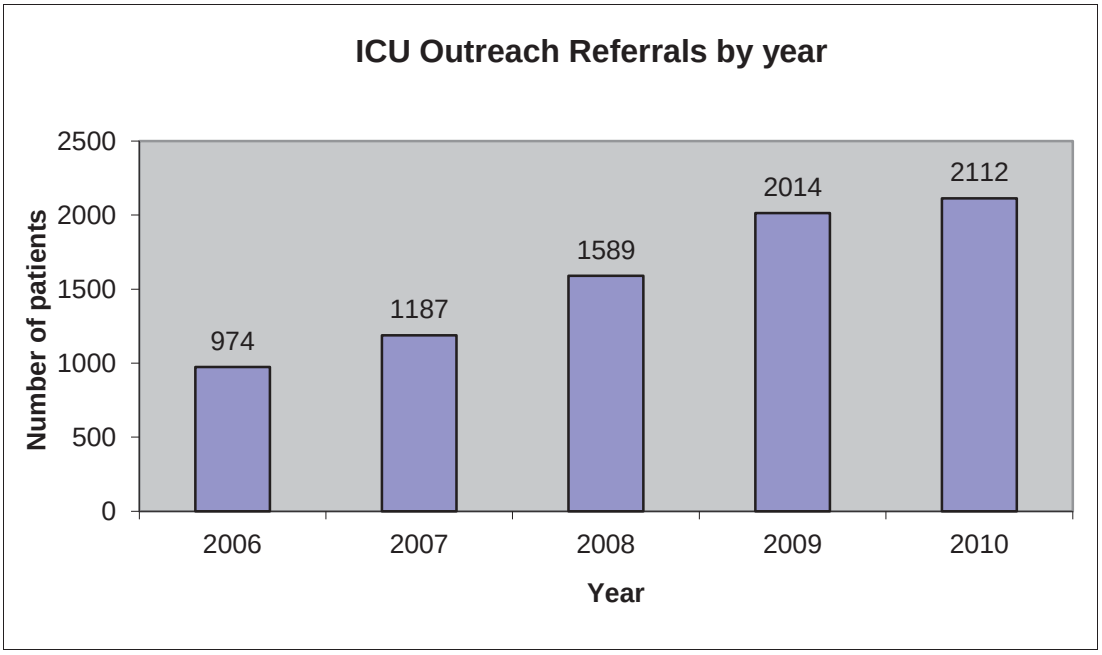

Figure 8. ICU referrals by year. Source (CCOT Database)

Hospital patient throughput has increased from a total of 51,000 patients discharged in 2005, to a total of 61,308 patients in 2010. Despite the increase in patient throughput, the number of deaths from cardiac arrests in the hospital has declined per 1000 patients. However, emergency calls to the 777 number, the hospital's cardiac and medical emergency number, have increased

by 35 percent since the introduction of CCOT in 2006 (Resuscitation Statistics, DHB). The increase in 777 emergency calls does not reflect an increase in actual cardiac arrests. Figure 9 illustrates the situation:

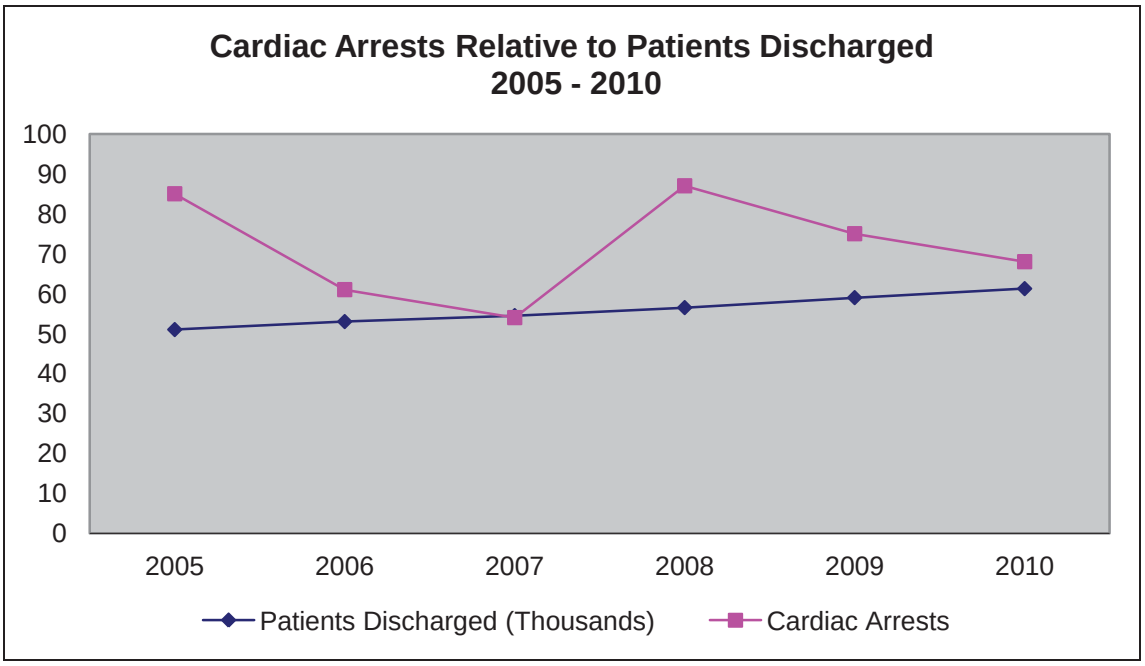

Figure 9. Cardiac arrests relative to patient discharges 2005-2010
Source: Information Analyst Medicine and Emergency Care Centre and the DHB and Resuscitation Co-ordinator.

The lowered rate of cardiac arrests may be attributable to more than one reason. The impact of CCOT and the early recognition of the physiologically unstable patient and early intervention may be contributing factors. Reduced cardiac arrests may also be attributable to the influence CCOT has on end of life decisions. With input from Outreach, appropriate decisions are being made by specialty teams and families about discontinuing aggressive intervention when it will not alter the outcome for the patient. Critical Care Outreach nurses and doctors are experienced at responding to difficult situations where treatment is futile and inexperienced staff require support during this time. An ICU Consultant shared his reasoning around possible causes for reduced cardiac arrests:

> **ICU Consultant:** *Our unexpected cardiac arrest rate has reduced. So it's* [Outreach] *certainly had some effects. You may well say that the reason we've got the reduced cardiac arrests is because we're not letting…we're making a decision about palliative care but I think that's equally as valid a point in that the team with the patient or their*

relatives is able to say well actually, we've reached the end of the line so rather than have an unexpected death they have a planned, supported end (p.7).

Audit

The CCOT Service has robust auditing and feedback processes which are part of the DHB Annual Quality Plan. The DHB is committed to continuous quality improvement through evaluation and auditing services. The CCOT Service policy contains a specific section relating to evaluation:

The CCOT Service Policy:

- *Evaluation of the CCOT Service and the clinical needs of the critically ill within the District Health Board will direct the future role of the team and inform service strategy*

- *All contacts, patient reviews and follow-ups will be documented through a specific CCOT Service database. This will be password protected and respect patient confidentiality. Compliance with the Health Information Privacy Code 1994 will be maintained* (p.13).

The audit activities referred to in the policy consist of auditing EWS charts, database activity and a quality improvement survey. Results from a staff satisfaction survey in 2009 identified that CCOT advantaged patients and staff. Respondents to the survey reported that the limitations of reduced after-hours service were a weakness in the system. Notwithstanding this, the responses to the survey were positive in the appraisal of CCOT.

Initially a random selection of ward EWS charts was audited weekly for compliance. The criteria for compliance are: completed sets of patient observations, accuracy of scoring table, correct use of referral algorithm, and frequency of vital sign assessment. As staff became more conversant and accurate with using EWS charts, weekly audits were changed to monthly audits and are now quarter yearly, with exceptions. The exceptions are wards which have reported critical incidents related to non-compliance with the EWS algorithm. In the event of non-compliance with the EWS algorithm and patient related incidents, wards are randomly audited. Results from random audits are utilised to target areas for improvement to patient care. Table five from two surgical wards:

Table 5. Summer audit results 2011.

	Score Completed (%)	Score Correct (%)	Observations Complete (%)	Missed Observations (%)	Referred Onwards	Average EWS	Observation frequency (hours)
Ward x							
Autumn 10	80	100	93	7 (RR)	3/4	1.13	5.9
Winter 10	100	100	93	7 (RR)	0/0	0.46	5.1
Spring 10	100	100	100	Nil	1/2	0.4	4.2
Summer 11	93	87	73	27 (RR)	0/0	0.66	6.3
Ward y							
Autumn 10	93	93	87	13(RR)	0/0	0.2	15.4
Winter 10	100	100	100	Nil	0/0	0.2	9.1
Spring 10	93	100	93	7 (RR)	1/1	0.26	6.6
Summer 11	100	87	93	7 (RR)	0/0	0.4	9.6

Explanation of results:

- *Score completed: Have the scores been filled in at the bottom of the chart (I allow 2 misses)*
- *Score correct: Is the score right, have they added it correctly.*
- *Observations complete: Has a full set of observations been done. (I allow 2 missed observations)*
- *Missed observations: Which ones are missed, on what percentage of charts?*
- *Referred onwards: If a patient scores 2 or more, is the doctor informed. This should be 3/3, 5/5 i.e. every patient who scores 2 or more gets referred on*
- *Average EWS of all patients reviewed, the higher the score the greater the acuity on the ward during that 48 hours*
- *An additional measurement of average observation frequency has now been added.*

Average observation frequency is calculated directly from times of observations documented on EWS charts.

