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**Enacting patient safety on the frontline
an ethnographic study of rescue work with acutely illpatients**

MacKintosh, Nicola

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Enacting patient safety on the frontline: an ethnographic study of rescue work with acutely ill patients

Nicola Jean Mackintosh

Thesis submitted for the degree of Doctor of Health Studies
Research,
King's College London

Abstract

Enacting patient safety in acute health care: an ethnographic study of rescue work

International concerns over ‘failure to rescue’ acutely ill patients on hospital wards have led to the widespread implementation of rapid response systems. Despite these system level changes, management of deterioration in such patients’ conditions remains problematic. Rescue is a complex process and only partially understood.

This study aims to explore the nature of ‘rescue work’, drawing on theoretical insights from medical sociology to illuminate relationships between organisational systems, department and individual level processes. Data collection involved ethnographic fieldwork over a 12 month period in two UK NHS Trusts, including observations (180 hours), interviews (35) with health care assistants, nurses, doctors and managers, and documentary analysis.

The findings expand understandings of rescue beyond reified, linear trajectories to include overlapping structural, technological and diagnostic influences. The thesis draws attention to the adaptability and intelligence displayed by frontline staff to handle clinical uncertainty, and the significance of hidden articulation work for minding gaps in patient trajectories. Technological monitoring tools open up aspects of rescue work for scrutiny, facilitating the development of a shared management approach for caring for acutely ill patients. Tools such as the track and trigger system perform a valuable bridging function between occupations. However, these tools also reinforce hierarchies and occupational boundaries. Relations between the domains of critical care, medicine and management influence the organisation and provision of services, and organ specialism assumes a hierarchical superiority over generalist services. Structural processes such as access to critical care, and transfer of responsibility between medical firms influence patient pathways.

This thesis helps to explain why organisations struggle to effectively manage acutely ill patients on the ward. The analysis suggests that priorities and solutions for the acutely ill should include greater recognition of the significance of the mundane routine of rescue work, structural and professional influences and inequalities, and diagnostic categorisation regarding escalation of care.

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Glossary of abbreviations

AMU	Acute medical unit
BP	Blood pressure
CCOT	Critical care outreach team
CCU	Critical care unit
COW	Computer on wheels
CPR	Cardiopulmonary resuscitation
CQC	Care Quality Commission
DoH	Department of Health
DNAR	Do not attempt resuscitation
ECG	Electrocardiograph
ED	Emergency department
EWS	Early warning system
EWTD	European Working Time Directive
FTR	Failure to rescue
F1 / FY1	Junior doctor in first year of foundation programme
F2 / FY2	Junior doctor in second year of foundation programme
GIM	General internal medicine
GMC	General Medical Council
HCA	Health care assistant
HDU	High Dependency Unit
HR	Heart rate
IAT	Intelligent assessment technology
IoM	Institute of Medicine
IHI	Institute for Healthcare Improvement
ICU	intensive care unit
MET	Medical emergency team
NCEPOD	National Confidential Enquiry into Patient Outcome and Death
NEWS	NHS Early warning score
NFR	Not for resuscitation
NG	Nasogastric
NHSII	NHS Institute for Innovation and Improvement
NICE	National Institute for Health and Clinical Excellence

NMC	Nursing and Midwifery Council
NPSA	National Patient Safety Agency
NRLS	National Reporting and Learning System
PAR	Patient at Risk
PDA	Personal digital assistant
QI	Quality improvement
RCP	Royal College of Physicians
RR	Respiratory rate
RRS	Rapid response system
RRT	Rapid response team
SATs	Blood oxygen saturation levels
SBAR	'Situation, Background, Assessment and Recommendation' communication protocol
SHO	Senior house officer
SNP	Site Nurse Practitioner
SpR	Specialist registrar
ST1 / ST2	Specialist trainee
STS	Science and Technology Studies
TTS	Track and trigger system
WHO	World Health Organisation

Chapter One: Introduction

1.1 Overview

This thesis is concerned with the nature of 'rescue work' in acute hospital care. It broadens inquiry beyond prevailing practice and policy discourse on managing acutely ill patients on general wards which largely focuses on the 'window of opportunity' that immediately precedes the point of a patient's collapse, and the implementation of rapid response systems to facilitate recognition and response to clinical deterioration. This thesis aims to provide fresh insights to existing practice and research by exploring the hidden and collective accomplishment of rescue work performed by lower level staff within trajectories of patient care. It explores the interactional linkages in rescue work between macro-, meso- and micro-levels of health care to draw out the complexities in health care organisation and delivery. The roles of rapid response systems themselves are also examined, including their intended, unintended and contradictory consequences, to increase understanding about the social processes causally linked to how these systems 'work'.

1.2 Research context

Medical wards within acute care settings are characterised by unpredictable workloads, medical uncertainty, and an increasing number of elderly patients with complex needs. In these settings, clinical deterioration can occur at any stage of a patient's illness. Significant changes in patients' vital signs are often missed, misinterpreted or mismanaged. This can result in adverse outcomes for patients including unanticipated admissions to the intensive care unit, increased length of hospital stay, cardiac arrest or death. Current risk management and safety strategies focus on education and training of ward staff to recognise and respond to acutely ill patients, and regulation of routine vital sign monitoring and nurse/doctor escalation of care. The 'Rapid Response System' (RRS) has been offered as a safety net for patients on the ward who are at risk of becoming acutely unwell. The RRS includes tools such as track and trigger systems which aim to aid event detection, and specific teams established to facilitate a predetermined response, such as the Medical Emergency Team or Critical Care Outreach Team. Implicit within the RRS is the assumption that it acts to improve communication between and within professional hierarchies, shapes cultural norms and professional practice, and enhances organisational reliability.

However, despite the widespread implementation of these RRS there is strong evidence that opportunities for rescue continue to be missed. There is continuing debate over the effectiveness of these systems solutions, with mixed evidence to date of their contribution to improved patient outcomes. Differences in service models, response and treatment have limited the interpretation of research findings (Subbe *et al.* 2003). While some proponents argue that the benefits of RRSs are self evident, analysis of their cost-benefit is lacking, and there is evidence that RRSs may introduce unintended or even contradictory consequences for patient care.

As Dixon-Woods (2011) notes, it is important to establish whether ongoing health care problems following introduction of quality improvement initiatives result from lack of understanding regarding underpinning social processes and mechanisms or their patchy implementation, or a combination of both factors. Continuing problems with rescue are complex and only partially understood. While qualitative studies (Chellel *et al.* 2006, Leach *et al.* 2010, Suokas 2010, Quirke 2011) have provided some insights, there is a need for observational studies of 'rescue in practice', to aid understanding of the causal picture of the RRS and the interlinked structural and social context of rescue.

1.3 Theoretical perspectives

This thesis draws on theoretical insights from social science literature. A social science approach offers a resource for helping understand the challenges encountered in implementing quality improvement changes and different ways of 'doing patient safety' and their consequences. Ethnographies of health care work can illuminate important contextual influences. The thesis draws on concepts from the social sciences to further understanding of complexities, links and contradictions within the field of rescue practice, and consider how these processes might offer opportunity for reframing the nature of the problem and solution.

In particular, concepts such as 'resilience' and the skills of staff in accomplishing unseen micro-level safety work offer the opportunity to broaden interpretations beyond 'managing deterioration' at the point of patient collapse to encompass the active and collective nature of rescue work performed earlier in patients' trajectories. The sociological theme of the uncertainty of medical action underpins management of acute illness and may provide further insight into the significance of associated concepts such as individualism and clinical

discretion for timely and effective rescue. Rescue work reflects and incorporates divisions of labour, the moral value of different types of health care work, and the management of bureaucratic hierarchical boundaries and organisational trajectories. Social science literature in this field offers the potential for understanding how RRSs can shape jurisdictions, cultural norms and structural power. This thesis draws on these social science perspectives in order to extend boundaries beyond policy interpretations of the nature of the problem, to determine if and how the RRS is 'fit for purpose', and to establish what aspects of rescue work lie 'outside' the structure and influence of the RRS and the significance of this for health care.

1.4 Research aim and objectives

The aim of the study is to explore rescue practices in order to draw out the associated interplay of socio-cultural and organisational processes and the context of clinical work within medical wards.

Specific objectives are:

1. To explore how organisational and structural factors influence rescue work
2. To explore how rescue work is enacted within general medical settings
3. To examine how boundaries are negotiated and mediated in rescue work
4. To offer theoretical insight into the underpinning social processes and mechanisms of the RRS

1.5 Research design and methods

An ethnographic approach was chosen as an effective means of exploring frontline work practices. The inclusion of two organisations as study sites enabled comparisons and insights into the influence of context on clinical practice. General medicine was selected as the setting for this research because of its competing demands, and complex and fluctuating workloads. Data collection (observations and interviews) took place over a 12 month period which facilitated immersion in and familiarity with the physical space of the wards, the routines of the staff, and the building of rapport with staff members. Data collection involved approximately 180 hours of observations of clinical interactions, management processes, ward rounds, multi-disciplinary team meetings, and informal situations (e.g. coffee breaks) in one general medical ward in each of the hospitals. Observations included periods of shadowing a sample of medical staff and an outreach

team, covering the selected wards together with others within the medical directorate of the hospitals. Observations of clinical activity took place during early and late shifts, weekdays, weekends and night shifts. In addition, data collection included attendance at committee meetings where care of the acutely ill patient was the focus.

Semi-structured, face-to-face, individual interviews were undertaken after the fieldwork to gain further insights into practices observed. They included doctors (14), ward and critical care nurses (9), health care assistants (4), allied health professional (1), trust lawyer (1) and safety leads and managers (6). Purposive, heterogeneity sampling was employed in order to capture a diverse sample of opinions and experiences. Observation notes were contemporaneously dictated into a digital recorder and transcribed, thereby enabling sharing of data with supervisors. Interviews were recorded and transcribed. Documentary evidence was collected which included escalation of care protocols, observation audits, critical care outreach team activity, cardiac arrest rates and mortality data, and real-time data generated by the intelligent assessment technology. Observation, interview and documentary data were inductively and deductively coded using NVivo v8 and organised thematically.

1.6 Structure of the thesis

The thesis comprises eight chapters. This first chapter has provided an introduction to the study by setting the broad context, detailing the research questions and noting its relevance for health care. Chapter two presents the policy and practice context in detail with a review of related literature within the field, including relevant UK and international policy regarding care of ward based acutely ill patients. Chapter three provides a theoretical framework for the study and presents the sociology of rescue work. It considers how social science theory regarding the 'doing' of patient safety, the handling of medical uncertainty, and diagnostic work informs rescue practice. It draws additionally on concepts such as the division of labour, 'temporal-spatial ordering' and 'boundary work' to explore how they influence patient and organisational trajectories, and the role of the RRS in managing these.

Chapter four sets out the study methodology and explains the choice of an ethnographic approach for the study of rescue work. Underpinning assumptions, ontological and epistemological considerations are briefly discussed. The chapter includes discussion of the

study sites, research participants, time spent in the field and of what constitutes 'immersive understanding'. Issues around objectivity, validity and reliability are also considered, along with ethical issues around consent and data collection. Lastly, I consider my own position as an ethnographic researcher in terms of developing reflexivity.

Chapters five to seven present the empirical data. Chapter five explores how policy was perceived and enacted at a local level. The structural characteristics and demographic profile of each organisation are presented alongside data demonstrating how external and internal factors shaped local decision making and policy implementation regarding rescue practice. Chapter six details how, at a micro-level, rescue was enacted on the ward, while chapter seven examines the significance of occupational, hierarchical, temporal-spatial and structural boundaries in managing acutely ill patients. The role of safety tools and technologies, and the RRS within rescue work is a theme that runs through all three findings chapters, to highlight how they influenced and were influenced by meso-level decision making, the enactment of rescue practices on the ward, and boundary work within medical services. Finally, chapter eight summarises how the main research findings inform social science theory on 'doing' patient safety and the practice of health care work. It builds on perspectives discussed in chapter one and two and outlines the contribution of the thesis to practice and policy on managing acutely ill patients. It provides a critique of the methods used and discusses the implications of the study for policy, practice and future research.

Chapter Two: Policy and Practice Context

'In the beginning of the malady it is easy to cure but difficult to detect, but in the course of time, not having been either detected or treated in the beginning, it becomes easier to detect but difficult to cure' (Machiavelli 2003, p.12).

2.1 Introduction

This chapter supplies contextual background to the research presented in this thesis, by setting the policy and clinical practice scene and drawing from empirical research. It provides a brief overview of safety discourse within health policy, and considers one of its underpinning premises, that safety can be 'built' into the provision of health care. The rationale is explained for selecting acute care as the lens for this particular research.

Discussion then focuses further on care of patients on general wards. The literature reviewed in this chapter was identified by three means, a database review, a search of the grey literature (patient safety related to care of acutely ill patients) and studies obtained from references listed within studies identified from the first two sources. The databases Medline, Web of Knowledge, Cinahl, Scopus, NursingOvid, and Cochrane were searched using the terms 'acutely ill patient', 'physiological deterioration', 'escalation of care', 'failure to rescue' and 'suboptimal care'. These search terms were considered to capture literature regarding team, organisational, and contextual factors influencing care of acutely unwell ward patients. The term 'rescue' was not used as it is rarely used within this field. Search terms 'track and trigger system', 'early warning system', 'rapid response system', 'rapid response team', 'critical care outreach' and 'medical emergency team' were also used in order to evaluate the role of safety systems designed to aid management of the acutely ill.

The literature reviewed indicates that many of these patients are acutely unwell and exhibit abnormal physiological signs before their condition becomes potentially life threatening. This period offers a window of opportunity for intervention, or 'rescue'. Empirical evidence regarding this rescue opportunity is considered, followed by exploration of the implications for staff and patients and organisations when the opportunity is missed, and why this occurs. The various safety strategies that have been proposed as a means to

enhance organisational resilience and reliability in care of acutely unwell ward patients are detailed, and a review of the evidence regarding their implementation and effectiveness is presented. The chapter concludes by highlighting gaps and uncertainties within this literature and considering how concepts from the social sciences might usefully help reframe both the nature of the problem and the solutions.

2.2 Safety discourse in health policy

Attention over the past 15 years within health services has increasingly focused on improving patient safety (notably in the US and UK, Australia and New Zealand). A number of professional, policy and public drivers have prompted this new emphasis. These include recognition of the scale of medical errors (many of which are preventable) and other incidents that harm patients (Leape 1994, Leape 1999). In England, as many as one million patients within the acute sector may be harmed annually by unsafe care, although the degree of harm in most cases is slight or temporary (Vincent 2006). For every adverse event occurring, there are substantially more 'near miss' incidents which might have resulted in harm (DoH 2000c). Adverse events have implications for both patients (including long term psychological effects) and health systems which include additional costs related to extended length of stays in hospital and increased demands on the health care workforce and resources (Zhan & Miller 2003).

Approaches to improving patient safety have been primarily guided in the US by the Institute of Medicine's report *To Err is Human: Building a safer health system* (Kohn *et al.* 2000) and in the UK by the Department of Health's *An Organisation with a Memory* (DoH 2000c). These reports, alongside others from the World Health Organisation (World Health Organisation 2004), Australia (Runciman & Moller 2001) and New Zealand (Cull 2001) have shaped international and national quality improvement and research agendas (Zuiderent-Jerak *et al.* 2009, Jensen 2008, Rowley & Waring 2011). They have contributed to the development of a global patient safety 'movement' which embraces the principles of safety science, focusing analytical attention on the sequence and contribution of upstream and contextual factors, and situating human error as an almost inevitable feature of organisational life (Rowley & Waring 2011).

Within this safety science approach, health care organisations are conceptualised as complex socio-technical systems, characterised by increasing patient acuity, technical complexity, and fundamentally dependent on human beings to execute care (DoH 2000c, Kohn *et al.* 2000). Health care organisations are encouraged to benchmark themselves with high reliability organisations, and to incorporate lessons learned from high hazard industries, such as aviation and nuclear power (Weick 1987, Tamuz & Harrison 2006). Safety is perceived as an active construct representing more than the avoidance of risk or management of error; characterised instead by the ability to anticipate and control for unexpected events (Rochlin 2003). Patient safety problems are considered amenable to methodical and technical improvement; recommendations for practice include implementation of standardised systems, rules and operating procedures such as early warning systems to enhance organisational reliability (Tamuz & Harrison 2006).

While patient safety and quality is now undoubtedly on the policy and practice agenda, questions have been asked about this prevailing policy focus (Rowley & Waring 2011), and underpinning theoretical perspectives (Jensen 2008). Rowley argues that current conceptual and theoretical orthodoxy is underpinned by a 'measure and manage' approach to safety which tends to gloss over the complexities of health care organisation and delivery (Rowley & Waring 2011). Some observers have pointed out that 'system' is used selectively within policy reports with greater focus on frontline operators than on designers, engineers, manufacturers, or policy advisers (Jensen 2008, Zuiderent-Jerak *et al.* 2009). Others note the difficulties associated with importing concepts and methods from other high risk domains without a detailed understanding of the defining differences within the context of health care teams (Musson & Helmreich 2004, Flin & Maran 2004, Hamman 2004, Tamuz & Thomas 2006, O'Connor *et al.* 2008). It has been argued that it is unclear which particular conditions, practices and contingencies contribute to safety (Summerton & Berner 2003); further exploration is therefore required to assess to what extent safety can be built in and 'fixed' as a non-human property to the system of health care.

The next section considers those features of acute health care which contribute to the safety challenges encountered in those settings. This is a 'high stake' context, the nature of which requires further exploration.

2.3 Care of acutely unwell patients on the ward

2.3.1 Context of acute care

The need to focus on patient safety and improve the quality, efficiency and consistency of medical care in acute hospital settings has been highlighted by a number of reports (RCP 2007, NCEPOD 2005). Application of a systems model for safety within this domain needs to address its unique challenges. Medical wards within acute care settings are characterised by unpredictable workloads, medical uncertainty, and an increasing number of elderly patients with complex needs.

2.3.2 The trajectory of deterioration

Providing an effective safety net for patients within general wards involves the surveillance and timely / appropriate management of patients whose conditions may vary from stable to acutely unwell. An acutely unwell patient is defined as a patient whose physiological signs indicate that their condition is at risk of becoming life threatening. Clinical deterioration refers to signs that a patient's condition is getting worse. These signs include reduced consciousness, difficulty in breathing and circulatory compromise. Clinical deterioration can occur at any stage of a patient's illness, but periods such as the onset of illness, during medical and surgical interventions and during recovery from critical illness present higher risk (NICE 2007).

The onset of critical illness appears to be often predictable (DoH and Modernisation Agency 2003). There is robust evidence that patients who become acutely unwell frequently exhibit abnormal physiological observations, sometimes for hours, before their final collapse. Two US studies in the early 1990s used retrospective chart review to demonstrate that signs of physiological deterioration are evident 6-8 hours prior to cardiac arrest (Schein *et al.* 1990, Franklin & Mathew 1994). Other studies that have reviewed the charts of patients who had deteriorated to the point of a cardiac arrest or unplanned admission to intensive care have identified that there is a trajectory of deterioration which potentially offers a window of opportunity to intervene, halt or reverse the process (Buist *et al.* 1999, Goldhill *et al.* 1999b, Hodgetts *et al.* 2002). Physiological abnormalities in respiration, pulse, oxygenation, and mental function in particular have been found to indicate clinical deterioration (Goldhill *et al.* 1999b, Schein *et al.* 1990). Measures of systolic blood pressure and temperature can also provide an indication of deterioration (NICE 2007). These

changes in physiological observations have been linked with patient outcomes. For example, a study of 433 ward patients demonstrated that those with normal vital signs had a negligible risk of death in the following month as compared to those with three or more abnormalities, who had a 21.3% mortality (Goldhill & McNarry 2004).

2.3.3 A focus on 'rescue' and the 'rescue trajectory'

During the time period where a patient's condition is deteriorating there is often an opportunity for staff to 'rescue' the patient, in other words, to detect such signs, and to halt or reverse this process by responding appropriately. Safety science literature argues that perceptions of safety need to move beyond negative interpretations involving risk (Rochlin 1999). Defining an organisation as safe because it has a low rate of error is limited. It underplays safety as an emergent property at both an individual and collective level within organisations operating complex technical systems under demanding conditions. A focus on risk detection and management may also interfere with the means and process by which safety is created and maintained (Rochlin 2003).

This safety science literature suggests that a move to from examining episodes of failure to rescue to exploration of 'rescue' as a construct may be fruitful. Rescue could be usefully reframed as an active construct; embodying collective safety promoting skills such as reflectiveness, vigilance, responsiveness and the ability to handle indeterminacy (Rochlin 2003). Similarly, a focus on the trajectory of rescue offers the opportunity to assess how staff exercise influence over patients' pathways through care, and provides a means of exploring linkages between care trajectories, points of clinical deterioration and organisational context.

At present, cardiac arrest is associated with poor outcomes; survival-to-discharge rates after cardiac arrest in hospital average only 17% (Gwinnutt *et al.* 2000). There has been little improvement in these rates over the last thirty years (Ehlenbach *et al.* 2009, Hillman *et al.* 2001) despite the enormous resources devoted to cardio-pulmonary resuscitation in terms of education, research and staff time as well as refinements and developments related to the technique itself (Hillman *et al.* 2001). More effective rescue at an earlier stage would lead to both health and economic gains e.g. by reducing cardiac arrests, intensive care unit (ICU) admissions and mortality rates.

The next section discusses the micro-level factors that influence the context of rescue.

2.3.4 Context of rescue

Most empirical studies exploring the management of acutely ill patients on the ward focus on gaps and deficits in care, illuminating why opportunities for rescue are missed, rather than how rescue is accomplished in practice. In this section, the profile of acute care and the health care workforce involved is presented to highlight the structural features of this setting and their influence on rescue practice. Factors affecting implementation of team processes (decision making, team working and communication) and tasks (observing and recording vital signs) on the frontline are also considered.

Profile of acute care

Ward profiles within acute care have become more complex, resulting in increased patient acuity on wards, and higher workload as a result of an ageing population, an increase in health care technology and an increase in patients with multiple co-morbidities (Bion & Heffner 2004, Bright *et al.* 2004, McGillis Hall & Doran 2007). Difficulties associated with delivering safe care within complex health care systems are exacerbated by the changing case mix of hospital patients combined with increasing medical specialisation (Hillman *et al.* 2011). A number of medical admissions present with additional morbidities, leading to a reported mismatch between complex at-risk patients with multi-system problems and doctors who have specialised training in a single area (Hillman *et al.* 2001, Smith & Kause 2011).

Emergency medical admissions have risen steadily; approximately 90% of patients in acute hospital medical wards present as emergencies (NHS Trust Federation 1995). Chellel *et al.* (2002) reported that over 12% of patients on general wards were at risk of their conditions deteriorating. Haines and Coad (2001) note that the increased acuity and dependency of patients on general wards has led to an increase in administrative and coordination work. Competing work demands on nursing resource such as transfers, phone calls and attending doctors' requests have also been noted as contributing to difficulties with prioritisation (NPSA 2007a). Nurses have to provide care for multiple patients, frequently switching and reprioritising patients and tasks to cope with time sensitive, high volume workloads (Tucker & Spear 2006). Frequent interruptions during tasks are a feature of both nursing and medical practice (Tucker & Spear 2006, Weigl *et al.* 2011). In one study, junior doctors'

workflow was disrupted on average every 11 minutes, potentially compromising clinical decision making (Weigl *et al.* 2011).

Placement of patients on clinically inappropriate wards has been reported to result in suboptimal care as nurses may be unfamiliar with the complexity of the patient's complaint or the care required (Hodgetts *et al.* 2002, NPSA 2007a). Communication is harder between nursing and medical staff when nurses are unfamiliar with the medical team caring for the patient who is an 'outlier' (Goulding *et al.* 2012, Schmid-Mazzoccoli *et al.* 2008).

Education, supervision, staffing levels and skill mix

Given the changing profile of acute care, it has been argued that current education does not properly prepare staff to manage critically ill patients that are outside designated critical care environments (NPSA 2007a, Smith & Poplett 2002). Studies have identified that some staff working on the wards do not have the skills or knowledge to assess, recognise and manage acutely ill patients (McQuillan *et al.* 1998, McGloin *et al.* 1999). Failure to appreciate clinical urgency has also been detailed by a number of authors (Schein *et al.* 1990, Franklin & Mathew 1994, Buist *et al.* 1999, Hodgetts *et al.* 2002). Smith and Poplett (2002) found that senior house officers lacked knowledge and understanding in interpreting signs of acute illness. Junior doctors have also been found to experience difficulties related to decision making and utilisation of 'Do Not Attempt Resuscitation' orders, particularly in distinguishing between those patients with reversible and irreversible conditions (Flabouris & Chen 2011).

Lack of medical supervision of juniors has been reported (NPSA 2007a, McQuillan *et al.* 1998, NCEPOD 2005, Hodgetts *et al.* 2002). Absence of experienced clinical decision making and teaching at the bedside leaves junior doctors unsupported in their care of acutely unwell patients (Chellel *et al.* 2006). The model of care provision may be a contributing factor; unlike in surgery where the on-call team are released from elective work, the consultant physician is rarely involved in the acute admission process or when a patient is deteriorating on the wards (NCEPOD 2005). A UK review of case notes from 118 consecutive in-hospital cardiac arrests, identified that medical review was limited to a junior doctor in 45% of cases (Hodgetts *et al.* 2002). Bion and Heffner (2004) note that the European Working Time Directive which reduced junior doctors' working hours results

in more frequent medical handovers and less continuity of care. Medical services are frequently run at beyond capacity resulting in junior doctors having to cover a large number of acutely ill patients (NCEPOD 2005).

Studies undertaken in the US, Canada, UK, Switzerland and New Zealand provide some evidence that nurse staffing and quality of the nurse working environment are associated with the quality of patient care (Clarke & Aiken 2003, Aiken *et al.* 2002, Rafferty *et al.* 2007, Tourangeau *et al.* 2006, Clarke & Aiken 2006, Aiken *et al.* 2012). Inadequate nurse-patient ratios together with increased workload have been reported as hindering nurses' ability to effectively watch over patients (Cutler 2002). Patient contact with nurses and health care assistants (HCAs) varies in frequency and duration; long gaps between patient visits provide fewer opportunities for detection of clinical deterioration. In their study of failure to rescue (FTR), Jones *et al.* (2011b) found that higher levels of clinically qualified staff (doctors and nurses) were associated with lower levels of failure to rescue. However, a higher nurse to doctor ratio was associated with higher rates of failure to rescue, suggesting that medical staffing levels are significant.

Difficulties in recruiting qualified nurses have led to a dilution of skill mix and reliance on temporary staff in many areas (McArthur-Rouse 2001, Endacott *et al.* 2007). It has been suggested that this has negative effects on the social and intellectual capital of the rest of the team and increases workload for permanent staff (Bajorek & Guest 2010). HCAs are involved in a large proportion of direct patient care (Kessler *et al.* 2010). HCAs may lack the knowledge to recognise abnormalities, interpret data and respond appropriately (NPSA 2007a, Preston & Flynn 2010).

Quirke's case study (2011) of four wards (two surgical and two medical) in two hospitals in New Zealand provides important organisational context for understanding how workforce factors influence rescue. Data were collected via interviews, focus groups, and documentation review focusing on experiences of ward nurses, doctors, as well as hospital executive and senior managers. Although the majority of factors affecting the quality of care of acutely unwell ward patients were not unique to the individual cases but were present across both organisations, these factors were perceived differently across organisational roles. Doctors and nurses identified that excessive workloads caused by increased patient acuity and staff shortages impacted

on time to care for acutely unwell ward patients. Nurses reported becoming task focused and reluctant to increase the frequency of observations on patients. However, executive managers showed little empathy for or understanding of staff members' perceptions of their workload, for example managers from one hospital described nurses talking themselves into a 'tyranny of busyness'.

Medical and nursing staff felt the hospitals did not have clear implementation and evaluation strategies for their service initiatives to support staff in their care of acutely unwell patients on the ward. These staff also perceived too many changes were introduced at once. Documentary review suggested that ward nursing establishments had not been updated sufficiently to reflect the increasing level of patient acuity. Executive managers and medical participants highlighted skills and knowledge deficits as a factor affecting care of acutely unwell ward patients; however this was not supported by nursing and ward management participants.

Quirke's (2011) case study approach provides information regarding organisational context and the situated application of rescue within general ward work. She identifies multiple and opposed perspectives of clinicians and managers across the organisation from ward to executive level. However, the study relies on reported rather than observational data and, while there is a spread of managers and senior clinicians within the single face-to-face interview data, most of the data from junior staff were collected via focus groups. Focus groups can facilitate collection of data on group norms, but can also censor individual deviations from group standards (Kitzinger 1994). There is a paucity of data from junior doctors at one of the hospitals, and at the second hospital data from this group were aggregated from a mixed focus group across medicine and surgery, making it difficult to draw out particular learning for each speciality. There is also a lack of articulation of difference within professional groups beyond the clinical-managerial divide.

Endacott et al (2007) studied 17 cases of patients unexpectedly admitted to ICU within one hospital in Australia. Their study involved notes review and interviews with 14 doctors and 11 nurses involved in those patients' ward care prior to admission to ICU. They identified inadequacy of infrastructure and local processes to allow timely identification of and response to cues relating to patient deterioration. Frequent use of casual and part time staff, multiple demands on medical time (particularly outpatient clinics), staff shortages,

and widely variable staff skill mix from shift to shift influenced patient management. There were frequent medical rotations and reliance on junior and inexperienced staff on the rotas.

'After hours issues were particularly apparent with many references to reduced staff, services and support, and the frequent use of 'covering doctors' who were unfamiliar with the patients and had limited authority to change patient management' (Endacott et al. 2007, p.104).

In Endacott et al's (2007) study, organisational differences (between regional and metropolitan hospitals) regarding access to specialist services with consequent implications for timely response to acutely unwell patients were reported by the majority of medical participants. Staff identified that local policies and ward specific practice restrictions sometimes prevented rapid response to requests for help. The need for additional organisational support such as a medical emergency team was emphasised. Despite the study being limited by its single site and the interview data by hindsight bias, it raises important insights into the contribution of workforce issues to rescue practice.

Decision making, communication and team working

Besides staffing numbers and skill mix, decision making and communication between members and team working also influences rescue practices. Several studies have shown that patient records are often incomplete and seldom contain written requests regarding the type and frequency of physiological observations or instructions giving parameters that should trigger a patient review (NCEPOD 2005), even once patients have started to deteriorate (NPSA 2007a, Endacott et al. 2007). Without specific criteria for escalation of care, decisions to ask for help or refer on to senior staff are left to individual judgement. Individual judgement varies in accuracy according to training, experience, professional attitude, working environment, hierarchical position and previous responses to alerts (Wood et al. 2004, Andrews & Waterman 2005, Cox et al. 2006). There is also widespread evidence of poor handover practices (Borowitz et al. 2008, Behara et al. 2005, Solet et al. 2005) which may lead to inadequate information transfer.

Several studies have found evidence of communication problems within and between health care professions, for example during transfer and referral (Endacott et al. 2007,

NPSA 2007a). In all parts of Quirke's study (2011), participants identified teamwork and communication as important for the care of acutely unwell patients, together with trust and access to senior support. Several research studies have reported that nurses encounter difficulties getting medical staff to respond to requests for urgent review (NPSA 2007a, Odell *et al.* 2009, Quirke 2011). Odell *et al.* (2009) and Andrews and Waterman (2005) both concur that few nurses feel confident reporting changes for fear of looking stupid in front of medical colleagues; nurses also lacked the knowledge and skills needed to persuade doctors to review their patient's condition. Doctors also report being frustrated by nurses' failure to provide sufficient information when referring a patient for urgent review (NPSA 2007a, Odell *et al.* 2009, Quirke 2011).

A review by Odell *et al.* (2009) explored the role of nurses in detecting and managing deterioration in ward based patients. They identified 16 studies that focused on nursing observation of patients on general wards. Two of these were excluded because of concerns about validity and reliability. The review identified that nurses rely on three processes for recognition of deterioration: intuition / pattern recognition, patient and/or family raising concerns, and coming across the patient through routine observations. Intuition was found to play a significant part in the detection of deterioration, with vital signs being used to validate intuitive feelings. One of the studies (Andrews & Waterman 2005) showed that intuitive knowing, contextualising and grabbing attention are strategies used by nurses to 'package' evidence of physiological deterioration in a way that will persuade doctors to review patients.

Gazarian *et al.* (2010) investigated nurses' experiences of identifying deterioration while caring for patients considered at risk of a cardio-pulmonary arrest. They interviewed 13 nurses from 4 medical units within one US hospital. Most of the situations they examined were characterised by conflicting cues. Nurses reported using altered level of consciousness, oxygenation status, trends in systolic blood pressure, knowledge of the patients, and contextual features as data informing their decision. A common theme that emerged as significant was whether or not the nurses 'knew' their patients. This enabled them to recognise subtle changes in the mental status of the patient. This study also showed the value of experienced staff members with tacit knowledge of navigating these situations, team work and collaboration, as well as flexibility in responding to unexpected

occurrences. While it was conducted on a single site, and relied on retrospective accounts, this study is valuable because it focused on rescue practice rather than on gaps in care.

A US study by Farnan et al (2008) linked junior doctor's management of uncertainty with delays in response and in some cases, patient harm. All internal medical residents at a single tertiary centre were interviewed within one week of their last on-call night of the rotation and asked to recall important clinical decisions made during this on-call period. The interviewer focused on decisions made in situations of uncertainty, and the seeking of advice to resolve this uncertainty. Forty two of the 50 residents identified 18 discrete incidents which occurred as a result of uncertainty: technical uncertainty (procedural skills, knowledge of indications); conceptual uncertainty (care transitions, diagnostic decision making and management conflict) and personal uncertainty (goals of care). The residents reported the existence of a defined 'hierarchy for assistance' and fears of losing autonomy, revealing knowledge gaps, and 'being a bother'. In managing uncertainty, they sought assistance from colleagues and literature for initial management, followed by escalation of care up the hierarchy. For 12 of the 18 cases reported, patient care was compromised: delay in procedure or escalation of care (n=8); procedural complications (n=2); and cardiac arrest (n=2). This study was conducted at a single site limiting its generalisability. Expectation-led interviewer bias may have influenced data collection. The retrospective accounts of incidents are likely to be subject to hindsight bias and may not acknowledge other organisational factors which influenced outcomes. However, findings from this study are congruent with others (NPSA 2007a).

The task of observing and recording vital signs

Odell (2009) describes the routine recording of vital signs as a ritualistic task orientated practice. As a result of being devalued, observations are often missed. Poor assessment of respiratory rates has been observed in a number of studies (Hogan 2006, Cretikos *et al.* 2008, Preston & Flynn 2010). Odell (2009) notes that the least reported process for detecting deterioration is 'coming across' patients during routine observation recording, which casts doubts on the effectiveness of these monitoring practices.

Assessment is compromised by inaccessible or broken equipment and over-reliance on electronic monitoring (NPSA 2007a). The length of time nurses spend assessing the patient appears to depend on how long the machine takes to process the readings (Wheatley

2006). Reliance on the use of electronic devices like the pulse oximeter, electronic sphygmomanometers, tympanic thermometers and blood glucose monitors can be detrimental to patient safety if the nurse is unable to recognise the significance of the observations being recorded (Wheatley 2006, NPSA 2007a, Odell *et al.* 2009).