Results from audits of ward observation charts over a period of three years (2007-2010) revealed that the frequency of patient vital sign observations was dependent upon the number of nurses on a shift rather than patient need. During the morning shift patient observations on average were recorded four hourly, and during afternoons these were recorded eight hourly while at night those same patients had observations recorded twelve hourly. Figure ten shows a slide from the presentation to the Australasian Commission on Safety and Quality in Healthcare Conference (2010) which illustrates the pattern of patient vital sign observations on the wards

prior to the introduction of the policy for the Frequency of Patient Observations. The slide shows the numbers of nurses on a shift and the frequency of observations:

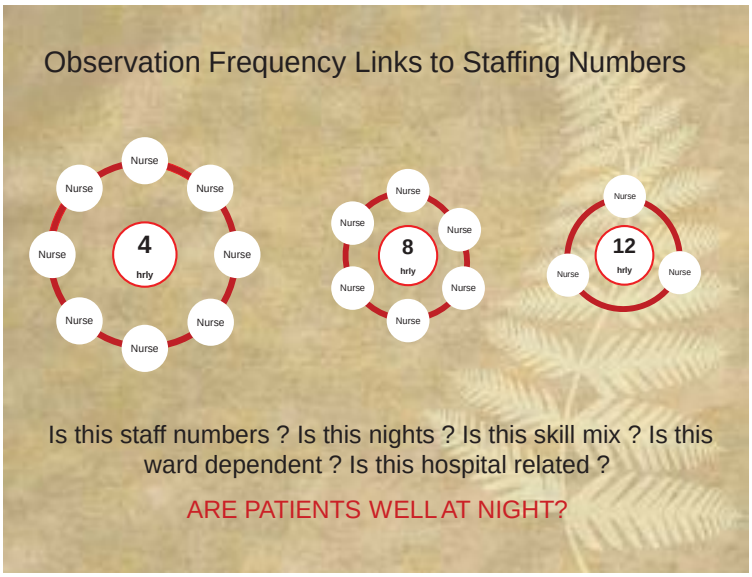

Figure 10. **Observation frequency links to staffing levels.**

A longitudinal audit to determine the long-term effectiveness of the 2010 Patient Observation Frequency policy would offer confirmation that the policy was being followed.

Audits confirm the integration of EWS policy at the hospital. Results from audits provide information for nurse educators which assist them to facilitate targeted training programmes in areas of need. Audits also yield important information on junior medical doctors' response to EWS triggers. Results are communicated to senior doctors for further action. Positive audit results confirm the use of EWS throughout the hospital. The only problem identified was the unavailability of specific CCOT nurses after-hours which was linked to a general deficit in after-hours senior nursing presence. It would appear that policy has been an important factor to support CCOT successfully creating a system which reduces delays and fosters collaborative care.

Education

A major component of institutionalisation was the embedding of on-going education. Further evidence that CCOT has become part of the institution may be seen by the involvement of the Outreach team in clinical training. Outreach has a permanent allocation on the resident medical

officers' continuing education programme and nursing education programmes. The CNS confirmed the commitment to education:

> **Clinical Nurse Specialist:** *I do three formal teaching episodes a week and educate ward staff on four occasions every day.* [Education] *makes up 5% of my work time and that does not include ward support / bedside teaching* (p.1).

Trust and cooperation

Gaining the trust of stakeholders was a key task of the initiation and implementation stages. Continuing to build on that foundation of trust remained a priority with the CCOT team. Ward nurses had to trust that CCOT nurses' clinical requests were valid. Likewise, senior medical teams had to trust CCOT with their patients. Of the trust issues, participants who were interviewed trusted the CCOT to negotiate issues between ICU and the wards and to promote a smooth transition between the two areas:

> **Clinical Nurse Specialist:** *One of the key tasks was to get people's trust and part of that is about putting on paper what people say, have policies and procedures that are clear and agreed by everyone. I think the people in the Outreach team have always been sensitive and sensible and if we* [outreach nurses] *do ask for something that is potentially difficult; we explain it in a good way. So if we're saying we want hourly observations, our rationale will be clear* (p.14).

> **ICU Clinical Director:** *Unless the senior medical team trusts the Outreach it can never really blossom, in my opinion. Unless the senior medical team go and...I mean, they've got to trust them to make it blossom but if they won't even tolerate them there's no point in running an Outreach* (p.9).

The role of CCOT in providing seamless care was drawn on to support a business case written by the CNM for the Services Manager in 2007 to increase the CCOT team hours and nursing numbers. Direct access by ward nurses to CCOT nurses has broken down barriers between specialties. No longer are ICU nurses only to be found in highly technical areas caring for patients connected to ventilators, invasive monitoring devices and a variety of other equipment. With the introduction of CCOT nurses, critical care skills have been taken to nurses and patients on the wards. These nurses have a direct link to ICU senior medical officers which facilitates a

more seamless approach to ICU involvement. Introduction of EWS and the presence of CCOT on the wards were acknowledged to reduce delays and definitive treatment for patients:

> **Critical Care Extension Business Paper 2007:** *Seamless care is the aim of the DHB; rapid effective referral between the ward teams and specialist services facilitates this. EWS and an increased ICU presence on the wards can reduce potential delays in referral and definitive treatment* (p.3).

By acknowledging and actively facilitating trusting relationships throughout the process of setting up CCOT a significant contribution to institutionalising CCOT was achieved.

Clinical governance for the project was provided by ICU management which facilitated management of operational issues as they arose by the CNS for Outreach. The CCOT Service Policy 2009 specified who was responsible for operational management, strategic development and clinical leadership. Clear reporting lines were determined:

> **CCOT Service Policy:** *The team will be managed operationally by the Specialist Nurse (Critical Care). Clinical leadership and strategic development of the service will be provided jointly by the Intensive Care Consultant team, Specialist Nurse (Critical Care) and Nurse Unit Manager (Intensive Care) and Clinical Nurse Educator (Intensive Care)* (p.6).

Although ICU Management was responsible for clinical governance, co-operation between senior clinicians, senior management and senior nurses during all stages of implementing CCOT was the key to establishing and sustaining the CCOT. The Clinical Director of ICU acknowledged the cooperation required to introduce a CCOT and the contribution of the CNM ICU at that time:

> **Clinical Director ICU:** Yo*u've got to have nursing leadership, medical buy-in and you've got to have management buy-in essentially, the right team. They're the really core components to making it work* (p.12).

Co-operation was not restricted to senior levels. That given by ward nurses, junior doctors and Charge Nurses also illustrated how working as a team optimised improved outcomes for participants. The CNS for Outreach recognised the importance of groups working together:

> **Clinical Nurse Specialist:** *The we also includes the charge nurses on the wards and it* [co-operation] *also includes many of the consultants. It* [co-operation] *involves some of the managers, it* [co-operation] *involves pharmacists, it involves physiotherapists. The "we" is the people who are interested in what's best for the patient*.

Co-operation extended to include ward nurses who contributed feedback during the creation of the EWS chart. An important example of feedback was:

> **Clinical Nurse Specialist:** The *"we" was the people who wrote "the boxes are too small on the EWS* [Early Warning Score] *for the older nurses!"*

Escalation of care for physiologically unstable patients cannot proceed unless nurses, doctors and CNMs collaboratively contribute their unique knowledge and skills to resolving the problems. If the CNM of a ward does not ensure EWS policy is followed by ward staff, recognition of physiologically unstable patients may not occur.

Nurses from the focus group understood the importance of nurses communicating accurately to doctors to gain their co-operation. The nurses acknowledged the difficulties doctors had prior to the introduction of EWS in discerning the urgency of the patient problem. With the introduction of EWS nurses and doctors shared a common escalation tool. A participant from the nursing focus group explained:

> **Focus Group:** *But the EWS score, not only does it gives the junior nurses as well as us* [senior nurses], *I mean it makes us, it's easier for us to articulate what's going on and it gives the junior nurses, but it also gives the junior doctors something to grasp as well and a pathway for them if they're unsure* (p.11).

Further confirmation of co-operation among nursing, medical and management teams came from the composition of the Critical Care Development Group and the current CCOT Team.

The right team

Critical Care Outreach nursing is clinically complex. A CCOT nurse practises across the entire acute services block of the hospital. Outreach nurses must be clinically competent, excellent communicators, exceptional patient advocates and educationally well prepared. They are expected to assess patients who are critically ill, possibly physiologically unstable but safe to remain in the ward or in need of emergency intervention across a number of different specialties. The ability to escalate care of a patient to senior members of the patient's team or ICU consultants is an essential skill. There is an expectation the nurse will share his or her knowledge and skills with nurses, junior doctors and allied health professionals.

Membership of CCOT reflected the multidisciplinary approach to critical illness. An excerpt from a decision paper written for the DHB in 2005 by the General Manager, explained:

> **Decision Paper:** *Outreach is a multidisciplinary approach to critical illness and this should be reflected in the membership of the service* (p.6).

The CCOT nurses are the face of the team. The team has a prominent profile in the acute areas of the hospital. Occupying a high profile position renders team members open to close scrutiny from nurses, doctors, managers, ICU senior medical officers and all other parties interested in the early recognition of physiologically unstable patient. Perceived qualities needed to be a CCOT nurse are described as a mix of clinical skills, communication and experience:

> **Clinical Nurse Specialist:** *The first thing was that they* [Outreach nurse] *had to be clinically competent and many people would say that that is the number one priority, the clinical competence has to be exceptional. They have to have good assessment skills, they have to be able to deliver good treatment and have reasonable diagnostic skills ..... to recognise what is life threatening and what it potentially is. But that clinical side has always looked as...whenever you see a job description...but I think it's actually a 50/50 split, that person has to communicate effectively, not be nice, but be effective and I think one of the things was when we looked for new people for the team, we really looked at how they would interact with the wards. And we looked for people with experience, not just intensive care experience, but life experience. And ... the people who have done best in Outreach are those with wide life experience, wide clinical experience and maturity, and if we may have any problems, those problems are,*

have been with the people who may have equal clinical skill but less maturity in the way they deal with things (p.12).