Summary

There is a robust empirical literature which details how the structural or organisational context, together with team processes such as managing clinical uncertainty and asking for help, and the task of 'doing the observations' influences rescue practices on the frontline. The picture is complex, and further research is needed to illuminate linkages and relationships between meso- and micro-level processes. Existing research has tended to focus on why opportunities for rescue are missed; qualitative studies have largely relied on reported accounts of practice. There is space for further work to identify how staff accomplish rescue within the structural and social context of acute care, and which factors facilitate or impede this process.

2.3.5 'Failure to rescue'

While acknowledging the need for further research on how patients are successfully rescued, it is important to consider the extent of the problem 'failure to rescue' i.e. when opportunities for intervention in the rescue trajectory are not taken. There is a robust evidence base detailing how changes in clinical signs are often missed, misinterpreted or mismanaged (Franklin & Mathew 1994, Goldhill 2000, McQuillan *et al.* 1998, Smith & Wood 1998). The term 'failure to rescue' has been used in relation to 'deaths among patients with treatable complications' (Griffiths *et al.* 2008, p.1). The different dimensions of this concept include; failure to *recognise* warning signs, failure to *interpret* these signs correctly and failure to *institute* timely appropriate clinical management (Schmid *et al.* 2007).

2.3.6 The extent of the problem

McQuillan and colleagues (1998) were the first to study the prevalence of failure to rescue within the UK. They examined the quality of care prior to admission to intensive care in two hospitals. They undertook structured interviews with the admitting clinical team and the intensive care team, focusing on events between hospital admission and admission to intensive care. The anonymised data were then assessed by external reviewers for the

quality of medical care and appropriateness and timeliness of admission to intensive care. Assessment involved scoring the adequacy of management of oxygen therapy, airway, breathing and circulation using a linear visual analogue scale. Half the 100 patients studied were judged to have received 'suboptimal' ward care prior to admission to intensive care and suboptimal care was seen as having contributed to mortality and morbidity in most instances. The study has been criticised for its reliance on the implicit judgments of only two external assessors, who were both aware of patient outcomes (Gorard *et al.* 1999, McArthur-Rouse 2001). Nevertheless it raised awareness of the significance of the problem.

Another UK study (McGloin *et al.* 1999) audited patients either dying unexpectedly on a general ward or requiring admission to an ICU during a six month period. Of the 477 deaths reviewed, 317 had occurred on the general wards. Thirteen of these were considered potentially avoidable. During the same period, 31 of the 86 patients admitted to ICU were deemed to have received suboptimal care in the period before their admission. This rate is lower than that cited by McQuillan *et al.* (1998). However, this study was the more robust as the assessors were blinded to outcome and initial diagnosis of patients, and provided with a clear definition of suboptimal care:

'the non-recognition of an abnormality clearly apparent from physiological recordings or laboratory data but which had either not been identified in the case records or not acted upon with any obvious therapeutic intervention (i.e. no entry on the drug chart) or clearly inappropriate or inadequate treatment, although the case records showed that the abnormality had been identified by nursing or medical staff' (McGloin *et al.* 1999, p.256).

A number of other more recent studies have confirmed that failure to intervene during the period of deterioration can lead to avoidable cardiac arrests, admissions to intensive care and deaths (e.g. Seward *et al.* 2003, Franklin & Mathew 1994, Schein *et al.* 1990, Buist *et al.* 2002, Goldhill *et al.* 1999a, Hillman *et al.* 2001, Hillman *et al.* 2002). In Hodgetts *et al.*'s study (2002), the number of UK in-hospital cardiac arrests per year assessed as preventable with better care was approximated at 23,000. This estimate was derived from a review of 139 detailed case summaries of consecutive adult in-hospital cardiac arrests over one year undertaken by a small panel of 'experts' (a professor of emergency medicine, a consultant

in general medicine and cardiology, a consultant physician specialising in intensive care, and a resuscitation officer with a background in critical care nursing). Panel members reviewed the cases without discussion. There was unanimous agreement that 62% of arrests were potentially avoidable, rising to 68% when emergency department (ED) arrests were excluded. The panel concluded:

'While it is recognised that our findings are from one hospital and may not be able to be extrapolated to other institutions, applying our avoidable primary in-hospital cardiac arrest rate (excluding ED events) to 11 million British NHS admissions in 1998/1999 produces a crude annual estimate of the order of 23 000 potentially avoidable events' (Hodgetts et al. 2002, p.122).

Limitations of methodology have been noted with audit-based studies such as McGloin et al (1999) and Hodgetts et al (2002); data extraction is reliant on the quality of documentation. The limited timeframe of data collection allows for observation bias and the Hawthorne effect (Buist 2011). Single case observational studies such as Hodgetts (2002) are also subject to case-selection bias. However, the growing evidence base has been instrumental in directing policy and practice attention towards the safety of rescue practice. In 2003, a UK national confidential enquiry (NCEPOD 2005) was undertaken into the care of acutely unwell medical patients in hospital. Data were collected for one month on all patients 16 years and over admitted to a general ICU in the UK. Physicians referring the patients to ICU and intensive care consultants completed questionnaires regarding the quality of care. Additional data were collected for patients who had died. The study found problems with lack of recognition of severity of sickness while patients were on the ward. Patients often had prolonged periods of physiological instability prior to admission to ICU.

'In patients who had been in hospital more than 24 hours prior to ICU admission, 66% exhibited physiological instability for more than 12 hours' (NCEPOD 2005, p.17).

ICU admission was thought to be avoidable in 21% of cases and suboptimal care was considered to contribute to about a third of the deaths that occurred (NCEPOD 2005).

Analysis of data submitted to the National Patient Safety Agency's (NPSA) National Reporting and Learning System (NRLS) during the same year flagged a number of serious incidents relating to the acutely ill patient (NPSA 2007b). This prompted the NPSA to commission work to identify the underlying causes and contributing factors in deterioration incidents. The NRLS received 484,441 reports of patient safety incidents from 2005, including 1,804 (0.4%) that reported the death of the patient. Of these, 425 occurred in acute/general hospitals. Sixty-four related to patient deterioration not recognised or not acted upon (22 of these were reported from medical wards). The majority of these incidents occurred in the evening or at night. In 17 cases it was reported that while deterioration was recognised and medical assistance sought, there was delay in the patient receiving medical attention (NPSA 2007a).

A search of NRLS data for similar incidents with less severe outcomes was undertaken for the same time period (NPSA 2007b). Fifty-eight further incidents were identified and classified into the same themes as above. For 24 of these, no observations had been taken, for 26 there was failure to recognise the significance of deteriorating observations, and for eight there was a delay in the patient receiving medical attention. Studies that have compared routine hospital reporting with case note review have found that incident reports represent only a very small proportion of incidents that actually occurred. Sari et al (2007) identified that of 110 admissions that had at least one patient safety incident resulting in patient harm, all of which were detected by the case note review, only six (5%) were detected by the reporting system.

2.3.7 Summary: evidence base regarding care of acutely unwell patients

While there is clearly the potential to improve outcomes for a significant number of patients by intervening when their condition shows signs of deterioration, there is little research evidence about how patients are successfully rescued. Studies exploring the structural and social context of rescue detail a complex and interlinked causal picture. There is a robust evidence base identifying that opportunities for rescue are often missed. This represents a significant national and international problem today despite different health care systems and local demographics. The reasons for this are complex and only partially understood.

In the next section, existing policy response to this continuing problem is considered. Details of those meso- and micro-level strategies perceived as safety solutions are provided, together with an assessment of the evidence base for their usefulness and effectiveness.

2.4 Policy response and identification of safety strategies

Recognising both the opportunities to intervene and the frequent failure to do so, policy makers have proposed a number of strategies. These include interventions at meso-level (organisational structures and models of care, guidelines, education and training), strategies to assist detection and diagnosis (track and trigger systems, intelligent assessment technologies), and strategies to improve communication and response (rapid response teams, rapid response systems). Each of these will be considered briefly before exploring the evidence for their utility and effectiveness.

2.4.1 Meso-level strategies

Organisational structures and models of care

In the UK critical care facilities have been highlighted as an important part of an acute care pathway (NICE 2007, DoH 2000a). Since 2000, acutely unwell patients have been classified by need or level of care rather than by geography¹ (DoH 2000a). In addition, the acute medical unit (AMU) has been posited as a means to help improve safety, largely in recognition of the increasing numbers of elderly patients with multiple chronic diseases who present as emergencies and are then distributed to multiple wards (with the associated risk of receiving fragmented care). AMUs provide expedited multidisciplinary and medical specialist assessment, care and treatment on admission for a designated period (typically up to 72 hrs) prior to discharge or transfer to medical wards (Scott *et al.* 2009). The Royal College of Physicians (RCP) has recommended AMUs as a way to respond more effectively and safely to the increasingly complex demands placed on hospitals for

¹ **Level 0:** patients whose needs can be met through normal ward care in an acute hospital; **level 1:** patients at risk of their condition deteriorating, or those recently relocated from higher levels of care, whose needs can be met on an acute ward with additional advice and support from the critical care team **level 2:** patients requiring more detailed observation or intervention, including support for a single failing organ system or postoperative care and those 'stepping down' from higher levels of care; and **level 3:** either patients requiring advanced respiratory monitoring and support, or patients needing monitoring and support for two or more organ systems, one of which may be basic or advanced respiratory support

acute medical care (RCP 2007, RCP 2004, AoMRC 2007). Findings from a systematic review of the effects of the introduction of an AMU on outcomes such as mortality, length of stay, readmissions, and patient / staff satisfaction suggest that AMUs may have the potential to improve the quality of care and safety of acutely ill patients presenting to hospitals (Scott *et al.* 2009). However, there is as yet no trial based evidence of their effectiveness.

National guidelines

In July 2007, the National Institute for Health and Clinical Excellence (NICE) issued the first guideline on the monitoring and treatment of acutely ill patients in hospital (NICE 2007). In this, nurses are identified as having the primary responsibility for monitoring, detecting, and interpreting the patients' physiological signs and instigating a timely response. Medical responsibilities include the creation and documentation of a clear physiological monitoring plan for each patient. It is recommended that this should detail the parameters to be monitored, the frequency of observations and an explicit statement of parameters that should prompt a request for review by medical staff or expert multidisciplinary team. Junior doctors are expected to respond promptly to referrals from nursing staff. Consultant physicians are required to supervise junior doctors effectively and to react quickly to requests for help. The NICE guidelines stipulate a graded response strategy for ward based patients identified as being at risk of clinical deterioration. This provides guidance regarding response action in terms of urgency, and whether escalation of care is to the nurse in charge, the patient's medical team or to a team with critical care competencies.

Organisations such as the NPSA and the NHS Institute for Innovation and Improvement (NHSII) also provide guidance regarding rescue practices (NPSA 2007b, NPSA 2007a, NHSII 2009). The NPSA highlights the importance of communication, situation awareness, risk assessment, training and skills development and equipment availability. It recommends that every acute trust should create a multidisciplinary deterioration recognition group to lead and coordinate efforts to improve the safety of patients (NPSA 2007a). A systematic review of evidence based quality improvement programmes has shown that dissemination and implementation of guidelines can promote compliance with recommended practices (Grimshaw *et al.* 2006). However, it has been observed that evidence is not itself sufficient to ensure changes in practice since such evidence is often not clear or accepted amongst professional groups (Fitzgerald *et al.* 2002). Research has also shown that social and cognitive boundaries between different professions impede the spread of evidence based

innovation as professionals tend to work within unidisciplinary communities of practice (Ferlie *et al.* 2005).

Education and training

There is widespread policy support for the provision of staff training to teach a systematic approach to the assessment and care of the severely ill (DoH 2008a, RCP 2002, NICE 2007). The UK based Acute Life-threatening Events – Recognition and Treatment (ALERT) course focuses on systematic patient assessment, interprofessional teamwork, communication, documentation and knowing when to seek help (Smith 2000). Evaluations of the effectiveness of acute care training are mainly limited to audit data (McGaughey *et al.* 2010). Evaluations of the ALERT training course found increased knowledge, attitude and confidence of trainee doctors (Smith & Poplett 2004, Featherstone *et al.* 2005). Similarly, evaluation of university-based acute care courses has shown improved levels of confidence in nurses (Haines & Coad 2001) and enhanced team performance following simulation based training (DeVita *et al.* 2005), but there is no evidence of knowledge transfer and its application to practice. Organisational issues that are not addressed by the educational intervention such as local values, planning and prioritisation of tasks, assumptions, allocation of resources and rewarding/punishing behaviour, which all influence how patients on general wards are assessed and monitored, are likely to limit the impact of such programmes (Fuhrmann *et al.* 2009).

2.4.2 Detection and diagnosis strategies

Track and trigger systems

In the mid 1990s, 'calling criteria' based on physiological observations were introduced to help secure timely intervention for the acutely ill (Lee *et al.* 1995, Morgan *et al.* 1997). Since then 'track and trigger' warning systems have been recommended by a number of professional bodies (RCP 2002, NICE 2007, DoH and Modernisation Agency 2003, NCEPOD 2005, NPSA 2007a). These are simple algorithms detailing a plan of action based on vital sign measurement. They aim to facilitate a graded response based on the severity of the condition of the patient. By allotting points to particular vital sign measurements on the basis of physiological derangement from a 'predetermined range', a cumulative score (early warning score) is generated. NICE distinguishes between four types of track and trigger systems.

Table 2.1 Types of track and trigger systems (DoH and Modernisation Agency 2003, p.14-15, NICE 2007)

System	Trigger
Single parameter system	One or more extreme observational values
Multiple parameter system	Two or more extreme observational values
Aggregate scoring system	Achieving a previously agreed trigger threshold with the total score
Combination system	Single or multiple parameter systems used in combination with aggregate weighted scoring systems

In the UK, many hospitals use a track and trigger system that is based on an aggregate of weighted scores for physiological variables. In contrast, in Australia and some US hospitals a single indicator is regarded as sufficient for activation. Multiple parameter weighted scoring systems have been argued to be more sensitive, but also time-consuming and often inaccurately calculated (Gao *et al.* 2007). Simple calling criteria (single parameter) may be less sensitive and specific, but they are predictive and have been reported to promote timely response activation (Cretikos *et al.* 2007, Harrison *et al.* 2005, Bell *et al.* 2006). Gao *et al.* (2007) reviewed the wide variety of systems in use internationally and found 25 distinct systems involving single parameter, multiple parameter and aggregate scoring systems. They found that a number of hospitals had developed their own systems or modified existing models. The RCP (2007) subsequently recommended a standardised NHS early warning score. As these systems have multiplied, terms such as EWS (Early Warning Systems) have been increasingly used as generic labels for a range of different physiological track and trigger systems (Morgan & Wright 2007). In an effort to make terminology more consistent, the National Outreach Forum advocated that the term 'physiological track and trigger system' should refer to all systems with set thresholds for assistance (DoH and Modernisation Agency 2003). The abridged term 'track and trigger system' (TTS) is used in this thesis.

The majority of acute UK NHS hospitals now report using a TTS (Rowan 2007) despite the absence of randomised controlled trial evidence of their effectiveness (McGaughey *et al.* 2007, Winters & Pham 2011, Cuthbertson *et al.* 2007). The heterogeneity of systems, implementation strategies and social contexts has limited comparisons of outcomes. Attempts to validate TTSs have had variable success and the TTSs have been criticised for their lack of accuracy in identifying critically ill patients (Rowan 2007, Gao *et al.* 2007). The extent to which the existing tools are valid or reliable predictors of hospital mortality, admission to critical care and cardiac arrest is also questioned (McCrossan *et al.* 2006, Johnstone *et al.* 2007, Subbe *et al.* 2003). Low accuracy has been attributed to the outcome measures utilised, the rapidity of deterioration in particular patients' conditions, lack of impending warning of some patients' collapse, and the setting of high trigger thresholds to manage workload (Rowan 2007).

Qualitative studies have indicated that TTSs help inexperienced staff identify sick and deteriorating patients, by giving them 'objective evidence' (Rowan 2007, Andrews & Waterman 2005, Suokas 2010). TTSs can increase staff knowledge and understanding (Leach *et al.* 2010), but this has to be balanced against over-reliance upon them (Rowan 2007, Suokas 2010). The available evidence identifies that ensuring effective use of TTSs is problematic (Sterling & Groba 2002, Endacott *et al.* 2007, Quirke 2011). Education and training (for medical as well as nursing staff) is perceived to be important for the success of TTSs yet few organisations run rolling programmes (Rowan 2007). In their systematic review of TTSs, McGaughey *et al.* (2007) conclude that further research is needed to explore their use in the practice setting to provide an understanding of the factors associated with poor documentation of early warning scores and the reluctance of ward staff to utilise the calling criteria.

Intelligent assessment technologies

As noted earlier, failure to detect deterioration and thus institute timely management is frequently linked to poor patterns of taking and recording observations. These include partial observations, absence of observations at night, incomplete charts and early warning scores not completed or miscalculated (NPSA 2007b). Intelligent assessment technologies (IATs) use personal digital assistants (PDAs), tablet PCs and hospital intranets to replace traditional paper observation charts with real-time data and electronic charting. They have been offered as a means of increasing the completeness, accuracy and legibility of vital signs data (Mohammed *et al.* 2009, Prytherch *et al.* 2006). Supporters suggest that the

objective scoring provided by the technology can help override hierarchies and that aggregated patient data (e.g. total number of vital sign datasets over time or early warning scores for the ward) may improve team situation awareness (Smith *et al.* 2006). The raw physiological data together with the scores and vital signs charts are made available to members of the health care team via wireless networking and linked to the hospital intranet. Vital signs data are directly entered by a nurse or health care assistant into the PDAs. When an early warning score reaches a predefined threshold the PDA triggers prompts for action e.g. 'increase frequency of observations to at least every 30 mins' and calls for help, e.g. 'involve registrar from the patient's team immediately'. Some of the IATs also have an inbuilt alerting system to doctors, enabling tracking of the clinical response. If inappropriate, unsuccessful, or absent, the doctor alerting process is repeated until the clinical situation is resolved (Jones *et al.* 2011c).