Clinical Director: *Structure is important too, but the membership is the most important in my opinion...There's a huge degree of inter-relationships and communication that is necessary* (p.9).

Consultant ICU: *I think a prerequisite of being an Outreach nurse is to have been an experienced Critical Care nurse and the more Critical Care you've probably done the better...So I think you need both time in nursing in an acute environment and time on an ICU because you can see what we can do with these patients* (p.8).

Ward nurses assumed clinical competency and focussed on the personal qualities of Outreach nurses. Foremost in the ward nurse's criteria for a CCOT nurse were ability to respect nursing colleagues, form relationships and communicate positively:

Focus group: *Because obviously the relationship on the floor is absolutely crucial to that role being effective* (p.23).

You know, they want to help you (p.26).

Practical support from CCOT nurses was acknowledged by nurses in the nursing focus group. Critically ill patients often require treatment interventions ward nurses are not familiar with, for example, inotropic support. The CCOT nurse works alongside ward nurses caring for the critically ill patient until physiological stability has been restored or the patient is transferred to ICU or HDU. The practical skills CCOT nurses share are recognised by ward nurses:

Focus group: *They don't leave it to you when you're so busy and you're already dealing with that patient. They take that step and will go and do it* (p.26).

Outreach nurses gained ward nurses' trust by demonstrating clinical credibility. The recruitment of clinically competent Outreach nurses was a key to establishing the trustworthiness of CCOT. A nurse from the focus group acknowledged her confidence in the skill of the Outreach nurses:

> **Focus group:** *But when X or Y came and they went and said "boom, boom, boom" I would feel very happy with the decisions that they'd made* (p.28).

Careful selection of Outreach nurses is crucial to the success of CCOT. The complexity of the role, the level of knowledge and skills required to effectively communicate with all levels of health professionals and families, and to make difficult clinical decisions means the right nurse must be selected to the team. From the evidence presented CCOT is a senior nursing position where members are respected by their ward colleagues and doctors alike. The role offers a unique opportunity to share knowledge and skills in ways not previously available in NZ.

Ward nurses from the focus group suggested that Critical Care Outreach has been instrumental in saving patients' lives. Critical care is a specialty with a body of knowledge from which to draw. The Outreach team is familiar with critical care knowledge and applies this to clinical assessment. Assessment and diagnostic reasoning supported by specialty knowledge makes CCOT adept at recognising critically ill patients who may go unrecognised by other specialties. Ward nurses explained how application of critical care knowledge on wards saved lives:

> **Focus group:** *Well I know of a couple of patients, young patients on the ward that would have been dead before they got to ICU, you know before they got to ICU without Outreach being involved earlier in their care because even the surgeon had been in to see them* [the patient] (p.8).

Early recognition of and early intervention for physiologically unstable patients has turned around the unacceptable situation of late recognition and late intervention for such patients which occurred before the advent of CCOT. The nurse-led CCOT for the DHB is now institutionalised at the hospital.

Support for nurses

Nurses are the largest professional group in hospitals. To be truly institutionalised CCOT was dependent upon acceptance by the nursing staff. It was accepted and valued by nurses almost from the day it commenced in 2006. Validation of the support and reassurance CCOT offered nurses was found throughout the nursing focus group data. The staff survey results identified CCOT as supportive to nursing and junior medical staff with Outreach nurses possessing

clinical and communication skills which contributed favourably to patient care, staff security and seamless care of patients.

Prior to the introduction of the EWS system there was no quick objective method to validate a nurse's clinical concern. Nurses may have suspected that a patient needed further assessment and treatment but, unless the junior doctor of the team or the on call doctor agreed with the nurses, clinical concerns were often dismissed. Excerpts from the nursing focus group explained how it was for nurses:

> **Focus group:** *Well, even if you did explain it* [clinical concern] *they* [junior doctor] *didn't necessarily listen to you or believe you or come quickly and assess the patient* ...(p.9).

With the introduction of the CCOT and EWS, clinical concerns were validated by a EWS score. The EWS score and algorithm dictated both the time interval within which a response should occur from a doctor and whether that response should be escalated to a more senior doctor. The nurse with a clinical concern no longer had to feel uncomfortable or unsure about reporting clinical concerns to a doctor. This is how the nursing focus group nurses described how the EWS assisted them:

> **Focus group:** *Well its* [EWS] *definitely helped because you've got a definite system to record when things are going wrong and only have to say "the EWS score's this..." and people will listen to you so...*(p.8).

Nurses had felt that they had to justify contacting a doctor with a clinical concern. The EWS and response from the CCOT Team provided validation for nurses' concerns.

The need nurses had to justify themselves to doctors suggested that a power differential existed between nurses and doctors. Having the EWS helped to redress the perception that nurses lack power and that doctors had more choices than nurses when a patient was physiologically unstable. Since the introduction of EWS and the sharing of ICU skills on wards by Outreach nurses, ward nurses and ward doctors have begun to place more trust in one another as nurses learn they have no need to seek justification from doctors for escalating their clinical concerns.

Doctors are now quick to respond to the EWS scores and CCOT. Members of the nursing focus group contributed their observations:

> **Focus group:** *If they* [CCOT] *ring, I've very rarely seen a house surgeon not do...what's been recommended.* (p. 27).

Furthermore, doctors are more inclined to act if the patient has been assessed by CCOT:

> **Focus group:** *The medical staff seem to listen to you more if you've been in touch with outreach and they're coming to assess them* [patient] *and I think it helps them also, not just the nursing staff* (p.3).

Support permeates all aspects of CCOT. Nurses are supported by the EWS score, the Acute Care Training Course (ACT), other education, EWS specific policies and the CCO Team. Junior doctors are supported by in-service education and CCOT sharing their critical care knowledge and skills on the wards. Support is intrinsic to Outreach philosophy. The CNS shared understandings of CCOT support:

> **Clinical Nurse Specialist:** *To me, it* [Outreach] *is a nursing supportive service. It* [Outreach] *is to support the sicker patients* (p.1).

Ward nurses develop nursing skills in assessment, decision making and intervention. The nurses acknowledged that CCOT nurses supported them educationally which improved their practice. They shared these understandings of the education role of CCOT during the focus group session:

> **Focus group:** *It's a mentoring role, education role* (p.1).

> *But I think they also teach us a lot too 'cos I know myself, like the way you read their notes after they've written it, I mean, personally I've started doing things like CRT,* [capillary refill time] *you know, and you pick up things that...*(p.27).

> [Outreach nurses] *are willing to explain and I think we're better for that because, you know, we* [ward nurses] *then do a better job* (p.28).

Nurses are supported and recognise and value the education which Critical Care Outreach nurses provide at the bedside. Ward nurses utilise new knowledge to practise more effectively.

Having the CCOT team in the hospital contributes to an environment where nurses are safe to practise. Before the implementation of Outreach, ward nurses had no senior nurses from ICU whom they could contact for support. Nurses in the focus group appreciated the safety which Outreach provided:

> **Focus group:** *It's* [Outreach] *a very important safety net when we have unwell patients on the ward* (p.2).

> *Well it's our back stop again isn't it?* (p.9).

> *Having the Outreach has been really brilliant because at least someone will come up and assess them and they're on the ICU radar in case things get worse which is very helpful* (p.2).

> *And you know that your patient's in safe hands, it will be sorted and you're supported* (p.20).

Well-supported ward staff contribute to creating a safe clinical environment on wards.

Clinical demands are constant and challenging for nurses caring for up to eight acute patients each on a ward. The practical support Outreach nurses give when assessing patients is appreciated by nurses. Focus group participants explained:

> **Focus Group:** *But they* [CCOT] *also support you because, like, if there's something not right, like with the fluids they'll say "oh, I'll ring the house surgeon" so they actually get things done* (p.24).

They don't leave it to you when you're so busy and you're already dealing with that patient. They take that step and will go and do it (p.24)

Come on, let's go and do it together so we can get it sorted and you know what you're doing (p.29).

Nurses are reassured by CCOT nurses assisting them with complex patients on the ward. The reassurance CCOT offered ward nurses caring for patients with tracheostomies or other complex respiratory conditions was highlighted by nursing focus group participants:

Focus Group: *When we're having trouble or any difficulty with the patient particularly the ones who have had sort of respiratory problems and tracheotomy and so forth they've* [Outreach] *been brilliant in just making sure we're still on the right pathway, which, you know, is reassuring* (p.19).

All patients who are discharged from ICU or the High Dependency Unit are followed up by CCOT. The benefits have been three-fold: it has reduced numbers of readmissions to ICU/HDU, improved patient satisfaction, and contributed to ward nursing support. In 2010 only six patients and one patient the previous year from a total of six hundred and seventy patients discharged from ICU/HDU have been readmitted to the unit (ICU/HDU database 2011). Members of the nursing focus group summarised how discharged ICU/HDU patients responded when Outreach followed them up on the ward:

Focus Group: *They* [patients] *love it* [ICU discharge follow up] *the patients love it (laughter). Well they do* (p.18).

It's their [patients] *comfort zone and you can appreciate that too and it's been the patients' comfort zone and when they see, you know, someone from Outreach and from down there and they just think "oooh" and they off-load a bit too on them* (p.18).

Critical Care Outreach nurses follow-up of discharged patients on the wards affords nurses the opportunity to ask questions and gain a greater understanding of a patient's condition while in ICU or HDU. Participants in the nursing focus group explained:

> **Focus Group:** *It* [follow-up] *does* [support us] *because it also, it gives us the opportunity to find out just how bad or you know, how much progress they're* [patients] *making and what sort of progress we should expect because they've* [Outreach nurse] *seen them at their worst* [in ICU] *and you know, are they really any better or you know, where are we going?* (p.19).

Nurses state they are supported and reassured by CCOT. Nurses in the focus group used the words, *mentoring, helpful, backstop, safe, and reassuring* when they were asked for a definition of CCOT. The terminology used signifies personalisation of CCOT to the individual nurse. Only one nurse referred to policy. Each nurse appeared to position Outreach nurses according to their personal experiences with them. They focussed on the pragmatic implications for individual nurses.

The focus group participants demonstrated an understanding of their own role and the role of the junior doctor in relation to physiologically unstable patients. An understanding of the Outreach role was also evident. Respect for the knowledge and skill of the CCOT Team is evident throughout the data. Overall nurses feel supported and reassured by the presence of CCOT at this hospital.

Summary

Integrating CCOT policies into DHB policy established Outreach as an essential permanent service of the DHB. Scheduled audits evaluated compliance to the utilisation of EWS and the escalation of patient concerns to more senior clinicians. Patients, whanau, nurses, doctors and the organisation benefited from changes CCOT produced. Physiologically unstable patients were recognised early and intervention was initiated in a timely manner.

Ward nurses, previously unsupported when caring for physiologically unstable patients, are now supported by education, the EWS tool and Outreach nurses. Outreach developed ward nurses' assessment, decision making and intervention skills and impacted favourably on the clinical environment by acting as a safety net for nurses and patients. Numbers of patients readmitted to ICU or HDU after discharge have been reduced. Patient satisfaction with follow up assisted ward nurses to understand the patient journey through ICU or HDU. Critical Care Outreach nurses, recruited for their knowledge of critically ill patients, provided a hitherto missing link between ICU and other specialties throughout the acute wards of the hospital.

This final chapter of data analysis has presented three themes with evidence from interviews, a nursing focus group and DHB documents to support each theme. The theme of becoming permanent was supported by policy, education, trust and co-operation. Equally important was having the right team that could provide support for nurses. The next chapter will discuss results of the data analysis in conjunction with the literature reviewed for this study.

Chapter Seven: Discussion

Introduction

In this chapter the major findings from the study are discussed in relation to international literature and theory. The most significant findings from the study are the shifting of late recognition/late intervention to early recognition/early intervention and the difference that CCOT has made for nurses.

Sustainable change has occurred at this hospital by introducing the CCOT into practice. Sharing of ICU skills and knowledge was achieved through recruitment of ICU nurses specifically for the role of CCOT, provision of a EWS and targeted education, investment in leaders with the requisite skills to make the changes, and through formation of policies.

The DHB did not use a specific change management model to implement the CCOT. However, the change management process which facilitated late recognition/late intervention to become early recognition/early intervention may be readily understood by categorising it to the stages of Fullan's Change Management theory and integrating the components of whole system reform. In Fullan's Change Management theory three stages of change are proposed: initiation, implementation, and institutionalisation. Each stage has tasks to achieve. Kotter (1996) and Holbeche (2006) concur that a staged approach to change management with tasks to be accomplished in each step, is an effective way to make changes. Complex problems were addressed at the hospital by using this approach. This chapter applies the principle of Fullan's whole system reform to the discussion of the changes that took place at the hospital with the introduction of CCOT.

Late recognition/late intervention

Participants from the study believed that there had been a serious problem on the wards of the hospital; physiologically unstable patients often went unrecognised and received late intervention. The origins of the problem were multiple. Nurses and junior doctors lacked knowledge and experience to interpret the significance of critical indicators of physiological instability. The hospital relied on unregulated assessment routines and random communication procedures between nurses and junior doctors. The onus of early recognition fell on ward nurses making the decision when to assess a patient and when to contact a doctor. The flaw in this was

the lack of objective criteria on which the nurse could base that decision. According to study participants decisions were dependent on individual nurses with varying degrees of expertise and knowledge. Equally, junior doctors lacked the knowledge to determine the priority of the referrals and respond in a timely manner. Compounding the problem, junior doctors did not always escalate clinical concerns to more senior doctors to review.

There was a lack of consistency in assessment procedures, communication of findings and response to those communications. Internationally, Schein et al (1990), McGloin et al (1999) and McQuillan et al. (1998) had identified similar serious problems in the United Kingdom and USA, and recommended doctors and nursing staff receive education to prevent this situation.

Identification of a problem is an important step towards finding a solution and making changes. Fullan (2007) stresses that motivation to make that change is of primary importance and is a key task of the initiation stage. Motivation for change with a strong leader initiating the process is the first stage of change (Fullan, 2007). This DHB had leaders with the motivation to seek solutions to the problem, and they looked for answers in international literature. Multiple ways to alter the dual problem of late recognition/late intervention have been discussed in the literature. Advancements reported from Australia included the introduction of a medical-led MET, whereas the United Kingdom responded with nurse-led CCOT and Patient at Risk Team (PART) and the USA with medical-led Rapid Response Team (RRT) (Coombs & Dillon, 2002; Institute for Healthcare Improvement, 2006; Lee et al., 1995).

Changing a hospital-wide system

Clearly there had been a need for hospital-wide system reform in this hospital in 2006. Major reform within the Canadian education sector provides an example of how a large organisation may be reformed through the utilisation of the principles of whole system reform (Fullan, 2010). This example provided the lens in this study to understand the changes that took place with the introduction of CCOT. Implementing the CCOT at the study hospital is an example of Fullan's Change Management Theory in practice, with all the components of reform integrated into the process. Piecemeal efforts would not have achieved success (Fullan, 2010).

Key priorities

For the DHB the key priority was to shift late recognition/late intervention to early recognition/early intervention at the hospital. The strategies to accomplish this were: implement

a CCOT, develop a EWS, share critical care skills on the wards, provide education, institute follow-up for patients discharged from ICU/HDU, and take responsibility for co-ordinating a response to referrals to CCOT. These strategies were supported by recommendations from the Department of Health (UK) (2000). Achievement of the key priority lay in interlinking strategies (Levin & Fullan, 2008).

The motivation to change the pattern of suboptimal care was challenged by financial constraints and organisational pressures of increased patient throughput. An increase in numbers of ICU/HDU beds had been proposed as a solution. Despite this being a practical solution there were insufficient funds available at the time to approve this option.

Finding a solution which was professionally acceptable, economically viable and logistically feasible was difficult for the DHB. In the NHS, United Kingdom, a similar situation of financial hardship had been reported which had contributed to finding new innovations and making changes (Vincent et al., 2001). New solutions too were needed at the hospital. The economic context of the hospital within a large DHB made it susceptible to the vagaries of complex economic pressures both internally from competing demands for services and externally from the government health budget. An increase in ICU/HDU bed numbers may have reduced the cost of avoidable patient delays in treatment from late recognition/late intervention and made a positive contribution to the economic constraints in operation. Reports from the NHS, United Kingdom, had highlighted the increase in costs from avoidable bed days (Vincent et al., 2001).

In the absence of any other proposal, a medically-led MET was suggested by a senior medical officer despite the conflicting reports in the literature on the effects of a MET. The MERIT study (2005) had asserted that MET failed to show an effect on cardiac arrests, unexpected death and unplanned admissions to ICU, whereas results from other large studies had concluded that MET reduced unplanned admissions to ICU with no increase in hospital-wide cardiac arrest rate (Bellomo et al., 2003; Bristow et al., 2000; Buist et al., 2002). The aim of the MET which would have operated across traditional specialty areas in the hospital was to rectify the immediate problems.

The solution to the problem was not to be found however in a medically-led innovation and MET did not become operational. Buy-in and flexibility to work across all the specialties in a way not previously practised in the hospital was a prerequisite for a MET, and was not secured. According to Fullan (2007), to introduce an innovation, multiple supporters of that change must

reveal themselves during the initiation and implementation stage. Without those supporters the change will not take place.

Medical leadership had identified the problem on the wards and provided the early motivation to change the situation. However, the doctors were unable to follow through with their solution. The joint support of senior ICU nurses with ICU medical leaders stimulated the solution for a CCOT. This was not a first for nursing; senior nurses in the United Kingdom had been establishing CCOTs for some time (Coombs & Dillon, 2002; Jenkins & Lindsey, 2010; McDonnell et al., 2007; Watson et al., 2006). It was, however, one of the first CCOTs in New Zealand. Although a nurse-led service was not the original intention, creating a CCOT was the main strategy which ultimately led to meeting the key priority. Continued leadership from CCOT nurses throughout the implementation and institutionalisation stages continued to address the problems on the wards.

A successful level of communication, often difficult in a large organisation, was accomplished by nursing, management and senior medical officers. To effectively make change, stakeholders need to be included in the process (Holbeche, 2006). Management, nursing and medical specialties were stakeholders in the solution. Management had a financial interest, nursing and medical specialties had professional interests. Close liaison and collaboration between medical personnel and nursing personnel are essential to escalation of patient care (Aneman & Parr, 2006; Carter, 2008; Jones et al., 2011; Priestley et al., 2004). Communicating clearly and inclusively to multidisciplinary stakeholders ensured that all parties were aware of the changes, and averted potentially sabotaging behaviours from uninformed stakeholders (Fullan, 2007). Communication is a key task in all Fullan's Stages of Change Management (Fullan, 2007).

Strategies with precision

The speed of change may be accelerated by strategies that are precise (Fullan, 2010). Critical Care nurses have a specific skill set which supported the onward momentum of changing late recognition/late intervention to early recognition/early intervention. Choosing the right members for the CCOT contributed to the success of the service. Watson (2006) considered the right calibre nurses as being vital to the success of the team. Results from this study reinforce the findings from Jamieson, Ferrell and Rutledge (2008) that CCOT nurses must be senior nurses, clinically astute, capable of making decisions, have the ability to share critical care knowledge and skills and be excellent communicators. There was general consensus from study participants that the team composition was very important.