IATs are now becoming more widespread (Jones *et al.* 2011c, Smith *et al.* 2006, Prytherch *et al.* 2006, Mohammed *et al.* 2009). There is some evidence that utilisation of the IAT improves early warning scoring error rates (Prytherch *et al.* 2006, Jones *et al.* 2011c), however, the IAT is still limited by the predictive ability of the inbuilt TTS. Findings from a historically controlled study (Jones *et al.* 2011c) of an IAT using automated clinical alerts suggest that the IAT may facilitate attendance to acutely ill patients on the ward. Between baseline and intervention of the IAT with its alerting system, 1481 consecutive patients from two wards in one hospital were recruited. There was a reduction in length of stay between the baseline and alert phase (9.7 days v 6.9 days, $P < 0.001$). Clinical attendance to patients with mid-range early warning scores increased from 29% at baseline to 78% with automated alerts ($P < 0.001$) while for patients with a high score, clinical attendance increased from 67% at baseline to 96% with automatic alerts ($P < 0.001$). However, the study is limited by its single site design and inability to control for confounding variables. Furthermore, it is unclear whether increased attendance was associated with improved patient outcomes. Additional trial evidence is required to provide evidence of effectiveness.

2.4.3 Communication strategies

Standardised communication tools have been proposed as useful for nurses in emergency situations to help them to articulate their concerns to the medical staff (who are often not co-located on the ward). These are situational briefing tools, designed to 'eliminate

excessive language' and 'convey, in less than a minute, vital information needed by the doctor or next caregiver' (Denham 2008, p39). One example, 'SBAR', uses the terms 'situation', 'background', 'assessment' and 'recommendation'. 'Situation' refers to the purpose of the call, 'Background' relates to information about the patient's condition while 'Assessment' requires the nurse to make an evaluation of what is likely to be the patient's clinical problem. Lastly, the nurse is prompted to make a 'Recommendation', suggesting treatment options to the listener (see Table 2.3). SBAR has been adapted from a protocol utilised in the US Navy Nuclear Submarine Service to facilitate urgent transfer of information and flatten hierarchies between junior and senior officers (Kaiser Permanente of Colorado 2009).

Table 2.2: The SBAR protocol

<p>Situation: "Dr Smith, this is Nurse Jones, I'm calling about Mr. Brown, who's suddenly become unwell with severe central chest pain."</p> <p>Background: "He's sweaty, distressed and has had pain for the last 15 minutes despite 2 GTN (a pain killer). His pulse is 110bpm, blood pressure 100/80. I have done an ECG and started him on some oxygen"</p> <p>Assessment "I think he may be having an acute coronary event".</p> <p>Recommendation "He needs morphine and treatment. I need your help immediately."</p>
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There is evidence about the relative acceptability of such communication tools (Leonard *et al.* 2004, Manning 2006, McCarthy & Blumenthal 2006, Woodhall *et al.* 2008), but their impact on triggering and response behaviour has not been evaluated. A systematic review of protocols to aid handover highlighted small sample sizes and lack of use of validated instruments (Riesenberg *et al.* 2009). To date there is no strong evidence that the use of scoring systems or structured communication tools effectively bridges power differences and hierarchies between professions (Robson 2002). Quirke (2011) found in her study of factors affecting care of the acutely unwell that despite having the SBAR communication frameworks in place, communication difficulties still existed. Lack of evaluation of the

framework meant it was difficult to assess whether this was due to its implementation or the tool itself.

2.4.4 Response strategies

Rapid response teams

Over the past 10 years there has been policy recognition that a more equitable hospital wide approach is needed to manage 'at risk' patients (DoH 2000a, DoH and Modernisation Agency 2003, Audit Commission 1999, Intensive Care Society 2002, NCEPOD 2005, RCP 2002). This includes rapid access to personnel with critical care competencies and diagnostic skills. The purpose of these teams is to provide timely management of acutely unwell patients on the ward, 'critical care without walls', educational support for ward staff and to avert need for ICU admission (DoH 2000a, Intensive Care Society 2002). Calls are guided by TTSS. In Australia the system uses a Medical Emergency Team (MET) model with critical care physicians within the team (Lee *et al.* 1995). In the US and Canada rapid response teams (RRTs) led by nurses or respiratory therapists have been developed (Chan *et al.* 2008), largely enabled by support from the Institute of Healthcare Improvement (IHI) (Berwick *et al.* 2006). In the UK, policy has recommended use of a critical care outreach team (CCOT) involving critical care nurses or a Patient At Risk Team (PART), a nurse led multidisciplinary team (Goldhill *et al.* 1999a). Policy documents have not been explicit in stipulating details about the service (ICS 2002, DoH 2000a). Numbers within the team vary, as does their availability, i.e. whether they provide a 24hour or a 9-5pm, Monday to Friday service.

For the purpose of this thesis, the term rapid response team (RRT) is used as an umbrella term to cover all types of critical care specialist team. Where specified as either the CCOT or MET, the former refers to a nurse led outreach service, while the latter denotes a doctor led team.

Evidence of effectiveness on outcomes

In the light of the considerable resource that has been invested in the RRT, a number of systematic reviews and meta-analyses have been undertaken to assess its impact. Because a primary action of RRTs is to triage sick patients to the ICU, it is important to demonstrate that these interventions not only reduce rates of intermediate outcomes (such as cardiopulmonary arrest outside the ICU), but also reduce hospital-wide mortality (Chan *et*

al. 2010). However, four systematic reviews have failed to demonstrate a decrease in overall mortality in patients receiving RRT care (Chan *et al.* 2010, Esmonde *et al.* 2006, McGaughey *et al.* 2007, Winters *et al.* 2007).

Esmonde *et al.* (2006) carried out a systematic review of evidence (1996 to 2004) on the impact of RRT on patient and service outcomes. They reviewed 23 studies of which 16 were uncontrolled before and after studies. They noted wide variation in availability and types of RRT models, and variability of organisational characteristics (e.g. 'do not attempt to resuscitate' policies, access to other services and variations in casemix), which made generalisability hard to assess.

A year later McGaughey and colleagues (2007) published the results from a Cochrane review of the impact of TTSs and RRTs on hospital mortality rates between 1996 and 2006. Secondary objectives included determining the effects of these on ICU admission patterns (admissions and readmissions), length of hospital stay and the number of adverse events (unexpected cardiac or respiratory arrest) in adult patients who deteriorated on general hospital wards before and after the introduction of RRT. Criteria for inclusion were limited to randomised controlled trials, controlled clinical trials, controlled before and after studies and interrupted time series designs. Only two randomised controlled trials qualified; one from Australia and the other from the UK. The two studies were published in 2004 and 2005 and included all adult patient admissions (14 years and over) to general hospital wards.

The MERIT study was a prospective cluster randomised controlled trial of general inpatient wards in 23 Australian hospitals over a 12 month period (Hillman *et al.* 2005). Twelve hospitals were assigned to MET care and 11 to standard care. Analysis after 6 months showed no improvement in cardiac arrest rates, ICU admissions, or unexpected deaths. The second study was a stepped-wedge randomised controlled trial which phased in the introduction of CCOT in 16 acute adult general wards in one hospital in the UK (Priestley *et al.* 2004). Wards were paired (high and low risk) using professional judgement by the team to assess overall risk of death and serious adverse outcomes. Each of the matched and randomised paired wards was then randomised to introduce outreach after a four week training programme. The sequence of the intervention was randomised over a 32-week period. Priestley and colleagues' study (2004) from the UK demonstrated a reduction in

hospital mortality rates, while the Australia based MERIT study showed no effect (Hillman *et al.* 2005).

The implications of the MERIT study remain the subject of much debate, as it has been suggested that design limitations may have resulted in the negative findings (Hillman *et al.* 2005). The study was underpowered for detection of a significant difference in the incidence of primary outcomes, and inter-hospital variability was higher than anticipated. There was a risk of contamination between intervention and control hospitals due to media attention that highlighted the benefits of MET. The MERIT investigators suggested that the cardiac arrest team also acted as a MET in control hospitals as 48% of cardiac calls in the control hospitals were not associated with cardiac arrest or unexpected death. Limitations of Priestley *et al.*'s study (2004) included possible contamination of the study wards and limited generalisability. In both studies the implementation and follow-up periods were relatively short, potentially influencing the findings.

Differences in setting, research design, intervention and outcomes between the two trials limited comparison across studies. The settings varied from a single non-teaching acute 800 bed hospital in England (Priestley *et al.* 2004) to a variety of urban and rural hospitals in Australia which differed in size and organisational characteristics (Hillman *et al.* 2005). The research design by Priestley included training in care of the acutely ill in the educational package; this was not part of the educational process in Hillman's study. The implementation period for MET was four months in comparison with four weeks for the wards introducing a critical care outreach service. In the UK study, the nurse led team additionally visited all new admissions within 24hrs and therefore had a higher ward profile than the physician led MET in the MERIT trial who were only alerted via the calling criteria. The UK study used a multiple parameter scoring system whereas the MERIT study relied on a single parameter system for their calling criteria. The primary outcome of the MERIT study was a composite score based on the incidence of cardiac arrests without a pre-existing not-for-resuscitation order (NFR), unplanned ICU admissions and unexpected deaths (without a pre-existing NFR order). The Priestley study measured hospital mortality and length of stay.

McGaughey's review (2007) highlighted the different models in use. The authors concluded there was no evidence to suggest that there are any differences in outcomes

between a nurse-led or doctor-led outreach team. However, factors such as the outreach nurse visiting every patient admitted within 24 hours in the UK model increased their ward presence, which may have fostered relationships between team members and ward nurses. Additional staff training in care of the acutely ill patient may also have influenced staff's implementation of the calling criteria and outreach service. Hillman's study showed a high number of early warning charts not completed therefore hindering alerting and response process. A low rate of MET calls preceding unplanned ICU admissions and unexpected deaths was evident in patients who had documented calling criteria, suggesting that nurses were reluctant to ask for help.

McGaughey and colleagues concluded that:

'The limitations and findings of both these studies highlight that, to date, there is no evidence to suggest that the introduction of outreach contributes to improved patient outcomes. Equally, there is no evidence to suggest that outreach is associated with adverse health care events. We were unable to determine the economic implications of implementing outreach from either study. The cost may vary substantially, depending on the staffing, resources and content of the intervention implemented' (McGaughey et al. 2007, p.2).

In a review published that same year (Winters et al. 2007), six observational trials of rapid response systems that provided empirical data on hospital mortality and cardiac arrest in control and intervention groups were included alongside the two trials reviewed by McGaughey (2007). Winters et al (2007) found weak evidence that RRTs were associated with a reduction in hospital mortality and cardiac arrest rates. However, they also noted that quality of the original studies, the wide confidence intervals, and the presence of heterogeneity limited their ability to conclude that RRT are effective interventions.

In a subsequent review published in 2010, Chan et al noted that although meta-analyses of RRTs had been previously performed, these had not examined the cumulative temporal trend on outcomes with inclusion of each additional study, and had not looked at the extent to which mortality benefits may be attributable to the interventions of the RRT. Their review and meta-analysis of randomised clinical trials and prospective studies of RRTs included research undertaken between 1950 and 2008 and focused on the impact on

mortality (primary outcome) and cardiopulmonary arrest (secondary outcome). To qualify for the review studies had to (1) be either randomised clinical trials or prospective active intervention studies of RRTs among hospital inpatients, (2) include comparisons with a control group or a control period, and (3) provide sufficient quantitative data on either the primary outcome of hospital wide mortality or the secondary outcome of rates of non-ICU-treated cardiopulmonary arrest. Eighteen studies (13 adult and 5 paediatric) from 17 publications (with one treated as two separate studies) were included (Chan *et al.* 2010).

Chan *et al.* (2010) found that collectively, implementation of an RRT in adults was associated with a 33.8% reduction in rates of non-ICU-treated cardiopulmonary arrest. However, these reductions were not associated with lower overall hospital mortality. They suggest this discordance may in part be due to establishment of 'not for resuscitation' (NFR) status of severely ill patients by the RRT, which removes these patients from consideration for the outcome of cardiopulmonary arrest without affecting overall mortality rates. In addition, as many of these patients are transferred to ICU, the measurement of non-ICU arrest is likely to introduce reporting bias and overestimate the effect of the RRT on cardiopulmonary arrest (Chan *et al.* 2008).

Chan and colleagues (2010) also concluded that the mortality benefit associated with the RRT in those studies that reported lower hospital mortality rates after RRT implementation was overestimated. They suggest that the excess deaths prevented may have reflected overall improvement in hospital care quality from RRT training and education, unmeasured secular trends, other quality improvement initiatives during the intervention period, or residual confounding (e.g. inadequate control for case mix and pre-intervention time trends). In an earlier study, Chan *et al.* (2008) advocate that a sample size of 150,000 patients before and after implementation of a RRT is needed to have 80% power to detect a 5% reduction in hospital mortality rates. A larger study than the nearly 1 million patients included in Chan and colleagues' (2010) study might have found a significant mortality reduction.

Numerous non-randomised studies conducted in Australia (Foraida *et al.* 2003, Bellomo *et al.* 2004, Buist *et al.* 2002, Buist *et al.* 2007, Jones *et al.* 2005), the US and Canada (Sharek *et al.* 2007, Sebat *et al.* 2007) and the UK (Ball *et al.* 2003) provide weak evidence of RRT effectiveness. Some single centre studies have also shown evidence of improved patient

survival to discharge from hospital and reduced readmissions to critical care (Ball *et al.* 2003). While it is acknowledged these studies are subject to incorrect inferences about cause and effect or improved care with time, and it is not possible to eliminate the influence of potential confounding variables such as changes in staffing (Schmid *et al.* 2007), a number of clinical and safety experts judge that on balance, these teams are effective (Winters & Pham 2011, DeVita *et al.* 2006).

Adoption and diffusion of the rapid response team

Despite the lack of robust evidence supporting its effectiveness, the RRT has continued to be promoted. Its spread has been encouraged by Joint Commission International (JCI)² in the form of National Patient Safety Goal 16 and 16A (JCI 2008), and its inclusion in the US-based Institute for Healthcare Improvement's (IHI) 100,000 lives campaign (IHI 2006, IHI 2007) and the UK-based NHS Institute for Innovation and Improvement's (NHSII) programme of work (NHSII 2009). RRTs and TTSs have been implemented as an intervention for the UK Safer Patients Initiative (The Health Foundation 2009), the Patient Safety First Campaign (The Patient Safety First Campaign 2009), the Scottish Patient Safety Programme (The Scottish Patient Safety Programme 2009) and Wales 1000 Lives Campaign (The 1000 Lives Campaign 2009). Over 70% of acute UK NHS hospitals now report using a RRT (Rowan 2007).

Other factors influencing evaluation of the rapid response team

Several factors appear significant in accounting for policy support despite RRT's failure to demonstrate mortality benefit. These include perceptions regarding the nature of the intervention itself, interactions between context and programme, and between RRTs and outcome data. A number of clinicians and safety experts claim that empirical methods may not be best suited for safety system evaluation, and that the benefits of RRTs are self evident (DeVita & Bellomo 2007, Berwick 2008). The premise of the RRT is felt to be sufficiently intuitive to justify discounting evidence to the contrary (Edelson 2010). However, there remains to date no formal evaluation of the cost-effectiveness of RRTs. Concerns have been raised regarding the cost involved in their development and maintenance in the absence of observable survival gains (Chan *et al.* 2010). There is also

² Joint Commission International works with health care organisations, ministries of health, and global organisations to improve the safety of patient care, through the provision of accreditation and certification services as well as through advisory and educational services aimed at helping organisations implement practical and sustainable solutions

the potential for unintended consequences. RRTs may shift the burden of mortality from the ward to the ICU, replacing a 'cheap' death with an 'expensive one' (Bright *et al.* 2004 p.38) and diverting resources that could be used elsewhere within the system. Moldenhauer *et al.* (2009) note the potential for patient outcome benefits when resources are channelled into developing ward team relations enabling continuity of care rather than a separate RRT model, with its associated additional handovers. Other unintended consequences have been noted such as a decreased sense of responsibility for patients on the part of the hospital ward team, together with deskilling of ward staff (Jones *et al.* 2011a, Rowan 2007) although there is survey evidence from Canada and Australia to suggest otherwise (Jones *et al.* 2006, Bagshaw *et al.* 2010).

Difficulties associated with interpretation of results due to heterogeneity of RRT models, and organisational characteristics have been noted; factors such as availability of ICU beds (Wunsch *et al.* 2008) and thresholds for admission vary (Wunsch *et al.* 2011), and staffing and roles of response teams are likely to influence the impact of the RRT. Systems widely accepted as successful are those which consistently deliver a high 'response dose' (>25 calls per 1000 admissions) (Buist *et al.* 2007, Foraida *et al.* 2003, Jones *et al.* 2005). The full impact of a safety system such as RRT may take some years to achieve cultural change (Santamaria *et al.* 2010, Calzavacca *et al.* 2010, Buist *et al.* 2007, Jones *et al.* 2007b). Jones *et al.* (2007b) found that over a four year period, surgical patients had reductions in hospital mortality although this did not occur with medical patients. Effectiveness of MET is likely to be related to ongoing education and training of staff (Campello *et al.* 2009). The success of an RRT may be a function of staff education as much as the addition of a 'special team' (Moldenhauer *et al.* 2009).