Senior ICU nurses are well educated and prepared to assess critically ill patients (Coombs & Dillon, 2002). The location has less relevance. A team of senior ICU nurses, CCOT, does not incur the same costs as extra ICU/HDU beds and presented a viable alternative to solving a significant problem. Sharing ICU knowledge and skills on wards in order to meet the key priority is an example of a precise strategy.

Critical Care Outreach nursing leadership on wards empowered ward nurses to lead the practice of identifying the deteriorating patient. Nurses gained the confidence to escalate patient care needs through the use of the EWS algorithm. Nurses in the focus group were very clear how they had gained in confidence. Similar findings had been reported in studies by Ryan et al. (2004) and Andrews and Waterman (2005). The findings from this study support similar published findings (Chellel et al., 2006; Donohue & Endacott, 2010; Ruth Endacott et al., 2009; Green & Edmonds, 2004). The EWS has changed observation charts from a record of observations document to a document of action. Normalised behaviour of nurses changed from a perceived powerlessness to one of control, certainty and action.

Developing a EWS and educating nurses and doctors how to use it was a priority for the CCOT. Accurate use of the EWS was crucial to escalation of patient care and early recognition/early intervention (Kisiel & Perkins, 2006). Although the nurse-led CCOT incorporated knowledge from overseas experience, local educational material was developed. Similar reports in literature of individual hospitals designing resources to respond to local needs had been recorded (G. Smith et al., 2008).

Nurses in the focus group agreed that communication was more effective. Findings from studies by Andrews and Waterman (2005) and Ryan et al. (2004) confirm that nurses and doctors sharing a common communication tool communicate more effectively. The EWS provided a gradient of importance by which doctors could prioritise. The larger the EWS score the more urgently a response was required. Communication of EWS was focussed and understood by nurses and doctors alike. Doctors learned to respond to EWS activation in a timely manner. More timely response by medical staff has been observed by nurses in previous studies (R. Ryan et al., 2004). The EWS offered a mechanism to reduce the complex to a simple but effective communication.

Evidence from the members of the nursing focus group in this study indicates that patient lives may have been saved by the presence of CCOT. Reports in the literature are inconclusive on

this point. However, Bokhari et al (2009) suggest positive outcomes from CCOT in early detection of physiological instability in a group of haematology patients, and Story et al. (2004) report reduction of life threatening conditions through early detection of myocardial infarction. Jain et al. (2010) reported that despite a reduction in cardiac arrests since the introduction of a CCOT the overall hospital mortality had not declined.

Resolute leadership

A strong and resolute leadership group consisting of nurses, managers and ICU doctors played a key role in establishing the CCOT. Implementing the service was assisted by leadership which kept everyone on track through apportionment of tasks at regular minuted meetings. Thereafter, during the institutionalisation stage, leadership of CCOT passed to the CNS responsible for the service, with the original members of the leadership group supporting at Senior Management and ICU Management levels in a secondary role.

This study provides evidence from the nursing focus group that nurses were enabled in their practice by the presence of the CCOT. It may be inferred that although nurse leaders initiated the leadership process when setting up the CCOT, it was the CCOT nurses who continued the leadership role. Fullan (2009) suggests that recruiting high calibre leaders is essential to enacting change. Previous studies suggest that nursing leaders play a pivotal role in the formation of CCOTs (Jenkins & Lindsey, 2010; McDonnell et al., 2007; Schweickert, 2010; Thomas et al., 2007; Watson et al., 2006). The leadership skills of CCOT nurses have been reported in other studies (Baker-McClearn & Carmel, 2008 ; Chellel et al., 2006). Kotter (1996) and Holbeche (2006) advocate for leaders who have the ability to lead by enabling people. Clinical leadership reassured ward nurses and engendered more confidence in nurses to use increasing assessment skills learned from CCOT nurses. As with the findings in this study, several other studies reported that nurses improved their assessment skills as a consequence of CCOT sharing critical care skills (Chellel et al., 2006; Donohue & Endacott, 2010; Ruth Endacott et al., 2009).

Findings from this study also demonstrate that nursing standards improve when senior clinical nurses readily interact with ward nurses and share their knowledge and skills through a variety of learning situations. Nurses in the focus group valued the personal interaction with CCOT nurses. The importance of this knowledge should guide the preservation and increase in numbers of senior clinical nursing positions.

Maccoby (2010) and Fullan (2007) attribute the most notable changes to great leaders. Leadership is a prerequisite for change management (Fullan, 2007). A key task in the initiation and implementation stages is to secure dynamic leadership (Fullan, 2007). A resolute leader remains steadfast to the concepts within the change, is determined and has the ability to form relationships (Fullan, 2010). Nursing leadership from CCOT has demonstrated the ability to remain resolute, form relationships and consistently reinforce the messages underpinning early recognition/early intervention. The nurses in the focus group were very clear that the relationships with individual CCOT members impacted on their response to CCOT. The initial suspicions which ward nurses had in relation to CCOT dissipated as relationships developed.

The steadfastness of leadership to the DHB key priority and to the strategies of the CCOT, the sharing of critical care skills on the wards, the provision of education, follow-up for patients discharged from ICU/HDU, and the taking of responsibility for co-ordinating a response to referrals from EWS, is evidenced by the increasing numbers of referrals to CCOT annually. The increase in referrals suggests that leadership of CCOT has been persistent and focussed.

Everyone can learn

The assumption that everyone can learn applied to the nurses and junior doctors at the hospital. Nurses and junior doctors have learned to apply critical care knowledge to assess and recognise early and intervene early for the physiologically unstable patient. The learning process occurred as a result of targeted education, the formal CCOT education programme, and support from Outreach nurses to reinforce new learning. Positive changes resulting from this learning included more accurate and more regular assessment of physiologically unstable patients by nurses, and more timely response to reported patient deterioration from junior doctors and senior ICU nurse support were achieved through nurses and junior doctors learning.

The nurses in the focus group were clear that the EWS algorithm was simple to follow. Cooper and Buist (2008) recommend simplicity when designing a EWS. Despite this, literature recommends that nurses and doctors receive education and support to correctly use and understand the significance of a EWS (Kisiel & Perkins, 2006; McArthur-Rouse, 2001; Subbe et al., 2003). The EWS was specifically designed to support nurses to facilitate prompt intervention for the physiologically unstable patient on the ward (National Health Service Modernisation Agency, 2003). The EWS was supported with CCOT nurses designated to co-

ordinate, educate and respond to EWS activations. Nurses and doctors learning together diminishes the perceived gap between the disciplines and promote mutual respect.

The DHB through the CCOT had planned strategies regarding education. Education strategies included ACT, orientation education sessions, new graduate education, junior medical officer ongoing education, follow-up teaching and bedside teaching. Policy supported education and compulsory use of EWS.

In contrast to Chaboyer, Gillespie, Foster and Kendall (2004), who stated that nurses and junior doctors may become deskilled by CCOT, in this study staff reported an improvement in their skill in relation to the physiologically unstable ward patient. The effects of CCOT on nurses were multi-factorial: Ward nurses' clinical skills improved, nurses felt supported, nurses communicated more effectively, confidence increased, nurses were empowered to act, and nurses were more accountable for patient observations. Nursing clinical skills continue to develop in response to a more educated nursing workforce and opportunities. This hospital's Outreach model has promoted nurses and doctors learning to become proactive by synchronising an early response to the physiologically unstable patient.

Collective capacity

With clear lines of escalation for patient care established by the EWS algorithm, teams across the hospital collectively improved the overall capacity of the hospital to promote better patient outcomes. The breaking down of specialty barriers by CCOT benefited patients through early recognition/early intervention regardless of their location in the hospital. Acceptance of CCOT by ward nurses, doctors and allied health workers made a significant contribution to collective capacity.

Confident, clinically competent nurses act as role models and mentors for more junior nurses and raise the standards of the nursing workforce in general (McCloskey & Diers, 2005). The CCOT nurses were viewed as highly-skilled, competent nurses who mentored, educated and supported ward nurses. A number of authors have documented similar findings from studies (Chellel et al., 2006; Donohue & Endacott, 2010; Ruth Endacott et al., 2009; Green & Edmonds, 2004; Thomas et al., 2007). Role modelling has a positive ripple effect.

Prior to the establishment of CCOT at the hospital, ICU nurses were unavailable to ward nurses for clinical support. The CCOT has demonstrated that nurses are able to transcend traditional

divisions within nursing and develop a new sub-specialty of ICU nursing. Working across many specialties to share critical care skills and knowledge is an example of how nurses are willing to diversify traditional roles in response to patient need. Coombs and Dillon (2002) describe similar changes in practice.

Assessing patients in unfamiliar environments without the aid of sophisticated technology may be daunting to an ICU nurse, and is a departure from the traditional role of an ICU nurse at the bedside of a comprehensively monitored patient. The CCOT nurse role is complex and often difficult. Tensions arise in unfamiliar environments without the security of ICU colleagues. Odell, Victor and Oliver (2009) similarly highlighted the potential for tensions. The CCOT is an opportunity to combine the best of two worlds, the world of ICU and the world of the wards, to the advantage of the physiologically unstable ward patient. All patients may benefit from the improved assessment skills acquired by ward nurses through the interaction with CCOT nurses and additional education.

The nurse-led CCOT has created new career opportunities for nurses at the hospital. Ward nurses are exposed to practice from senior nurses sharing ICU skills and knowledge. Ward nurses can progress to ICU and experienced ICU nurses can progress to CCOT and thus a new career pathway has developed at the hospital for nurses. Expanding career opportunities at the hospital may contribute to staff retention over time.