Weaknesses in the chain of events that lead to successful implementation of RRT have been offered as reasons why studies have failed to show a mortality benefit (Edelson 2010). Vita and Bellomo (2007) note that the success of the RRT is related to a systematic change in the way hospitals deliver care, rather than down to the team *per se*. The predictive abilities of TTSs, noted earlier, have been found to be only moderate (Smith *et al.* 2008). Vital sign collection can be as infrequent as 12 hourly, leading to missed opportunities for calling the RRT (Smith *et al.* 2006). In addition, risk to patient safety can be increased by inappropriate placement of patients on wards. Some have questioned the rationale for measuring the success of RRTs by counting the number of saved lives that

were put at risk by triage errors, and driven by ineffective management of patient flow. Litvak and Pronovost (2010) argue that using the number of saved lives as the appropriate metric for RRT effectiveness, is like 'rewarding a pilot for ultimately landing safely after he or she had made a dangerous decision to take off during inclement weather'. Some secondary outcomes are hard to interpret e.g. whether increase in rate of NFR orders associated with MET reflects better practice, given that unmeasured factors beyond the MET system also appear to influence the issuing of NFR orders (Chen *et al.* 2008, Calzavacca *et al.* 2010).

The rapid response system

In June 2005 a consensus conference took place involving experts in patient safety, hospital medicine, critical care medicine and METs to agree the basic requirements for such a system (DeVita *et al.* 2006). The team advocated implementation of a structured, systems approach to the management of acutely ill patients. They recommended a shift from focusing on RRTs, to a rapid response system (RRS) with its integral four components. The four components comprise 1) detection and crisis triggering strategies, 2) a response team (available 24/7) together with 3) evaluative process improvement and 4) governance / administrative structures (DeVita *et al.* 2006, Smith 2010). Unfortunately, opportunities to study the effectiveness of RRSs will be limited by widespread implementation of RRTs and TTSs in the US, Australia and the UK, making future randomisation difficult. The heterogeneity of different systems currently in use also makes it hard to endorse a preferred model for responding to patients in crisis (Winters & Pham 2011). DeVita *et al.* (2006) recommend that each health care organisation needs to weigh the 'proportionality of burden of proof' before implementing system level changes, taking into account the resources available, their perceived needs, the perceived benefit, and the strength of the evidence.

Evidence of effectiveness on process of care

In addition to focusing on outcome measures, the Cochrane review highlighted the importance of qualitative studies with regard to addressing subjective end points (medical and nursing ward staff and management opinions) and factors (e.g. communication, professional boundaries) which hinder or support the introduction of complex health care interventions in practice (McGaughey *et al.* 2007). A number of qualitative studies have demonstrated the benefits of RRTs, notably structuring relations between the ward and

critical care staff, mediating decision making at the interface between the two and promoting uniformity and standardising the clinical response to the acutely ill patient (Carmel & Baker-McClearn 2011, Leach *et al.* 2010, Endacott *et al.* 2009).

Three studies in particular provide robust data regarding the impact of RRTs on care processes. The first is a mixed methods evaluation of critical care outreach services in the UK which comprised five sub-studies: one of which was a qualitative evaluation to characterise the impact of the introduction, development and current use of models of CCOT within acute NHS Trusts in England (Rowan 2007). Interviews were conducted with 122 staff (including managers, nurses, doctors, health care assistants and allied health professionals) and some observations were undertaken, the purpose of which was to identify stakeholders, and contextualise and corroborate interview data. The researchers frequently witnessed examples of acutely unwell patients on the ward serendipitously identified by the outreach nurse. Participants reported improved relations between ward and critical care, outreach was perceived as valuable educational support for ward staff. The authors suggest that the aspiration of 'critical care without walls' has a valid organisational and social meaning about which there is considerable evidence of achievement.

'The development of [outreach] appears to have contributed to a rapprochement between wards and critical care units. This has worked in both directions - from the perspective of the wards, the critical care unit is no longer a mysterious black box, whereas from the perspective of the critical care unit, there is enhanced understanding of the pressures on ward staff' (Rowan 2007, p.7).

Part of the impact of the outreach services was deemed to be a change in culture by 'facilitating connectivity, reducing communication difficulties, and enhancing the delivery of care across organisational, professional, and specialty boundaries' (Rowan & Harrison 2007, p.1166). The importance of facilitating factors such as education, leadership and regular audits was noted (Rowan 2007) and these have been recognised by a number of others (Jones *et al.* 2011a, Buist *et al.* 2007, DeVita *et al.* 2006).

In the second study, Chellel *et al.* (2006) investigated 20 cases in which CCOTs were involved in the care of ward patients across two acute Trusts (five general hospitals). All staff

involved in the cases were purposively sampled. In total, 80 interviews were carried out, 20 with the outreach nurses and 54 with other members of health care teams involved in the cases, and six further targeted in-depth interviews with senior anaesthetic and nursing staff. The outreach activities identified included: action (getting things done, getting decisions made and following through), focus and vision (concentrating on one patient and having a vision of what action was needed to meet their care needs), orchestration (a communication and co-ordinating role) and expertise (bringing critical care skills and experience to the bedside). The interview data also revealed a changing ward environment where an overwhelmed workforce defensively resisted taking responsibility for the extra clinical demand of critically ill patients. Passing the buck and handing the problem on to someone else created 'holes' for any patient whose clinical progress was obstructed by the complication of critical illness. They concluded that:

'the need for outreach is grounded in complex issues of deficiencies in the processes of ward care rather than in measurable outcomes of care delivery' (Chellel et al. 2006, p.50).

In the third study, interviews across eight study sites were conducted with staff from the outreach service and ward staff who had come into contact with these teams (these staff were identified through periods of non-participant observation) (Carmel & Baker-McClearn 2011). In total, 115 interviews were carried out with 122 staff (including doctors, nurses, managers, health care assistants and allied health professionals). They identified changes to the division of labour were limited in scope: senior medical staff in particular tended to regard the CCOT as acting only under the formally delegated authority of critical care doctors. The outreach service facilitated the breaking down of barriers between professions on some occasions; but the existing boundaries, divisions of labour and hierarchies remained intact and were even reinforced:

'The inter-occupational boundary which appeared to be most affected was that between [outreach] nurses and junior doctors; many aspects of the [outreach] nurses' role could be seen as transferred from the responsibility of junior doctors. While such a transfer of responsibility was not universally welcomed, it seems to us that in the case of [outreach], junior doctors are potential beneficiaries of [outreach] expertise' (Carmel & Baker-McClearn 2011, p.12).

These studies provide useful insights into the contribution of the CCOT to rescue practice on the frontline. They also identify its contradictory effects.

2.4.5 Summary: evidence base regarding safety strategies

There is limited robust evidence to suggest that the introduction of these safety strategies has contributed to improved patient outcomes. New technologies such as SBAR and the IAT lack conceptual clarity regarding their influence on existing rescue practice. Continuing policy support for safety strategies appears to reflect their theoretical appeal as a clinical resource. 'There is publication bias and a strong bias in the grey literature and conference reports in favour of (quality improvement) success stories' (Øvretveit 2009b, p.9). Given the widespread implementation and utilisation of heterogeneous models of RRTs and TTSs in the US, Australia and the UK, there is little opportunity for prospective randomised controlled trials to measure their effectiveness. Further research needs to explore underpinning social processes of RRSs and their intended and unintended consequences, and evaluate how structural and social context influences implementation of the strategies.

2.5 Mapping the strategies to a rescue pathway

Mapping the safety strategies to a rescue pathway illuminates where they are designed to act. Figure 2.1 shows how policy attention has focused primarily on shaping practices of taking observations, identification of a problem and asking for help. Safety strategies such as SBAR, TTSs, and the IAT are designed to work at the start of a rescue trajectory, largely targeting the work of HCAs, nurses and junior doctors. RRTs also tend to focus on the nurse – doctor interface; less attention is paid to intra-professional communication and decision making *within* medical teams. Figure 2.1 highlights the gaps in the trajectory i.e. those aspects of rescue practice that are largely left unaffected by the adoption of the safety strategies.

The rescue pathway detailed in Figure 2.1 also needs to be located within the context of rescue discussed earlier. A number of strategies, notably the TTS, IAT, and communication tools focus on the individual and the immediate work environment rather than the wider organisation. The predominant focus thus remains at the micro level of the individual or group performance, albeit in a systemic context. Other root causes such as increased

patient acuity and system processes such as deficiencies in acute care provision, bed capacity and staffing have not received an equivalent level of policy attention. While there is evidence that the RRT provides organisational support for an overstretched workforce of ward nurses and junior doctors, it may 'plaster over' existing problems (Chellel *et al.* 2006) and may create additional problems (e.g. discontinuities in care). The majority of research into the safety strategies is evaluative and has also focused at micro-level; what has not been sufficiently explored is how these strategies interact with and shape existing rescue practices within the socio-cultural and structural context of acute care. Evidence of missed opportunities for rescue continues to emerge despite the considerable economic investment associated with implementation of these safety strategies (McGaughey *et al.* 2010). Further research could usefully explore the social processes and mechanisms that underpin the use of these strategies in practice, their implementation, and the interface between micro- and macro-level work.

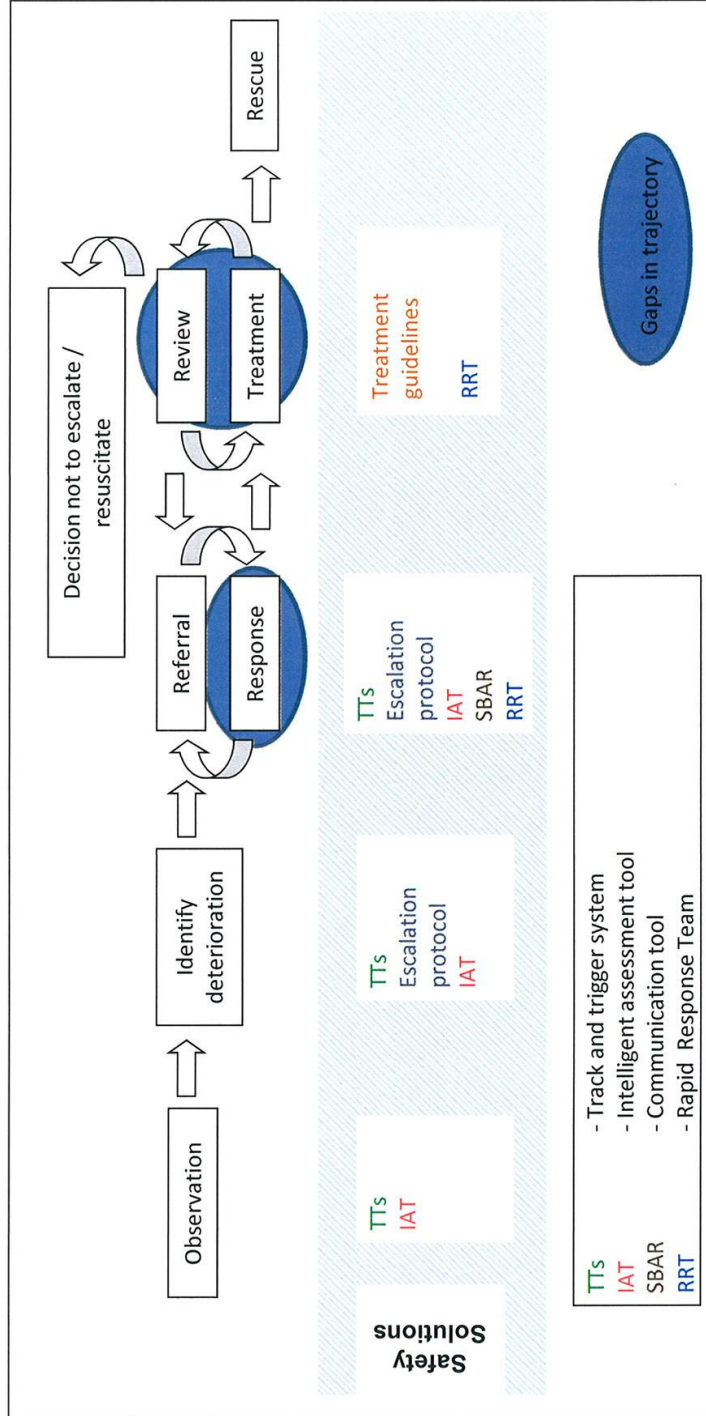


Figure 2.1 Mapping the strategies to a rescue pathway
 This figure highlights the gaps in the trajectory where rescue practice is left largely unaddressed by safety strategies

2.6 Conclusion

Rescue provides an opportunity to improve the safety of patients who are acutely unwell. For most of these patients, a trajectory of deterioration offers a window for intervention, with associated health and economic gains for patients and health care (e.g. reducing morbidity, cardiac arrest, ICU admission and mortality rates). The context of rescue is complex, encompassing interlinking structural, social and cultural factors. There is a need for research to move beyond exploration of why opportunities for rescue are missed and, instead, to offer insights about when and how rescue works effectively. Greater understanding is required about the trajectory of patients whose clinical course was positively influenced through the use of staff, technologies and structures and who, as a result, were not admitted to critical care and did not suffer cardiac arrest or death.

The evidence base for the effectiveness of safety strategies introduced to aid rescue practice is weak and the heterogeneity of models makes it hard to interpret results or make recommendations for practice. Despite the introduction of RRS, evidence of failure to rescue continues to emerge. Mapping the strategies onto a rescue pathway has illustrated that certain areas of the pathway have received more policy attention than others. Interventions tend to focus on frontline practice rather than latent organisational conditions e.g. staffing. A number of qualitative studies suggest the benefits of these strategies, yet this largely depends on reported data. This provides an opportunity for further work to explore the operation of these strategies in action and their influence on rescue practice, but also how this links with the structural and social context of acute care.

Social sciences have informed the science and practice of patient safety (Øvretveit 2009a). Drawing on a social science literature provides an opportunity to further understanding of rescue. Sociologically informed ethnographies of health care work and medical wards have illuminated important contextual influences. Studies exploring the enactment of safety work on the frontline offer insight for rescue practice. Critical insight from studies of standardisation and utilisation of tools in practice also offer a means to open up the black box of these safety strategies. The next chapter draws on a social science literature to explore further the complexities, links and contradictions within the field of rescue practice, and considers how concepts from the social sciences might help reframe the nature of the problem and identify potential solutions.

Chapter Three: The Sociology of Rescue Work

3.1 Introduction

In chapter two, a review of the policy and clinical practice literature identified the complexity of the structural and social context of rescue. Opportunities for rescue are often missed, yet the reasons for this are complex and only partially understood. There is little evidence to suggest that safety strategies introduced to help address the problem have improved patient outcomes. The aim of this chapter is to extend inquiry beyond that literature to provide additional insights into the nature of the problem. The value of social science in patient safety has been recognised (Øvretveit 2009a, Vincent 2009, Dixon-Woods *et al.* 2011). Social science can usefully reframe problems and ‘complexify the taken-for-granted conceptualisations of the object of study’ (Zuiderent-Jerak *et al.* 2009, p.1713). It can also illuminate the everyday ‘work’ of patient safety and act as a resource to help with implementation problems (Øvretveit 2009a).

The rescue pathway from chapter two, which both conceptualises policy and clinical interpretations of the problem and depicts where safety solutions are designed to act, is expanded in this chapter to include sociological contributions to this field of study. Four topic areas inform the discussion: the social system of health care work; managing boundaries; the cultural context of acute care; and sociological insights into the RRS. These topics are mapped to the rescue trajectory to highlight areas such as interactions between staff, technologies and structures where this literature can usefully add to insights. After this visual overview, the chapter considers each of the four topic areas in turn. The chapter concludes by identifying the research questions which emerge from this reframing, and the implications of this sociological literature for the design of this doctoral study.

3.2 Mapping a sociological framework to the rescue pathway

In chapter two, micro- and meso- level influences were found to be significant for rescue practice. Distinctions have been drawn between ‘active errors’ associated with human behaviour, and ‘latent’ or contributory contextual features that make possible these mistakes. Yet, there is little existing data which illuminates how rescue is accomplished. Exploring micro-level work and focusing on the active construct of safety (rather than error) is likely to draw out the resilience and skills of frontline staff and open up the space around their agency in managing tasks and technologies within the socio-cultural and political

arena of hospital based acute care. Social science offers a useful resource for this, including a number of ethnographies of health care work, which may shed light on the enactment of rescue on the frontline. There is also a substantial social science literature which has focused on the inherent uncertainty of medical practice. This presents an opportunity to consider how professional cultures influence the handling of risk and uncertainty, and its relevance for diagnosis of clinical deterioration and decisions regarding intervention.

Other sociological concepts explored within this chapter include the social system of health care work and its distributive nature. Rescue involves a division of labour and the negotiation of jurisdictional boundaries between professions. Sociological theories regarding allocation of responsibility within and between particular occupations, the moral order of health care work and 'boundary work' (political management of symbolic and social boundaries) may add to understanding of the micro- and meso-level organisation of rescue work. Consideration of patients' complex care trajectories may offer further insight into management of the trajectory of rescue.

The last area worth considering is the sociological literature evaluating implementation of quality improvement programmes. Greater insight is needed into how rescue practices and safety tools relate to wider organisational structures, processes and tasks which can both work to promote safety but also introduce adverse effects. There is a large body of work from medical sociology, and science and technology studies that can usefully reframe problems with rescue and implementation of safety solutions in the light of power, cultural norms and social structures. This literature offers opportunities to expand discourse beyond assessment of whether RRSs work, to why and how they work, constructs of 'effectiveness' in practice, and how tools, health care work and the socio-political context are interlinked and co-constructed.

3.3 The social system of health care work

The purpose of this section is to explore further the rich and contextual nature of health care work. Strauss et al.'s (1985) notion of the 'patient trajectory' offers a useful theoretical resource for the study of rescue as it encompasses not only the unfolding pathology of the patient condition but also the organisational work undertaken to accomplish that trajectory, and its consequences for the relationships between those involved in influencing the patient trajectory. Everett Hughes' work (1951, 1981) is also potentially significant as he links the distribution of tasks and processes with the division of labour, and conceptualises the moral value of different type of medical work. Ethnographies of rescue as health care work can highlight both the complexities of the routine and mundane, and the routinisation of that which is complex.