Internationally, and in NZ, Nurse Practitioners are emerging in response to the opportunity of developing autonomous nursing practice. The Critical Care Outreach principles are suitable to be managed by an independent Nurse Practitioner (Pirret, 2008). Currently there is one Nurse Practitioner in HDU/ICU in NZ (Nursing Council of New Zealand, 2010). A Nurse Practitioner CCOT could replace the intermediary nurse-led CCOT, reduce junior medical staff work-load, by an initial response to EWS activations and instigation of treatments not within the scope of Clinical Nurse Specialists. A Nurse Practitioner- led team would be a highly effective independent CCOT service of the future.

Fullan (2007) describes the process of embedment as the final stage of change management, institutionalisation. Outreach has become part of the organisation. Ward nurses have integrated the changes from CCOT into practice. It is the ward nurses supported by CCOT who will ensure the longevity of a reformed way of identifying the physiologically unstable patient on the ward and the institutionalisation of CCOT. Baxter (2006) states that ward nurses are the most

important members of the team. Be that as it may, nurses do not work in isolation therefore any new system introduced must be acceptable to the multidisciplinary team.

Intelligent accountabilities

Measuring achievement is a method of addressing accountability. Collective accountability has increased in intelligent ways. Ongoing audit processes highlight clinical areas of concern which require increased intervention from CCOT either through point of contact teaching or formal education. Areas with a high compliance with EWS demonstrate that nurses and junior doctors have learned to assess potentially critically ill patients and take appropriate action.

Fullan (2007) theorises that policy ensures the longevity of a service. Policy influences decisions by stating explicitly the standards and expectations that are required from staff (Waitemata DHB, 2010). Compliance with standards ensures permanence of the service.

Policy legitimised the service of CCOT within the wider context of the organisation. In a DHB the subject of a policy is guaranteed to be reviewed in accordance with the DHB Quality Review Plan. With CCOT being embedded in DHB policy, regular review will ensure the service remains dynamic and responsive to change. The evidence to support the continuance of CCOT will be scrutinised on a regular basis and ensure the CCOT's ongoing accountability to the key priority.

All means all

The final element of whole system reform, all means all, is demonstrated by the involvement of everyone from those within the DHB who initially approved the CCOT to the entire staff working across specialties at all levels of nursing and medical practice. The collective participation of all groups within the DHB ensured the successful integration of strategies from all elements of whole system reform. Resolving a serious hospital-wide clinical problem in times of financial hardship and increasing patient numbers reflects the power of nursing participation and the interdependence of management, nursing and medicine in the change process.

Hospital-wide reform reaffirmed where the responsibility of senior medical and nursing clinicians lay in regard to the physiologically unstable patient, thereby making a difference for nurses. Since the introduction of the EWS senior clinicians are involved earlier. Initial frontline

care for patients who are deteriorating is now readily accessible and the onus of responsibility for early recognition/early intervention has been shifted from the individual nurse at the bedside to a collective DHB responsibility across all specialty areas. This suggests that a more collaborative approach to patient care has developed between the disciplines.

The initial leadership group of management, nursing and medical expanded to other service leaders within the organisation to bring about whole hospital reform though integration of the elements of whole system reform. Representatives of that same leadership group at the time of writing are undertaking a six week review of CCOT for the first time since it commenced. Results from the review will shape the future size of the team and determine the resources required to continue delivering education, sharing critical care skills on wards, EWS and following up patients discharged from ICU/HDU. Extending operating hours of CCOT nurses and increasing the capacity of the team would hopefully result from the review.

Summary

In this chapter, findings from the study are discussed in relation to international literature, Fullan's Change Management Theory and the principles of whole system reform. Patients and nurses benefited from the formation of a nurse-led CCOT and a key priority of the DHB was met.

A major change has taken place at the hospital with the introduction of a mode of support for nurses hitherto unknown at this hospital. An environment of objectivity has developed which supports early recognition/early intervention. Strategies that were introduced through EWS to escalate patient care have removed indecision and interdisciplinary miscommunications for ward nurses and the most junior doctors. The system affirms nurses' assessment of patients. Nurses have become more confident and empowered knowing they have the backstop of CCOT when caring for complex unstable patients.

A culture of timeliness has developed for junior doctors and nurses, and for senior medical review. Outreach nurses communicating with both ICU consultants and with team doctors are facilitating more timely transfer of patients to ICU/HDU.

Outreach nurses sharing ICU skills on wards and making direct ward patient referrals to ICU consultants were new experiences for both the ICU service, and other hospital specialties. These innovations have broken down the barriers between ICU and the wards. Furthermore, ward nurses have gained a greater knowledge and insight into the patient's stay in ICU. Understanding the antecedent course of treatment in ICU has improved nursing response to patients discharged from ICU or HDU.

The calibre and competency of the CCOT nurses contributed to the success of CCOT providing new career opportunities for ICU nurses. Future possibilities include Nurse Practitioners leading CCOT. Nurse Practitioner-led CCOT would change the service from an intermediary service to a fully autonomous unit.

The study results confirm previous findings from international studies. The CCOT has made a difference for ward nurses at the hospital by providing the leadership, education, EWS, and sharing critical care skills on wards to enable more informed clinical decision-making. Therefore, it may be inferred that CCOT is transferable between differing health care service delivery models. The CCOT provides an international nurse-led model to make a difference for nurses.

For late recognition/late intervention to shift to early recognition/ early intervention a whole hospital system reform had to take place. The changes are an example of how a hospital with a serious problem can address that problem in a flexible and an innovative manner through a nurse-led service with support from management, senior doctors and ward nurses. Maintaining the changes is the ongoing challenge.

Results from the study suggest that Fullan's principles of whole system reform may be used to guide the change management process not only in educational settings but also at all levels of the health sector with positive outcomes. The principles of whole system reform and Fullan's Change Management Theory are readily transferable into practice.

The next and final chapter presents the conclusion of the study and summarises how the study was organised and includes recommendations and possibilities for future research from the study findings.

Chapter Eight: Conclusion

Introduction

In this final chapter a brief summary of the main issues is presented followed by limitations and recommendations for further possible research, general recommendations and a concluding statement.

Study findings have shown that CCOT has made a difference for nurses and provided a system for the early recognition/early intervention of the physiologically unstable patient on the acute wards of the hospital. Limitations of the study which are presented are drawn from a number of sources: researcher, methodology and scope of study. Possibilities for future research range from an individual study investigating how CCOT influences an individual ward nurse, to a collective NZ case study. General recommendations for improving and maintaining CCOT are followed by a concluding statement for the thesis and a challenge to the DHB to continue to support the CCOT.

Critical Care Outreach and EWS make a difference

I embarked on this thesis to explore how CCOT had made a difference for nurses and in the process discovered so much more. Not only has CCOT made a difference for nurses, it has brought about a whole hospital reform in the way that patients who are physiologically unstable are recognised and receive early intervention. The hospital that once had a problem now has a system. An environment of objectivity has developed from the integration of EWS into practice, education and the presence of CCOT on wards to share critical care knowledge and skills. This thesis has argued from evidence presented in DHB documents, interviews and a nursing focus group that changes have been made by the implementation of a nurse-led CCOT.

Fullan's Change Management Theory and principles of whole system reform (Fullan, 2010) provided the framework to organise data and discuss data findings in intelligent ways. The tasks within Fullan's Change Management Theory, initiation, implementation, and institutionalisation (Fullan, 2007) provide insights for the future maintenance of CCOT. Critical Care Outreach must respond and adapt as changes in the organisation occur. Institutionalisation will guide that process. The institutionalisation of CCOT is robust, with strong leadership, specific policies and

procedures to ensure its place in the organisation thereby ensuring the longevity of the service (Fullan, 2007). However, there will be instances where breaches in protocol occur. Maintaining the CCOT and meeting the key priority of the DHB are the ongoing challenges.

Nursing implemented a system at a time when the cross disciplinary boundaries seemed insurmountable. The study has identified and acknowledged the contribution nurses have made towards resolving a major problem and changing a system for referring the physiologically unstable ward patient. It describes how whole hospital reform occurred in one area of a NZ hospital. The value ward nurses place on having CCOT nurse backup has been presented. There is clear evidence that the support ward nurses receive from CCOT and the EWS has made a difference for them.

This study supports the concepts of CCOT, EWS, education, and sharing ICU skills, as sound and translatable across international health care delivery models. Findings from this study confirm international literature that CCOT supports nurses (Baker-McClearn & Carmel, 2008 ; Chellel et al., 2006; Green & Edmonds, 2004) and contributes further knowledge. New knowledge for healthcare services gained from the study shows that CCOT promotes an environment of objectivity and a culture of timeliness and that whole hospital reform occurs when CCOT is implemented with all the recommended elements of whole system reform in the process.

Limitations and possibilities for further research

The study is a qualitative case study designed to explore and understand the nature of and reasons for the difference CCOT has made to nurses. In qualitative studies the researcher interacts with participants (Denzin & Lincoln, 2000; Polit & Beck, 2008). Interaction and analysis of data was limited by the experience of the researcher, her values and her position as a member of the CCOT. The mechanisms in place to minimise the limitations on the study were the oversight of a study supervisor, the use of a research assistant and disclosure of the researcher's biases stated through propositions.

The phenomenon being studied was specific and situated in a particular location, the acute wards of the hospital. These conditions fulfilled Stake (1995) and Luck et al.'s (2006) criteria for an instrumental case study. Although instrumental case study methodology is ideally suited for this study question, it does however have limitations. The major limitation is that only a

single case is studied, whereas a collective case study would include cases from multiple sites and present a more comprehensive insight into the study question and provide findings with greater transferability. A collective case study that includes other DHBs would give a fuller picture of the NZ experience.