3.3.1 Managing complex trajectories

The organisational context of rescue work is likely to be integral to how it is enacted in practice. While the clinical literature draws attention to the contribution of system factors such as workload and the changing profile of patients on the wards, less is known about how these factors shape everyday practices, and how practitioners negotiate individual patient and organisational trajectories to accomplish safety. The distributive nature of rescue work has been acknowledged, but further attention needs to be paid to the role of organisational trajectories in health care work.

Medical sociology has paid considerable attention to organisations in health care. As Currie et al (2012) note in their review of the disciplinary foundation of studies of the social organisation of health care, the 'Second Chicago School' of the 1950s and 1960s developed a wide range of studies examining workplaces, mostly inspired by the thinking of Everett Hughes (1951). Anselm Strauss's study of *The Social Organisation of Medical Work* (1997, 1985) provides a useful example. After extensive study of death and dying, and chronic illness, Strauss became interested in the role of technology in chronic illness. Strauss and colleagues undertook an ethnographic study of medical work. Their analysis is based on four years of observations and interviews (with doctors, nurses, technicians and administrators), carried out between 1977 and 1981, across seven US hospitals. They developed a theoretical structure focusing on a number of themes including several with relevance for rescue practice, such as trajectory work, conceptualising how health care work is carried out over time and space. Given that they focused on medical work that was

embedded within 'technologised' hospitals, as Timmermans and Berg (2003) have observed, there is surprisingly little consideration of the technologies themselves within their analyses. There is, however, a clear focus on organisational context. Throughout their work they argue:

'We have taken pains to spell out linkages between the more detailed (microscopic) aspects of work and the larger structural (macroscopic) conditions' (Strauss *et al.* 1997, p.xv).

Strauss *et al* note the centrality of patients' bodies within medical work and locate 'body work' within the context of trajectory work (1997). For them, the patient trajectory includes not only the unfolding pathology of the patient condition, but additionally the organisational work performed to accomplish that trajectory, and its consequences for the relationships between those involved. Linkages between trajectory work, teamwork and intra- and extra-organisational contexts are important; teamwork is carried out within a 'thick context of organisational possibilities, constraints, and contingencies' (Strauss *et al.* 1997, p.266).

Strauss *et al* argue that an organisation can be conceived as a temporal matrix embodying multiple lines of work, each of which has a biography (encapsulating past, present and future). The extent to which types of clinical safety work can be articulated depends on the degree to which various dangers and risks associated with the trajectory phases can be mapped out. 'This determines the extent to which the required total arc of work, including the bundles of implicated tasks, can be coordinated' (Strauss *et al.* 1997, p.182). If an illness is well understood, standard operating procedures can control it. However, highly problematic trajectories involve uncertainties. 'These uncertainties greatly increase the probability and even cumulative impact of certain kinds of mistakes stemming from the tasks themselves, from possible consequences of doing the tasks and even from the organisation of error work itself, which can lead to unanticipated new mistakes' (Strauss *et al.* 1997, p.243).

The value of Strauss *et al*'s work for rescue practice is its focus on coordination of components of the trajectories which crosscut with one another. Tasks and lines of work within trajectories are distributed and need managing. 'Articulation work' is necessary 'to

assure that the staff's collective efforts add up to 'more than discrete and conflicting bits of accomplished work' (Strauss *et al.* 1997, p.151). This theoretical focus offers an opportunity to illuminate low profile safety work which is nevertheless essential for the achievement of potentially competing and conflicting individual and organisational goals.

The importance of coordination work has been recognised within gender studies that highlight women's supporting role within the organisation of health care; lower level staff and HCAs move patients through the system, providing vital adjunct work to supplement the expert work of senior staff and professionals (Davies 1995). Science and technology studies also recognise the importance of articulation work to manage distributed work by patching up unanticipated contingencies in the patient trajectory (Gerson & Star 1986). Practitioners routinely detect and bridge gaps in safety work that lie under the radar (Cook *et al.* 2000).

A number of ethnographic studies of health care work have noted the importance of nurses' coordination work, buffering patients from organisational contingencies (Allen 1997), progressing patient pathways and 'plugging gaps' in care (Nugus 2007). Junior doctors also perform important work that is low profile, yet important for progressing treatment trajectories. This includes conducting tests or other investigations and is often central to determining whether a patient should be admitted or discharged, and persuading other specialist doctors to become engaged in the care of patients (Nugus 2007). Sinclair (1997) found that while wards rounds provided insight into the official front stage work of junior doctors, important official backstage work constituted clerking patients, co-ordinating the hospital and often working on their own.

'Housemen's work of co-ordinating the disparate work of the many different departments of the hospital, most of which are bound by various restrictive practices, means that housemen have to compromise themselves and resolve conflicts between the different instructions that may be given by different functioning units in the hospital' (Sinclair 1997, p.289).

Strauss *et al.*'s (1985) trajectory concept has been usefully applied to UK based studies of health care work. Their focus on chronic care does not restrict its theoretical relevance, given that a large number of patients in hospital who are acutely ill are suffering from an

acute phase of a chronic disease. Bowker and Star (1999) have drawn on this trajectory concept to highlight the importance of infrastructure, in the form of medical classification systems and bureaucracy, which interlink with patient trajectories. They note that the representation of time is a source of tension within most classification systems; when linear models are used then intersections between the categories and the influence of temporal-spatial relations become unclear. Mesman (2008) uses Strauss et al's trajectory in her depiction of neonatology practice and highlights how technologies discipline the treatment trajectory. She notes that tools and technologies become part of a necessary array of activities and interactions for the trajectory.

Strauss et al's trajectory model has been criticised by Allen et al (2004) for not providing any basis for analysing the character of the relationship between trajectories of care and the organisational context. They note that 'trajectories of care cannot be adequately conceptualised simply by reference to their constituent elements' (Allen *et al.* 2004, p. 1012). They argue that further work is needed to understand relationships between them.

However, Strauss et al's work is still being usefully applied within studies of health care work. Nugus (2007) draws on Strauss et al's framework in his ethnographic study of the organisational world of the emergency department. He demonstrates the benefits of expanding focus beyond patient treatment trajectories to also explore the impact of the formal bureaucratic structure of the hospital, in this case the significance of boundaries between departments for care trajectories. His research draws on approximately 535 hours of ethnographic observation of emergency department work and 56 interviews with doctors and nurses within a 10-month period across two sites. He found that the emergency department clinical-organisational work reflected the need to manage time and motion, and to balance the unique circumstances of the individual patient, with the demands of organisational efficiency.

'The enactment of structure and agency is complex, dynamic and simultaneous. Emergency clinicians creatively negotiate the bureaucratic structure of the hospital to fulfil the broader role of the ED within the hospital, to organise patient care by acting and responding to the time and motion-bound trajectory of the patient' (Nugus 2007, p.298).

There have been calls within sociology to make links between micro- and meso-levels of study, in order to get a deeper understanding health care organisation and delivery of services (Davies 2003a, Griffiths 2003). An analysis of rescue could benefit from an analysis of the coordination of patient trajectories of clinical deterioration with other types of medical work, structural conditions and the temporal-spatial influences. The predominant focus of clinical and policy literature on rescue at present remains at the micro level of the individual or group performance, albeit in a systemic context. There is space for research to further explore the interface between micro and meso processes such as deficiencies in acute care provision, bed capacity and staffing.

3.3.2 Distribution of tasks and processes within the division of labour

A key theme within the sociology of work is the increasing complexity of the division of labour. Everett Hughes' sociology of work (Hughes 1951, Hughes 1981) offers an important conceptual resource for situating rescue practices as he considers the social drama of work at the micro-level. For Hughes, the division of labour signified interaction and inter-relationships within a social system rather than divisions. As Wellin and Fine (2001) note, the core insight of a Hughesian approach is that occupational ideals, routines and aspirations are shaped by institutional arrangements, disparities of power and cultural legacies.

'No line of work can be fully understood outside the social matrix in which it occurs or the social system of which it is a part' (Hughes 1981, p.75).

Hughes (1981) argues that all work can be divided up into routine or emergency. Routines or frequently encountered situations can generate feelings of mastery when attended to successfully. Emergencies occur when administration of the routine does not generate the expected success; however, if attended to with assurance, mastery can be re-established. Emergencies which spiral out of control generate a sense that a mistake or error was made, creating a threat to the integrity of the work group. Understanding the tension between routine and emergency work is useful for advancing understandings of different types of rescue work associated with managing acutely ill patients.

Hughes (1981) also draws attention to the concepts of 'license' and 'mandate' which enable the medical profession to locate itself within the moral division of labour. License

provides the doctor with the authority to carry out particular activities whilst a mandate enables medical staff to define what is considered 'proper conduct of others toward matters concerned with their work' (Hughes 1981, p.78). Moral and social functions are differentiated; boundaries are set with regard to the norms of social behaviour and the limits of responsibility and power. Hughes considers that within health care, the doctor stands at the top of the hierarchy, embarking on the risky behaviours of decision and action, yet given moral protection in taking these risks. Lower level professionals such as nurses provide a set of organisational checks and balances and act as a 'built in shock absorber' against the possible mistakes of medical staff.

Attention is focused on the importance of the technical division of labour and its systemic effects. Hughes' work draws out the role of social systems in delegating, spreading and in some cases, concentrating the risk and guilt of mistakes. He notes how hospital work practices such as supervision, consultation and case conferences are organised so as to control and limit the occurrence of mistakes. All of these devices make it harder to see individual mistakes (or system errors) and to filter out recognition of individual responsibility, or accountability, for them. Thus a course of action is shared within a community of fellow workers who second decisions all along the way. For Hughes, an elaborate division of labour keeps errors and mistakes from visibility.

Despite the fragmentation of Hughes' writings, as Allen and Pilnick (2005) note, his analysis successfully draws attention to systems of work at the micro-level. Hughes' theoretical concepts suggest it might be useful to explore the nature of rescue work within the management of acutely ill patients. This would need to consider the complex division of labour within this social system, and how tasks are distributed. Hughes sociology of work provides insight into normative and moral interpretations of rescue. Analysis of boundaries regarding risk and responsibility, license, and power across the social system could usefully contribute to this body of work.

3.3.3 The role and significance of mundane health care work

Becker's (1961) concept of 'scut work' provides an additional useful framework to explore the significance of different tasks undertaken within the drama of rescue work. Scut work comprises the mundane, low status tasks undertaken by medical students as part of their socialisation (Becker *et al.* 1961). It has been additionally explored by Emerson and Pollner

(1976) and Strauss (1997) and appears still relevant for organisational studies of nursing and medical practice. The concept of scut work offers potential for further understanding the significance of categorisation of certain tasks as mundane for the trajectory of rescue, especially given the temporal and constructed nature of this categorisation.

'[Work is defined] not only by the person doing it, but by definition of multiple audiences [...] some of these audiences may be likely to convert some kinds of scut work into (discrediting) work, while at the same time other audiences might be trying to convert aspects of the same [...] work into positive virtues, deserving of honor' (Strauss et al. 1985, p.251 quoting Gerson, 1981).

This conceptual focus on low status work aligns with other social science research documenting the increasing number of aspects of 'hands on' work in health and social care which are now performed by cheaper labour (Cohen 2011). Isaksen (2002) notes the stigma attached to close physical proximity work with bodies. Allen (1996) conducted an ethnographic study of nursing work to explore the ways in which nurses in a general hospital accomplished occupational jurisdiction. She focused her fieldwork on a medical and surgical ward within the same hospital. She spent 12 weeks on each ward and interviewed 57 staff (including nurses, doctors, managers and health care assistants). Her attention was drawn to key nursing boundaries such as nurse-support worker and nurse-nurse. While inter-occupational boundaries were managed with little conflict, Allen found unanticipated policy-related tensions at nurses' intra-occupational boundaries. These included complaints about the way that doing the observations was organised as a task within the division of labour. While nurses generally valued hands on care, they widely resisted doing the observations as a task.

As Hughes (1951) points out, low status work is found in all professions, however, those hospital workers who perform lowly tasks are not recognised among 'the miracle workers'. Within the social system of rescue, categorisation of tasks offers insight into the moral value attached to certain activities, and the impact this may have on completion of these tasks given competing workplace priorities and codes of practice. There is space to explore further the symbolism associated with mundane work within the rescue trajectory, and to investigate in particular the role of observation work performed by nurses and HCAs, and taking blood and clerking by junior doctors.

3.3.4 Summary: the social system of health care work

Drawing on Strauss et al's (1985) concept of the patient trajectory allows a focus on relationships between the general ward and organisational work. It opens up hidden but potentially important aspects of rescue such as coordination work and minding gaps in care. It also directs attention away from individual behaviours to macro- and meso-influences such as the European Working Time Directive, workload, capacity and staffing, and their role in shaping rescue practices at ward level. Similarly Hughes' and Becker's insights provide a resource for exploring the complex division of labour including what is considered mundane or high status within the rubric of rescue work; these factors may help explain delays in detection and poor response behaviours.

3.4 Managing boundaries in health care settings

Sociological studies have largely moved away from a focus on the work of particular occupations towards studying the interrelationships between different occupational groups, and interactions between individuals from different occupations within particular work arenas. Relations at work in health care settings intersect at the crossroad of gender, profession and hierarchy (Davies 2003b). Existing hierarchical working practices have 'emerged under the influence of organisational, technical, economic and political constraints to 'end up' as relatively stable organisational structures and cultures' (Tjora & Scambler 2009, p.5). However, the hospital's bureaucratic hierarchical structure may not necessarily be a deterministic one. Sociologists such as Nugus (2007) and Svensson (1996) argue that hospital staff can enact agency, change and recreate social relations within these structural constraints. This is considered in the next section which seeks further conceptual clarity regarding successful mediation across occupational, social and symbolic boundaries in rescue, including consideration of the temporal-spatial ordering of health care work, and intra-occupational jurisdictional tensions. This in turn may offer insight into the role of tools and technologies in facilitating escalation of care within a rescue trajectory.

3.4.1 The gendered, occupational and hierarchical nature of health care work

The relative power of any one occupation can only be understood through an exploration of its interactions with other occupations. There are a number of 'countervailing powers'

within health care (Light 1988, Light 1991). Inter-occupational interaction in health care work is characterised by issues of legitimacy, power and conflict. Unequal relationships exist in health care work, the everyday practice of 'doing dominance and doing deference have been part and parcel of how nursing and medicine were historically constructed in relation to one another' (Davies 2003b, p.728).

A consequence of the allocation of certain tasks and processes within the division of labour is the resulting influence of power and status on the distribution of health care work. In Vaughan's (1999) review of the literature on organisational sources of safety and danger, she draws attention to the problem of 'structural secrecy', the compartmentalisation of knowledge and information associated with the division of labour within organisations. Authors such as Porter (1992), Svensson (1996) and Davies (2003b) note how structural barriers based on hierarchy, profession and gender can make relationships difficult.

A problem long recognised within sociological understandings of patient safety that relates particularly to rescue work is that 'lower-level actors are often repositories of critical information', yet 'unable to persuade higher-ups in the organization of either the credibility of their knowledge or relevance of their perspectives' (Silbey 2009, p.361). Nurses' relationships with patients puts them in a relative position of strength in relation to the doctor who may be unaware of any changes in the patient's condition (Svensson 1996). Cohen (2011) points out that labour rationalisation and re-organisation has resulted in the separation of manual 'body labour' tasks from cognitive health care work such as advice giving and providing direction. Senior staff are increasingly reliant on lower level workers' abilities to offer 'cogent verbal and written explanations' of patients' embodied states (Cohen 2011, p.193).

In Whyte's (1949) study of restaurant work he notes a similar tension between the lines of authority within restaurant work and relations associated with the flow of work. The flow of restaurant work usually originates with the customer and is passed to waitresses who then have to initiate the work of higher status 'barmen'. Whyte (1949) argues that relations among individuals along the flow of work run more smoothly when those of higher status are in a position to initiate orders for those of lower status in the organisation and, conversely, that frictions will be observed more often when lower status individuals seek to originate orders for those of higher status. Restaurant work to some extent mirrors health

care work where waitresses, like nurses, have to overcome lines of authority and initiate work of higher status.

Distinctions of power and status may influence doctors' responses to nurses (Hughes 1988, Strauss *et al.* 1963). Nurses are confined within already existing relations of power and knowledge that position them as persons whose concerns need not be taken seriously (Ceci 2004). Underlying gendered ideologies may fashion medical responses to nurses' means of raising the alarm (Porter 1992). Public display of anxiety and concern for the patient may be perceived as 'over reactive' and dismissed accordingly on account of underpinning masculinist ideals which value rationality, objectivity and self control (Davies 1995). Whilst nurses lay claim to jurisdiction over activities they are routinely expected to do, such as taking observations, assessing the patient and reporting back any concerns, their findings are pitted against social norms that determine whose testimony is credible or authoritative, whose testimony is to be distrusted or discounted (Anderson 1995).

Gender is but one factor (albeit an important one) in inter-occupational interaction. The doctor - nurse relationship can be perceived as dominant - subservient, mostly in terms of the division of labour according to gender but also by the fact that doctors have a monopoly over both diagnosis and treatment (Gjerberg & Kjølørød 2001). However, a changing negotiation context, new nursing knowledge and new organisational conditions in the hospital context have strengthened the voice of nursing (Svensson 1996). Hierarchical relations between doctors and nurses have seen important changes in recent years (including increasing numbers of women in medicine) (Gjerberg & Kjølørød 2001). Yet traditional relations still hold sway; those lower down in the hierarchy, regardless of gender are subservient to those higher up (Davies 2003b).