Appropriate methodology and multiple sources of data from interviews, a nursing focus group and DHB documents fulfil the criteria for confirmability and objectivity of a study (Huberman & Miles, 2002). However, the inclusion criteria (page 34) to participate in the nursing focus group limited the nurses who were eligible to participate. Including new graduate nurses and casual nurses may have contributed different insights from those captured and analysed. Be that as it may, triangulation of data from DHB documents, the nursing focus group and interviews contribute to the faithfulness of this study's findings (Huberman & Miles, 2002).

The research question is focussed towards a specific phenomenon of CCOT and limits the scope of the investigation to explore further issues which are worthy of investigation. Throughout the process of conducting and analysing data from this study, several areas for further research became apparent if the extent of influence from CCOT on nurses and nursing is to be fully appreciated. Investigating the long term effects of CCOT on the nursing workforce retention and patient care would be valuable for management and nursing leaders. This study was focussed on the experience of nurses; however, future studies could include the perspective of both junior and senior medical house staff as well as that of patients. In future studies useful correlations could also be drawn between CCOT calls and not for resuscitation orders, similar to Chen et al.'s (2008) study exploring MET. Further research is recommended to study the influence of CCOT on ward nurse development in a hospital. Outreach nurses are perceived as role models (Athifa et al., 2011; Baker-McClearn & Carmel, 2008).

Recommendations

The following recommendations are informed by findings from the study:

- That regular review of the CCOT occurs to ensure it remains true to the principles of Outreach and avoids creep into other non-priority areas that it is not designed to address.
- That Critical Care Outreach Teams continue to be composed of senior nurses, and teams are adapted to local conditions in all NZ hospitals. The investment in senior clinical nurses available to ward nurses is a model that has proven to contribute significantly to

nurses and patients. A future option for CCOT at the DHB is Nurse Practitioner-led teams. Development of a career pathway leading to a Nurse Practitioner role for CCOT is strongly recommended at this hospital.

- That this study be a driver and reference for other hospitals who may be considering implementing a CCOT. Through the utilisation of Fullan's Change Management Theory and the elements of whole system reform as a framework to guide the study, valuable insights into the process and elements required to implement a CCOT have been identified. I would argue that the knowledge is transferable to other DHBs in NZ.

Concluding statement

Critical Care Outreach has demonstrated that nurses are able to learn the skills required to recognise and intervene for a deteriorating patient. A hospital-wide system of support provides the right environment for this to occur.

The level of patient acuity on acute wards is sufficiently high that CCOTs are not an optional extra but a necessity to optimise patient care. However, organisations considering implementing a CCOT must be cautious. Critical Care Outreach is not a panacea for inadequate staffing, insufficient educational preparation or poor organisational systems. Rather, CCOT is a supplementary service supported by robust principles to augment non Intensive Care specialties with ICU skills beyond the walls of the ICU. As such it is a highly effective utilisation of nursing skill and organisational resources and is an example of nurses making a difference.

The challenge to NZ nursing now is to continue to build on the evidence from this study that CCOT has a beneficial impact on ward nurses. The challenge to the DHB is to preserve CCOT to ensure that nurses are supported and late recognition/late intervention is truly a phenomenon of the past.

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Appendix one: Ethics approval

Health and Disability Ethics Committees

Northern X Regional Ethics Committee
Ministry of Health
3rd Floor, Unisys Building
650 Great South Road, Penrose
Private Bag 92 522
Wellesley Street, Auckland
Phone (09) 580 9105
Fax (09) 580 9001

29 July 2010

Ms Kathryn Davies
Massey University
30B Riverside Rd
Orewa

Dear Kathryn -

Ethics ref:	**NTX/10/EXP/118** (please quote in all correspondence)
Study title:	**Implementing a critical care outreach team: what difference has it made for nurses?**
Principal Investigator:	Ms Kathryn Davies
Supervisor:;	Dr Jill Wilkinson

This study was given ethical approval by the Chairperson of the Northern X Regional Ethics Committee on 29 July 2010.

Approved Documents

- Participant Information Sheet/Consent Form for Focus Group V#2 dated 23 July 2010
- Participant Information Sheet/Consent Form for Interviews V#2 dated 23 July 2010

Please ensure all PIS/Consents have a footer with V#2, 23/07/10

This approval is valid until 29 July 2011.

Amendments and Protocol Deviations

All significant amendments to this proposal must receive prior approval from the Committee. Significant amendments include (but are not limited to) changes to:

- the researcher responsible for the conduct of the study at a study site
- the addition of an extra study site
- the design or duration of the study
- the method of recruitment
- information sheets and informed consent procedures.

Significant deviations from the approved protocol must be reported to the Committee as soon as possible.

Annual Progress Reports and Final Reports

Should you wish to extend the study, please forward a Progress Report for this study **by29 July 2011**. The Annual Report Form that should be used is available at www.ethicscommittees.health.govt.nz (forms – progress report). Please note that if you do not provide a progress report by this date, ethical approval may be withdrawn.

A is also required at the conclusion of the study. The Final Report Form is also available at www.ethicscommittees.health.govt.nz.

Requirements for the Reporting of Serious Adverse Events (SAEs)

All SAEs occurring in patients located in New Zealand must be individually reported to the Committee within 7-15 days.

Please see www.ethicscommittees.health.govt.nz for more information on the reporting of SAEs, and to download the SAE Report Form.

We wish you all the best with your study.

Yours sincerely

Pat Chainey
Administrator
Northern X Regional Ethics Committee
Email: pat_chainey@moh.govt.nz

Appendix two: Focus group Information Sheet

MASSEY UNIVERSITY
COLLEGE OF HUMANITIES
AND SOCIAL SCIENCES
TE KURA PŪKENGA TANGATA

Information Sheet

Focus Group

Implementing a Critical Care Outreach team: What difference has it made for nurses?

My name is Kay Davies and I work as a Critical Care Outreach nurse, Intensive care Unit (ICU), XXXXX District Health Board. This research thesis forms the research component for the completion of a Master of Philosophy in Nursing from Massey University.

The purpose of this research is to investigate how Critical Care Outreach services were implemented and to explore what differences introduction of the Critical Care Outreach Team has made for nurses on the adult acute wards since the establishment of the service in 2006. Data for the study will be gathered from interviews, a focus group and various documents.

Invitation to participate

You are invited to participate in the focus group part of the study. Nurses who are knowledgeable about the adult acute services at XXXXX Hospital before the introduction of the Critical care outreach service, ICU, and who are still practicing in that service are invited to attend. I would like to have a focus group of between six to eight nurses.

What is involved if you take part in the study?

If you are interested in being in the focus group you will be invited to attend with six to seven other participants and a research assistant who will facilitate the focus group, in the XXXX Intensive Care training room. The research assistant has signed a confidentiality agreement so I won't know who participates in the group. The focus group will be audio taped and the tape transcribed by a professional transcriptionist, who has signed a confidentiality agreement. Tapes will not be returned to participants as each participant's contribution is confidential to the participant and cannot be separated from a group discussion. Tapes will be destroyed by the researcher after the transcription has been verified by the research assistant as true and accurate. There is no cost beyond your time.

Risks

There are not any envisaged risks to participating in this study beyond your time. In the unlikely event that you are harmed by this study the principal researcher will supply you with clear details of the Health and Disability Advocate.

Benefits

This study will identify the strengths and weaknesses of the Critical Care Outreach team. The information will inform further development of the team to best meet the needs of nurses caring for the deteriorating patient on the ward and ultimately patient care.

Confidentiality

The transcribed tape will not identify you in any way. No material that could personally identify you will be used in any reports in this study. At all times the data will be under lock and key or on my password protected computer which is not accessible to anyone else.

Participant's Rights

Participation is voluntary with an option to withdraw before the focus group takes place. You may request the tape recorder to be stopped at anytime during the focus group discussion. You are free to ask any questions throughout the study. XXXX DHB has granted permission to do the study.

Results

Results will be available when the study is complete.

Please contact researcher Kay Davies, 09 4861491 Ext 3156 or Supervisor Dr Jill Wilkinson, Senior Lecturer School of Health and Social Sciences, Massey University Private Box 756 Wellington, Tel; +64 4 8015799 ext 6639 if you have any questions.

This study has received ethical approval from the Northern X Regional Ethics Committee reference number NTX/10/EXP/118.

Thank you for taking the time to consider being a participant

Appendix three: Interview Information Sheet

MASSEY UNIVERSITY
COLLEGE OF HUMANITIES
AND SOCIAL SCIENCES
TE KURA PŪKENGA TANGATA

Information Sheet

Interviews

Implementing a Critical Care Outreach team: What difference has it made for nurses?

My name is Kay Davies and I work as a Critical Care Outreach nurse, Intensive care Unit (ICU), xxx Hospital, xxx District Health Board. This research thesis forms the research component for the completion of a Master of Philosophy in Nursing from Massey University.

The purpose of this case study research is to investigate how Critical Care Outreach services were implemented and to explore what differences introduction of the Critical Care Outreach has made for nurses on the adult acute wards of xxxx Hospital since the establishment of the service in 2006. Data gathered from interviews, focus group and the examination of documents will be collected for the study.

Invitation to participate

You are invited to participate in this study. Key persons pivotal to the establishment of Critical Care Outreach team, ICU, xxxx Hospital are invited to contribute to this study. I would like to interview three people.

What is involved if you take part in the study?

If you are interested in being interviewed you will be asked to attend one interview at xxxx Hospital which will take approximately forty five minutes at a mutually agreed

time convenient to you. You are most welcome to bring a support person or whanau to the interview. Your interview will be audio taped and transcribed by

professional transcribers who have signed confidentiality agreements prior to commencement of transcribing. A copy of the transcription will be returned to you if you are being interviewed for verification that it is accurate and true. The tape will then be destroyed or returned to you if you should request it. Further information about the research is available by contacting the researcher at the phone number at the conclusion of this information sheet. There is no cost beyond your time.