3.4.2 The temporal-spatial ordering of health care work

The temporal-spatial ordering of health care work refers to structural constraints imposed by time and space. A number of sociological studies have identified that one of the greatest tensions between nursing and medicine appears to present in their temporal – spatial occupancy of the modern hospital (Snelgrove & Hughes 2000, Allen 2004b, Nugus 2007, Svensson 1996). Allen (1996) notes the breadth of ethnographic literature suggesting that the relative permanency of nursing staff can augment their influence with doctors (Haas & Shaffir 1987, Mumford 1970, Burling *et al.* 1956, Myers 1979, Hughes 1988, Roth & Douglas

1983). However, nurses also hold a weak negotiating position in their relationship with on-call doctors where 'contacts are superficial and temporary' (Svensson 1996, p.396).

In Allen's (1996) observational study of ward work, she found that the division of labour reflected a temporal-spatial ordering of work. Occupational boundaries of support staff, nurses and doctors were to a certain extent shaped by their location in time and space. She notes the complexity of hospital work rhythms identified by Zerubavel (1979). Allen found that internal divisions and hierarchies associated with occupational groups posed numerous difficulties of co-ordination, illustrating the dangers of an excessive division of labour that were identified earlier by Durkheim (1933). Patient washes, observations and meal times formed a temporal structure and order for the delivery of patient care. Different temporal-spatial ordering between doctors and nurses (particularly with regards to on-call work) created different priorities and perspectives which were a source of strain. The temporal-spatial ordering meant that nurses had little choice but to make diagnostic decisions. However, most doctors and nurses did not perceive that the judgements nurses made about a patient's condition constituted 'making a diagnosis' (Allen 1996, p.361).

3.4.3 Occupational jurisdictions

Sociological work on jurisdictional boundaries has implications for rescue work in its attention to the differences within occupations and the relationships between professionals, according to the specific clinical locales they are practising within. A number of qualitative studies highlight the jurisdictional battles that prevail within medicine; hierarchies privilege some perspectives and groups, and marginalise others (Sanders & Harrison 2008, Pickard 2010, Oborn & Dawson 2010, Martin *et al.* 2009).

'Specialists use counter-accommodative strategies, particularly interpersonal control, emphasising role and status to win conflicts' (Hewett *et al.* 2009, p.1739).

The embedded social boundaries between specialists are linked to disparate values and structures (Lave & Wenger 1991) with sticky knowledge diffusion between these boundaries (Ferlie *et al.* 2005, Currie *et al.* 2009a). Fox (1994) in his study of anaesthetists and surgeons shows how the division of labour and spatial organisation within the operating theatre contributed discursively to differentiate their different responsibilities, interests and objectives. Power imbalances were evident, highlighting the micro-politics of

front-line work with its associated conflict and uncertainty, control and resistance. There was privileging of certain groups over others e.g. surgeons exerted authority over anaesthetists within the operating theatre (Fox 1994).

In Nugus' (2007) ethnographic study of the emergency department he found that the structural power of organ-specific medicine had a significant impact on medical work and patient care. Wards were categorised according to the particular medical specialties that aligned with these organs. The organisational hierarchy of organ-specific departments versus generalist departments prevailed over the hierarchy of positional roles.

'In the absence of negotiation strategies, at points of clinical disagreement or ambiguity over the fit of a patient's condition with a specialty, the position of an inpatient team registrar prevails over that of an emergency staff specialist, even though the staff specialist holds a higher position than the registrar in the hospital-wide positional hierarchy' (Nugus 2007, p.263).

Sinclair (1997) noted in his study of the apprenticeship of doctors the difficulties associated with co-operation within and between medical firms, particularly for junior doctors who are trying to negotiate the hierarchical and vertical segmentation of the profession. Intra-professional hostility is highest when the 'ownership' of patients is ambiguous, such as on-call shifts where one firm covers another's patients. Patients admitted during these on-call shifts frequently need to be transferred from one medical firm to another in a process Sinclair refers to as 'turving'. Turving involves referrals to other firms deemed to be better suited to deal with the patients' clinical conditions or 'hand backs' to teams who have managed the patients in the past. These processes are associated with cultural codes of conduct which the junior doctors quickly have to learn.

3.4.4 Boundary work

A number of sociological studies in health care have drawn attention to the importance of establishing, maintaining and defending differences and jurisdictional boundaries (Abbott 1988, Nancarrow & Borthwick 2005, Fournier 2000). The concept of boundary-work has been used to articulate the social organisation of scientific knowledge (Lamont & Molnár 2002). Gieryn (1983) offers a framework which could equally be applied to boundary work in rescue practice. He interprets the practices of scientists as strategic actions to claim

scientific authority and jurisdiction over a contested field. He identifies how scientists manage the social and symbolic borders of science. While Gieryn focuses on boundaries between science and non-science, others have explored boundary work that takes place between or within different disciplines (Burri 2008, Allen 2004b, Allen 2001). Sociological studies have also moved away from purely conceptualising boundaries as markers of difference, to perceiving boundaries as interfaces facilitating knowledge production (Star & Griesemer 1989). Research on boundary work offers the potential to extend understandings regarding the complex processes involved in calls for help within and across medical boundaries, and jurisdictional boundaries between critical care and the ward.

There is the potential to learn from ethnographic studies such as Whalen and Zimmerman (1990), Jean (2004) and Nugus (2007) which have explored the employment of discursive strategies for mediating access to and from emergency services. Whalen and Zimmerman (1990) note that when members of the public call emergency services, the burden of proof to demonstrate that the call is a 'legitimate emergency' falls to the call maker. Call makers seek to establish their credibility by aligning with the gatekeeping function of the call taker, shaping problems into appropriate cases. Jean (2004) studied the telephone screening process in which clerical workers responded to prospective patients' requests to make an appointment to see a doctor in emergency departments, medical centres or surgeries in the US. She found that clerical workers helped callers shape problems to fit particular specialties relevant to the clinic. Nugus (2007) found that similar strategies to those used by Jean's clerical workers were used within emergency departments by emergency doctors to persuade appropriate in-patient medical teams to become involved in patients' care. Senior emergency doctors taught juniors how to 'sell' or 'package' their patients. They used strategies such as concise presentation of the patient case, underplaying diagnosis thereby illustrating deference to organ-specific medicine, shaping the case to fit the needs of the specific team, and lending the junior doctor the positional authority of a senior emergency specialist during an encounter with an inpatient team doctor.

Social science studies exploring how tools and technologies work in everyday practice offer a perspective for understanding how safety strategies such as TTSs and escalation protocols fit into the organisation of rescue work, particularly their role in defining and shaping occupational and jurisdictional boundaries. Studies have extended the notion of boundary work to explore the role of technologies as 'boundary objects'. This expands understanding

beyond boundaries as conditions for separation and exclusion, to communication, exchange, bridging and inclusion (Lamont & Molnár 2002, Rycroft-Malone *et al.* 2008, Pinder *et al.* 2005).

'Boundary objects are objects which are both plastic enough to adapt to local needs and the constraints of the several parties employing them, yet robust enough to maintain a common identity across sites' (Star & Griesemer 1989, p.393).

It is worth considering whether tools such as TTSs and standardised communication tools could fulfil a role in structuring relations between hierarchical and occupational groups. Written orders in hierarchical restaurant work have been found to minimise interaction and serve as a means of reducing friction (Whyte 1949). Further study could explore whether utilisation of TTSs and communication tools enable nurses to gain authority and 'symbolic capital', improving their social position (Bourdieu 1993, Gieryn 1983) in order to achieve the resources they perceive as important to improve patient care.

The advent of critical care outreach has to some extent provided critical care physicians / anaesthetists with a new set of organisational strategies by which to challenge other groups, for example, surgeons authority (Fox 1994). *Comprehensive Critical Care* (DoH 2000a) advocated the creation of outreach to break down geographical boundaries, providing 'critical care without walls'. Green *et al* (2011) studied critical care as a case study of the 'modernisation' of health services, referring to a number of public service changes that took place towards the end of the 20th Century (Harrison 2002, Kuhlmann 2006). These included the increasing regulation of professional work through the introduction of standardised protocols, audit and performance indicators (Power 1997, Flynn 2002), and changes to styles of governance within organisations, replacing hierarchical silos of activity with cross cutting arrangements (Modernisation Agency 2004). Green *et al* found that critical care was seen as a specialism that had developed and could now hold its own against those established hospital specialities which had already 'modernised'. The Modernisation Agency provided critical care with a strategic resource which was 'utilised agentially as a lever for resources or legitimacy' (Green *et al.* 2011, p.10). The advent of outreach and the development of the critical care consultant increased autonomy over practice and provided symbolic capital in terms of political authority and control over the bounded space of ITU. The control exerted by ICU consultants in determining admission to

their units contrasted with the brokering by bed managers and erosion of medical consultants' power (Green & Armstrong 1993).

In another study, the implementation of a CCOT, while strengthening critical care's expanding sphere of influence, was found to reinforce boundaries (Carmel 2006). Closing ranks of the joint critical care nursing-medical team against the rest of the hospital, served to increase its influence and to reinforce boundaries between critical and ward care. Carmel notes that the impact of outreach team members was limited by their peripatetic nature given that temporal-spatial relations influence relationships. Outreach service provision had laid claim to their speciality, reinforcing ICU's image of 'rescuing patients at the brink of death', 'rescuing patients from the substandard care and chaos on the wards' (Carmel 2006, p.169). This concept suggested the superior technical skills and knowledge of ICU nurses compared with general nurses. A distinction was drawn between the uncomplicated, straight forward nature of ICU medical work and the messiness and clinical uncertainty of medical wards. Carmel's study provides a rich backdrop for the study of rescue; however, his data was limited to interviews with ward and critical care staff. Further observational data is needed to assess how boundaries between outreach and general wards are managed, and the consequences of this for patient care.

Such studies draw attention to the agency that staff can exert within the bureaucratic structure of the organisation. They offer clues as to how nursing staff and junior doctors can successfully mediate gendered, occupational and hierarchical boundaries. Further research is needed to explore the particular strategies HCAs, nurses and doctors use to facilitate escalation of care within the complex division of labour, as well as to examine further those boundaries in action between critical and ward care.

3.4.5 Summary: managing boundaries in health care settings

These sociological studies suggest that despite the hierarchical, temporal-spatial, occupational and gendered boundaries associated with health care work, there are opportunities for staff to bridge some of these and to address power imbalances. The study of staff's role in mediating these boundaries within ward settings, and between wards and critical care appears significant for understanding the complexity of rescue. The literature also suggests that technologies are an integral part of rescue work, in terms of their ability to shape jurisdictions and standardise care across geographical boundaries. Existing

ethnographies on safety have tended to focus on either health care work or the role of technologies; there is space for further work to explore relations between technologies and organisations. This could then focus attention on inter-relations between tools such as TTSs, guidelines, rescue practices and organisational context.

3.5 The cultural context of acute care

Rescue embodies the handling of risk, medical uncertainty and error. These constructs do not have fixed meanings, but are fluid and flexible, and often context specific. The uncertainty of medical action lies at the heart of health care practice. This encompasses the nuances and variations associated with the manifestation of illness, and the part patients and relatives play in enacting their own safety when their health deteriorates. Multiple, competing explanations of a patient's condition typify health care work, prompting variance in the way that practitioners detect, diagnose and respond to acute illness. It is often difficult to establish links between specific professional actions and patient outcomes. Rescue work cuts across ward and department boundaries, further distributing responsibilities. The cultural relativity of what is considered risk and error needs further consideration. Ethnographic studies provide a resource to explore further how cultural norms within mundane, everyday health care practice as well as emergency work shape understandings and actions. Studies concerning medical uncertainty, diagnosis and decision making are considered first in this next section, followed by those focusing on risk and error.

3.5.1 Medical uncertainty, diagnosis and decision making

One of the most pervasive themes in the sociology of medical knowledge is the role of uncertainty in medical practice (Atkinson 1995, Fox 1980, Fox 1957). In Fox's early work on the medical school experience, and experimental treatment, she emphasised three different categories of uncertainty that medical students are faced with: the limitations and gaps in medical knowledge; incomplete or imperfect mastery of available knowledge; and difficulty in differentiating between personal ignorance or ineptitude and the limitations in medical knowledge (Fox 1959, Fox 1957). Light (1979) suggests that the medical trainee or practitioner controls these kinds of uncertainty by mastering what they can, limiting the domain of knowledge they try to know and settling the remaining uncertainties through

collective solutions. Training for control involves specialising, adopting particular schools of thought, collecting success stories to demonstrate effectiveness and shifting the emphasis onto technique as an end as opposed to as a means (Light 1979).

A number of authors have questioned Fox's categorisation of uncertainty. Fox's distinction between an uncertain world and uncertain knowledge about that world is at odds with science and technology's constructivist views of knowledge. Mesman (2008), for example, argues that 'there are no medical situations that are *intrinsically* more uncertain than other situations; there are situations about which physicians know less and that hence are less predictable'. Sinclair (1997) in his ethnographic study of the institutional apprenticeship of UK based doctors differentiates between the uncertainty of written knowledge, which is learnt in the preclinical years but gives way to the certainty of experience in the houseman years which reinforces the personal authority of medicine's practitioners.

Atkinson (1995) has criticised Fox's analysis for lumping together different versions of uncertainty. He argues that training for certainty would be a more apt rubric for the sociological analysis of medical practice (Atkinson 1984). His study (1995) of haematologists explored how medical knowledge was produced in and through medical work. His fieldwork within one teaching hospital in the US spanned ten weeks. Data collection focused on collegial talk during ward rounds and weekly conferences. His findings demonstrated that not all knowledge within medical practice is treated as having equal value.

'It has different sources, has different weight attached to it, and may be regarded as more or less warranted. These orientations to knowledge cannot be reduced to generalised categories of certainty and uncertainty in medical discourse' (Atkinson 1995, p.127).

Atkinson's findings showed how junior doctors and medical students had to use rhetorical skills to demonstrate clinical competence to their peers and seniors. Imaging, laboratory and investigation results were presented as evidence of a patient's condition, justifying past actions and current plans. Narratives were used to express degrees of certainty, construct zones of credibility, and ascribe hierarchies of trust and responsibility.

[The narrative framework] 'provides, metaphorically speaking, a scaffolding or armature of uncontested events and decisions. They establish with relative certainty a chronology of events and decisions that form a basic structure for the case account and – more importantly – a backdrop for more problematic aspects of the account' (Atkinson 1995, p.120).

Atkinson's study (1995) draws out the importance of context and the different domains of medical knowledge. His findings regarding differential orientations to knowledge, the expression of which also inscribes the moral and technical division of labour, opens up understandings regarding the engagement of medical practitioners in rescue practice. His research highlights the practical accomplishment of medical talk and suggests how inter-subjective understandings of cases of acutely ill patients are likely to be negotiated and shared within and across medical teams involved in their care.

Diagnosis is an important classification tool of medicine (Bowker & Star 1999). A number of studies (Berg & Mol 1998, Mol 2002, Goodwin 2009, Gardner *et al.* 2011) highlight the temporal, incoherent and distributive nature of diagnosis; the incoherence and tension between contradictory numerical frameworks in use in practice. Consequently, health care staff have to engage in continuous negotiations about their meaning. This literature suggests the importance of coordination work for rescue practice in order to patch together different diagnostic interactions.

Other studies also suggest that diagnosis is not restricted to medical practice. Nurses do make diagnostic decisions, although most nurses and doctors do not see these judgements as 'diagnoses' (Pooler 2010, Hughes 1988, Svensson 1996, Allen 1996). Diagnostic work is intertwined with communication processes, power and hierarchy which have particular relevance for the study of rescue. Mattingly (1998) studied the practice of occupational therapists in three large urban hospitals. She drew from data collected through observations of team meetings and more casual settings (e.g. lunch conversations) as well as interviews with therapists, over a period of ten years in several different studies. She found that storytelling often crept into accounts of practice when diagnoses were uncertain. Representations of practice guided the clinical gaze of therapists, in terms of what they placed in the foreground and relegated to the background in their accounts of

patients, how they ascribed causality, and who they blamed or praised for particular actions.

3.5.2 Managing risk and error

Several ethnographic studies of medical work have illuminated the cultural relativity of understandings of risk and error (Douglas & Wildavsky 1982, Douglas 1985) and their implications for patient safety (Bosk 1979, Atkinson 1995, Becker *et al.* 1961, Millman 1977). A number of these studies have focused on areas perceived as 'high risk' such as surgery (Waring *et al.* 2007, Bosk 1979, McDonald *et al.* 2005b), anaesthesia (Mort *et al.* 2005, Goodwin 2009) and intensive / neonatal care (Mesman 2008). There has been generally less focus on the more mundane setting of the medical ward perhaps because of the fluid nature of teams working within this locus. Rescue work cuts across ward and department boundaries, with significant implications for managing risk and patient safety.

However, one relevant study is that of Dixon-Woods and colleagues' (2009), who explored risk management at the 'sharp end of medical ward work'. They studied four medical wards within four organisations within the UK, carrying out around 150 hours of observations alongside interviews with 49 staff. Their findings show how features of risk management are also features of wider organisational and institutional processes. Informal logics existed alongside formal ones and 'may be necessary to make the system work at all' . These informal practices involved important forms of normative judgements and identity work (Green 1997). There was some comfort for staff working in a system of risk spreading and guilt sharing where no one person could be blamed if things went wrong (Dixon-Woods *et al.* 2009, Hughes 1951).

Dixon-Woods and colleagues (2009) found that 'different classifications of risk were influenced by the particular features of different risks, by how staff sought to manage their identities, and by the availability of plausible legitimacy discourses' (p.367). Importantly, the multiplicity of rules in practice was such that they quickly exceeded individuals' ability to act on them. Staff had to choose which rules to prioritise and which to ignore, and often ended up over-riding others without realising that they were doing so. Partial compliance became the accepted state.