Risks

There are not any envisaged risks to participating in this study beyond your time. In the unlikely event that you are harmed by this study the principal researcher will supply you with clear details of the Health and Disability Advocate.

Benefits

This study will identify the strengths and weaknesses of the Critical Care Outreach team. The information will inform further development of the team to best meet the needs of nurses caring for the deteriorating patient on the ward and ultimately patient care.

Confidentiality

The transcribed tape will not identify you in any way. No material that could personally identify you will be used in any reports on this study. At all times before the tape is destroyed it will be under lock and key in the researcher's filing cabinet which is not accessible to anyone else.

Participant's Rights

Participation is voluntary with an option to withdraw until the time of transcription of your interview. You may request the tape recorder to be stopped at anytime during the interview. You are free to ask any questions throughout the study. xxxx DHB has given permission for this study to take place.

Results

Results will be made available when the study is complete.

Please contact researcher Kay Davies 09 4861491 Ext 3156 or Supervisor Dr Jill Wilkinson Senior Lecturer School of Health and Social Sciences Massey University Private Box 756 Wellington, Tel; +64 4 8015799 ext 6639 if you have any questions. This study has received ethical approval from the Northern X Regional Ethics Committee reference number NTX/10/EXP/118.

Thank you for taking the time to consider being a participant

Appendix four: Consent forms

MASSEY UNIVERSITY
COLLEGE OF HUMANITIES
AND SOCIAL SCIENCES
TE KURA PŪKENGA TANGATA

Implementing a Critical Care Outreach team: What difference has it made for nurses?

PARTICIPANT CONSENT FORM – INDIVIDUAL INTERVIEW

I have read the Information Sheet dated July 2010 for volunteers taking part in the study designed to explore: How has the introduction of Critical Care Outreach made a difference to nurses. I have had the opportunity to discuss this study. I am satisfied with the answers I have been given. I understand that I may ask further questions at any time and may withdraw from the study at any time and that anything I contribute will remain confidential.

I agree/do not agree to the interview being sound recorded.

I wish/do not wish to have my recordings returned to me.

I agree to participate in this study under the conditions set out in the Information Sheet.

Signature: ..... **Date:** .....

Full Name - printed .....

MASSEY UNIVERSITY
COLLEGE OF HUMANITIES
AND SOCIAL SCIENCES
TE KURA PŪKENGA TANGATA

Implementing a Critical Care Outreach team: What difference has it made for nurses?

FOCUS GROUP PARTICIPANT CONSENT FORM

I have read the Information Sheet dated July 2010 for volunteers taking part in the study designed to explore: How has the introduction of Critical Care Outreach made a difference to nurses. I have had the opportunity to discuss this study. I am satisfied with the answers I have been given. I understand that I may ask further questions at any time and may withdraw from the study at any time and that anything I contribute will remain confidential.

I agree not to disclose anything discussed in the Focus Group.

I agree to participate in this study under the conditions set out in the Information Sheet.

Signature: ..... **Date:** .....

Full Name - printed .....

Appendix five: Confidentiality Agreement

MASSEY UNIVERSITY
COLLEGE OF HUMANITIES
AND SOCIAL SCIENCES
TE KURA PŪKENGA TANGATA

Implementing a Critical Care Outreach team: What difference has it made for nurses?

Research assistant

CONFIDENTIALITY AGREEMENT

I ..... (Full Name - printed)

agree to keep confidential all information concerning the project .....

I will not retain or copy any information involving the project.

Signature: ..... **Date:** .....

Appendix six: Schedule of proposed questions

Schedule of proposed questions for Focus Group and Interviews

Focus Group

1. Tell me about Critical Care Outreach, what is it?

2. Tell me why you think the Critical Care Outreach was established?

3. How did you know about the Critical Care outreach?

4. Tell me about EWS (Early Warning Score) and how it has changed things for ward nurses at xxxHospital?

5. Tell me about the support for discharged patients from the Intensive Care Unit since the introduction of the Critical Care Outreach Team and how this has changed things for ward nurses?

6. Tell me how the ACT (Acute Care Training Course) has changed things for ward nurses?

7. Explain to me if having senior critical care nurses through the Critical Care Outreach Team coming on your wards has changed things for ward nurses?

8. What has the Critical care outreach offered to you as nurses on the wards?

9. How do you see this service developing in the future?

10. Is there anything further you would like to add?

Interviews

1. What were your concerns about the deteriorating patient on acute wards before the event of the Critical Care Outreach Team?

2. Where did you go to find answers that would help you to address these problems?

3. Within the adult acute services there are many specialties. How did you go about getting support from the other specialties to consider your concerns about the deteriorating patient on the ward?

4. Tell me about the response from specialties and management to your concerns at that time?

5. Tell me about your strategies to implement a Critical Care Outreach team, how did you go about it?

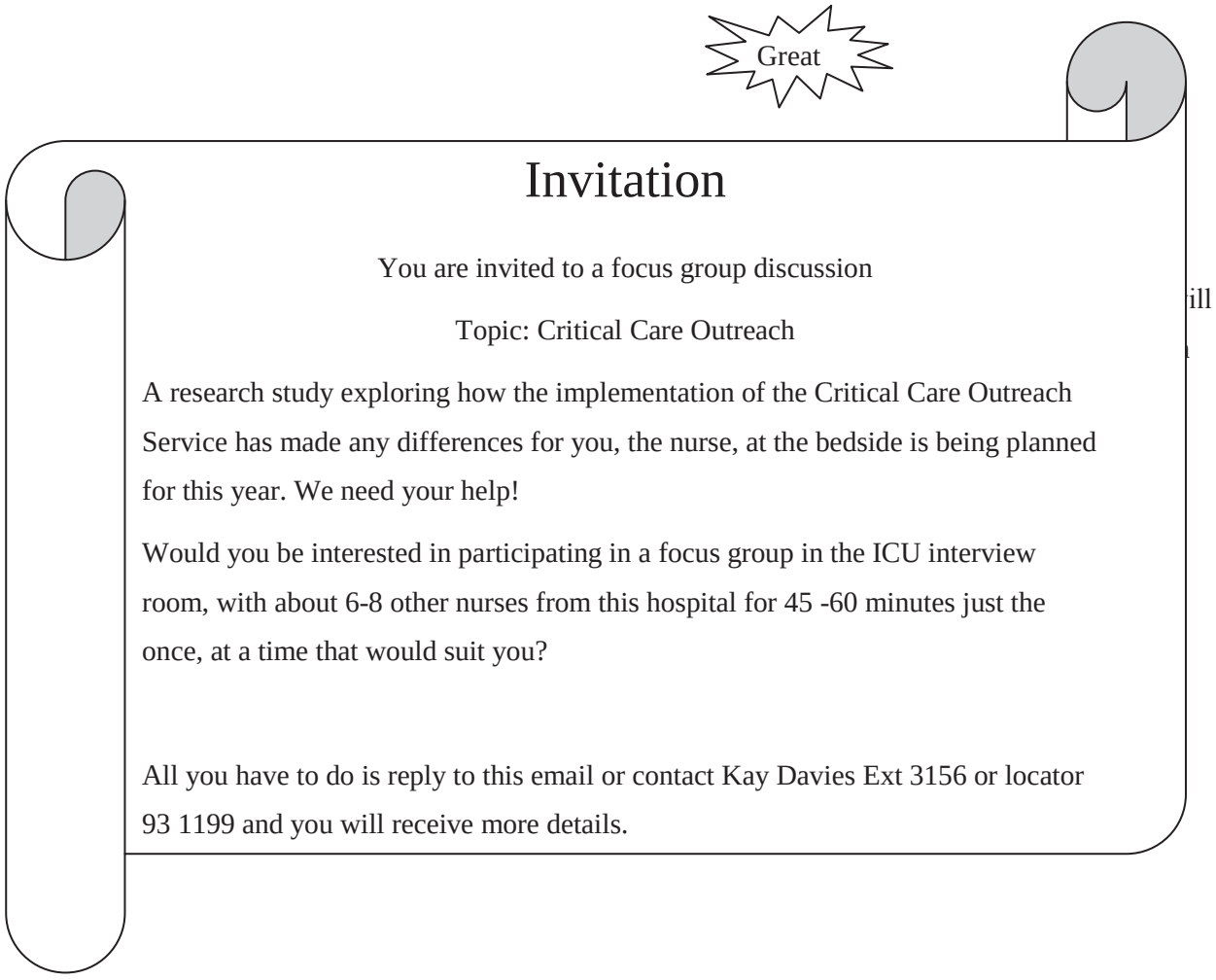
6. What were the key considerations for you during that period?

7. Since the Critical Care Outreach Team became functional, have you noticed any changes in Ward nurses?

8. How do you see this service developing in the future?

9. Is there anything else you would like to add at this time?

Appendix seven: Invitation



Appendix eight: List of documents

List of Documents

Adult Health Services: PBMA Bid Abstract	2007
Advertisement: Senior Critical Care Outreach nurse	2006
Critical Care Outreach Development Meeting: Minutes	2006-2007
Critical Care Outreach Extension: Business case	2007
Critical Care Outreach: EWSletters	2006-2009
Critical Care Outreach: Policy document	2009
Decision paper: High Dependency Care and Rapid Response Adult Patients	2005
Decision-Making Criteria and Proposal Scoring sheet	2007
Development of Critical Care Outreach Service Project	2005
DHB: Discharge patient statistics	2004-2010
ICU Internal EWSletter	2006
ICU Outreach referrals by year	2010
EWS algorithm	2010
Presentation: HDU and Critical Care Outreach Plans for the future	2005
Presentation: Implementation of Critical Care Outreach	2006
Resuscitation statistics	2005-2010
Summary of Critical Care Outreach Review Questionnaire	2009
Summer audits	2010

Appendix nine: Patient referral flow chart