Amalberti and colleagues (2006) propose a three phase model derived from Rasmussen's (1997) theory of migration to boundaries to explain the mechanism by which rule violation occurs, stabilises, regresses, or progresses to harm. Their model suggests that violations are unavoidable because of system dynamics; deviances are markers of adaptation to complex work situations. The first phase signifies an initial safe space of action where work processes are designed to operate according to a set of rules and procedures with some regard for the likely pressures of production. As time goes on, 'borderline tolerated conditions of use' are created in response to new social and technical demands, and pressures to cut corners. This stage can be seen to provide management and individuals with the maximum benefit for the minimum and accepted probability of harm. However, at the 'normal-illegal' stage, the same violations may be committed as in the second phase, but these are now routine and so common as to be almost invisible to both workers and managers, echoing the normalization of deviance noted by Diane Vaughan (1996, 1999).

These studies provide useful background for the study of rescue and suggest the complexity of managing normative rules and competing demands in medical ward work. Further study is needed to establish how risk taking and sharing occurs within the management of acutely ill patients. While based in surgery and carried out over 30 years ago, Bosk's study (1979, 2003) also offers additional insight into the cultural norms likely to influence rescue. It aimed to understand the 'shared and socially patterned ways that surgeons treat deaths and complications' (Bosk 1979, p.31). For 18 months Bosk was a participant observer in two hospitals. He observed how the social control of technical performance remained inconspicuous whilst the control of moral performance was a very conspicuous feature of the environment. Technical or judgemental errors were forgiven providing the juniors were seen to recognise the problem, seek help, demonstrate that they had learned from the experience, and did not then repeat the error. Errors were blameworthy when they involved normative breaches, breaking universal rules about how a doctor should act. Also blameworthy were quasi-normative breaches or failure to abide by senior doctors' ways of doing things. Difficulties coded as normative included failure of a junior doctor to recognise clinical deterioration sufficiently early, attempts to cover up mistakes, and failure to seek appropriate help. Given the dynamic nature of health care contexts, the relevance and application of Bosk's findings for rescue work within today's medical care settings needs to be explored further.

3.5.3 Summary: managing risk and error

These ethnographic accounts highlight the significance of cultural context. They suggest that studying rescue would benefit from analysis of associated socio-cultural and organisational frameworks. Diagnosis as a distributed activity requires coordination work and the management of temporality in terms of consequence for timely and effective rescue. There is space for further research to expand the lens beyond medical diagnosis of conditions to diagnostic work regarding detection and speaking up. Such research could explore how cultural norms regarding managing certainty and uncertainty influence rescue practice across the health care team. Exploration of the micro-processes of diagnostic work needs also to be linked to the political and structural influences that influence health care work. The complexity of the micro-cultures associated with medical practice offers explanation for the limited benefits of those structured, rational safety systems introduced to date to facilitate rescue practice. Further study could distinguish those cultural norms which might provide leverage points for safety strategies in facilitating rescue and those that are likely to inhibit or resist quality improvement. This theme is developed further in the next section.

3.6 Sociological insights into quality improvement programmes

Given the lack of trial-based evidence, ongoing policy support for the RRS appears to reflect its theoretical appeal as a clinical resource. This political backing resonates with the level of support for other technological fixes such as telehealthcare within the health service, despite the relative lack of randomised controlled trial (RCT) evidence for their effectiveness (Williams *et al.* 2003). As Williams *et al.* note (2003), those directly involved in introducing these technologies seek to construct 'facts' about their utility to defend the relative lack of RCT evidence in the area. Territorial disputes often ensue regarding whose knowledge is considered authoritative (Øvretveit 1997).

There have been calls for a greater understanding of not just whether, but 'how' and 'why' an intervention works (Boaden *et al.* 2008, Walshe 2007, Grol *et al.* 2007, Grol *et al.* 2008), and potential interacting determining factors (Grol & Grimshaw 2003). When quality improvement initiatives are implemented without a proper understanding of what they involve, how they work, and how context and programme interact, their operation remains a black box (Stame 2004). Dixon-Woods and colleagues (2011) note that as a result other implementers of the initiatives do not have the required information to know where best

to direct their efforts. When health care problems continue following the introduction of these quality improvement programmes, it is unclear whether this is due to flawed theory regarding underpinning social processes and mechanisms, patchy implementation or a combination of both. This leads to a problem termed as ‘cargo cult quality improvement’ which was first identified by Feynman in 1974.

‘In the South Seas there is a Cargo Cult of people. During the war they saw airplanes land with lots of good materials, and they want the same thing to happen now. So they’ve arranged to make things like runways, to put fires along the runways, to make a wooden hut for a man to sit in, with two wooden pieces on his head like headphones and bars of bamboo sticking out like antennas—he’s the controller—and they wait for airplanes to land. They’re doing everything right. The form is perfect. It looks exactly the way it looked before. But it doesn’t work. No airplanes land. So I call these things Cargo Cult Science, because they follow all the apparent precepts and forms of scientific investigation, but they’re missing something essential, because the planes don’t land’ (Feynman 1999, p.208).

Feynman (1999) describes how the distorted imitations succeed only in replicating the superficial outer appearance but not the mechanisms (or set of mechanisms) that produce the outcomes in the first instance. The initiative therefore fails in a different context. Dixon-Woods and colleagues (2011) drew on this phenomena to explain the achievements of the Michigan ICU project, which attracted international attention by successfully reducing rates of central venous catheter bloodstream infections. They challenged popular simplistic accounts of the programme which attributed the programme’s achievements to a simple ‘checklist’, instead providing a sophisticated account of the causal chains and mechanisms, and reconceptualising it as a complex social intervention (Bosk *et al.* 2009).

Sociologically informed accounts of quality improvement programmes offer a powerful resource for extending understandings of the role of the RRS within rescue work. In the following sections, underpinning assumptions regarding the nature of cultural change associated with the RRS are explored. Research examining the ‘doing’ of patient safety and the role of the technological fix within the structural and social system of health care also offer insights into why perhaps only some RRSs work.

3.6.1 Defining 'culture' and 'cultural change'

Policy and clinical literature tends to focus on gaps in care in order to highlight where problems exist. The research that informs the policy and practice interventions discussed in chapter two has tended to focus on failure to rescue and the ability of safety interventions such as the TTS or outreach to plug these gaps. An underpinning assumption is that it is possible to change and manage the culture in health care in the search for wider organisational objectives (Davies *et al.* 2000). Technological innovation offers an opportunity for cultural transformation in the form of a 'safety fix'.

However, such definitions present a reification of culture, reducing it to an entity that can be easily measured and managed. As Davies and colleagues (2000) and Scott et al (2003) note, the evidence from the NHS suggests that previous attempts at cultural transformation have only succeeded at a superficial level. Sociologists and anthropologists offer an alternative perspective which may explain why culture is less amenable to manipulation. Rather than seeing culture as what an organisation 'has', sociological critiques regard culture as emergent and indeterminate, something an organisation 'is' (Silbey 2009, Davies *et al.* 2000, Schein 1985). Culture is perceived as 'an indissoluble dialectic of system and practice, both the product and context of social action' (Silbey 2009, p.356). Features of complex organisations and socio-technical systems are understood to shape cultural norms; they are characterised by competing and conflicting group interests, power differentials and structured inequality (Antonsen 2009). Research studies adopting this focus therefore, focus on understanding relationships between organisational structures and practices, and processes of social construction, rather than solely focusing on the management of change.

Adoption of Davies and colleagues' (2000) position that an organisation's culture is an emergent property of its structures and processes, offers opportunity for opening up understandings of relationships between rescue and the RRS. Perceiving culture as emergent also offers potential for assessment and description of characteristics of that culture in terms of functionality regarding the organisation's goals (Davies *et al.* 2000). This broadens the frame of reference from a policy orientated focus on the role of RRS in changing the culture of an organisation, to a model of rescue that includes relationships between social structures and processes, underpinning power differences, and competing group interests that shape frontline practice. It would also enable exploration of not only

positive predicted effects of the RRS but associated unintended and dysfunctional outcomes (Scott *et al.* 2003).

3.6.2 The 'doing' of patient safety

Sociological and cultural research exploring the intricacies of safety work within complex organisations and socio-technical systems offers a useful resource for the study of rescue, as it can take into account inter-relationships between meso- and micro-level systems. Ethnographies that have explored the frontline practice of patient safety work offer important background into the complex situated accomplishment of everyday health care practice (Mesman 2009, Suokas 2010). By exploring the active construct of safety, research has explored how operational safety is achieved in complex health care settings (Mesman 2008, Nugus 2007). Findings highlight practitioners' abilities, the role of group cultures and collective agency, and the role of practices and technologies in creating safety locally (Goodwin 2009, Thelander 2003, Pirnejad & Bal 2011, Boaden & Joyce 2006).

Medical sociology has a long tradition of focusing on the social environment of medicine or the social implications of medical encounters (Bloor 2007, Timmermans 2006, Berg 1992), rather than studying what is done *in* medicine (i.e. the central, cognitive aspects of medical work). Science and Technology Studies (STS) stand apart from medical sociology studies in avoiding analysis of 'constructs', which implies the creation of stable and fixed entities, instead exploring the enactment of practice, which alludes to the potential fragility and temporality of care processes. Studies of this kind can usefully 'focus on multiple ontologies in the pragmatic sense' (Zuiderent-Jerak *et al.* 2009) and emphasise the competence of staff in negotiating complex trajectories particularly with the introduction of new medical technologies. STS studies offer insights for patient safety research regarding the 'doing' of different ways of doing patient safety and their consequences. Hess (2007) refers to 'good ethnographies' [which] 'frequently interrogate or complexify the taken-for-granted, such as commonsense categories employed by social scientists, policy-makers, activists and scientists' (Hess 2007, p.239).

Mesman (2008) provides a case in point with her ethnography of practice within a neonatal intensive care unit in the Netherlands. Her analysis, based on eight months of participant observation, draws on the 'hidden' constituent of practices, and ordering processes previously considered within science and technology studies. She locates her focus within

two of the four types of invisible work identified by Nardi and Engström (1999); work defined as routine or manual, and informal work processes. She opens up the concept of patient safety beyond a policy orientated 'deficit model' which focuses on the 'problem' of professional behaviour, towards what Mesman terms 'exnovation', or the process of bringing to the foreground what is already present, though hidden, in specific practices (Wilde de 2000). This approach challenges the dominant trend to overlook existing practices; asserting that 'things or practices are not less valuable simply because they already exist' (Wilde de 2000, p.13).

Mesman's work is useful for extending understandings of rescue practice as her concept of exnovation takes into account that which is already evident, but not articulated within patient safety frontline work. She provides a rich textured account of the intersections, junctions and hidden competencies within medical work. Repertoires (reasoning and legitimising), vocabularies (speaking and interpreting) and scripts (directions for actions) assume importance in ordering and structuring medical work. Her depiction of both the fluidity and order of medical work, and the contingencies of hierarchies of knowledge and 'gold standards' of evidence based care provide a context for rescue practice. She highlights the competence and skills employed by nursing and medical staff in using their knowledge and technology in the treatment trajectory.

Mesman's reference to the presence of contingencies in medical practice is suggestive of craft work. Practitioners have been argued to draw on two types of knowledge, technical knowledge which may exist as rules and practical knowledge which is nebulous and indefinable. A number of authors such as Jamous and Peloille (1970), Atkinson et al (1977) and Nyiri and Smith (1988) have applied these forms of knowledge to medical practice. Doctors exploit the ambiguity of medical practice invoking 'science as a legitimising discourse, but also invoke craft mystery to justify its departure from science and its claims to particular forms of knowledge' (McDonald *et al.* 2005a, p.408). Such craft work implies there is always a large chunk of tacit knowledge embedded in professional decision-making (Prior *et al.* 2002). It has also been argued that 'distinctions between technical and practical knowledge serve as dimensions around which segments of the medical profession articulate ideology and legitimate professional dominance' (Pope 2002, p.380).

It is arguable that tacit skills and craft work embody the 'essence' of medical practice. An analysis of the everyday nuances of practice, the routines of assessing and intervening, the 'invisible work', could provide new understandings into the doing of rescue and illuminate their consequences for patient safety. However, a limitation of studies that focus on medicine-in-action is their refusal to grant explanatory power to social determinants and structures (Timmermans 2006). As Timmermans (2006) argues, a medical sociology of practice needs to acknowledge the influence of organisational context, the structural elements, policies and relationships that are 'reestablished and reconstituted through work practices'. Rescue links work at micro- and meso-level and the influences on this work; this includes the role of safety tools and technologies introduced to facilitate rescue. As Blaxter (2009) notes in her analysis of high tech medicine, it was not the images created by these technologies that produced feelings of disembodiment for patients, it was the system in which they were used which proved problematic. The translation of the images into records and decisions appeared 'to create and control both medical practice and the patient's medical experience' (p.776). It is thus important to acknowledge the structural setting and context of rescue work, rather than solely the ability of certain patient safety practices or particular technologies to change such a setting.

3.6.3 Relationships between context, structures, staff and technologies

A theoretical perspective focusing on structural features and systemic processes alongside individual behaviours and the agency of tools such as the TTS and escalation protocol offers promise for furthering understandings about the role of the RRS within the situated context of rescue work. There is a long history of social science research exploring the way treatment protocol and care pathways standardise professionals' practice and influence clinicians' autonomy. The intellectual origins of protocols, care pathways and decision tools can be traced back to the Enlightenment's social engineering model of society, which constantly sought both improvement and the rational ordering of society. This organisational engineering tradition permeated the classical management theory of the late 19th century, scientific management in the 1920s and business process re-engineering in the 1990s (Pinder *et al.* 2005).

Long standing debates about the standardisation of professional practice have traditionally been limited by a binary opposition between two normative positions, one for and one against external control of clinical practice (Yeung & Dixon-Woods 2010). However, these

positions fail to capture the complexity and intertwined nature of standardisation-in-action. Social scientists are now suggesting that formality and standardisation have a useful social purpose in some instances (Yeung & Dixon-Woods 2010, Bosk *et al.* 2009). Research adopting this agential view of technology and standardisation has usefully uncovered both positive and negative changes in the nature of health care work, jurisdictions and interprofessional relationships (Petракaki *et al.* 2012, Oudshoorn 2012, Allen 2009, Pirnejad & Bal 2011). An important line of inquiry for understanding the role of safety strategies in rescue practice is to consider the intended, unintended and perhaps contradictory consequences of their introduction.

Berg has extensively researched the role of medical protocols. He notes how in getting the protocol to work, the relationship between the order embedded within the tool and the 'messiness' of practice becomes more complex.

'First, the order embedded in the end-product inevitably contains much more of the messiness it sets out to erase. In addition, the order of X is not merely polluted in the process of construction and implementation of a protocol: it is also distinctively transformed' (Berg 1998, p.228).

Berg argues that managing patients' trajectories is a collective, cooperative enterprise (Berg 1999). However, while standardisation may be perceived as a solution to address variability, variability tends to creep back once standards are localised. Articulation work (the 'glue' that holds complex work practices together) is needed to promote homogeneity and to work-around local contingencies, resistant attitudes and lack of knowledge (Berg 1999).

Various studies also highlight that 'it is the uniquely human ability to vary and adapt actions to suit local conditions that preserves system safety in a dynamic and uncertain world' (Reason 1999, p. 9, Hollnagel *et al.* 2006). Thus, safety within complex organisations is maintained because 'workers do not follow predetermined protocols or designs; instead, they interpret rules, adapt resources to innovative uses, develop work-arounds, and invent *in situ* many of the routines that ultimately come to constitute the system in practice' (Silbey 2009, p. 359). In Bate *et al.*'s (2008) study of the improvement journey of leading hospitals in Europe and the US, they found that ward staff demonstrated what others have

called 'mindfulness' (Weick 2001, Weick & Sutcliffe 2001, Langer 1997), in safeguarding against 'missing the zebra' when using technologies such as care pathways.

Missing the zebra is described metaphorically 'where, because of the conditioning of routine clinical decision-making, everything is seen in terms of the standard illness or the standard patient (everyone a black horse), while unique and often consequential features of individual illness episodes (the zebra – the exceptions to the rule) do not get noticed and picked up' (Bate et al. 2008, p.28).

Of significance was the finding that this micro-level action where the emphasis was on individualising processes (delivering high-quality personal care), was interlinked to meso-level action that focused on standardising processes (achieving consistent high-volume care across the organisation). The features of the micro-system as a whole revealed similarity to the organisation studies concept of a 'community of practice' (Wenger & Snyder 2000, Lave & Wenger 1991). Much of the flexibility in managing ward level work was linked to staff's ability to trust each other's judgement and expertise, mirroring what Weick describes as 'respectful interaction' in which 'trust, trustworthiness, and self-respect develop equally and allow people to build a stable rendition of what they face' (Weick 2002). Bates et al (2008) conclude that unlike previous literature on mindfulness that affords priority to technical and behavioural variables such as the nature and degree of information technology support, measurement, leadership, method and structure, their findings provide a strong reminder that:

'Quality is not only about method and technique, but also outlook and frame of mind - the immaterial (and therefore easily missable) subjective dimension of life' (Bate et al. 2008, p.34).

In their *ex post* account of the Michigan ICU project, Dixon-Woods et al (2011) identified some learning points which may have relevance for understanding the application of the RRS. They found that data monitoring about quality improvement had disciplinary effects providing the data had legitimacy among participants and was used to encourage learning, rather than solely punish or reward. The restructuring of relationships implied by the safety checklist was a significant challenge to those trying to establish new rituals and overcome occupational hierarchies. Relationships between doctors and nurses were subject to

strongly reinforced etiquette rules, which included showing regard for others through deference, even when the recipient of that regard did not deserve it (Goffman & Best 2005). Contextual influences were a source of vulnerability for the Michigan programme (Davidoff 2009). Two major influences on organisational legitimacy were the extent to which the problem being addressed was perceived as being genuinely a problem, and the availability of resources, given other competing clinical demands. Lastly, a reasonable consensus was required on the scientific evidence for the supporting interventions to improve performance and the validity of the performance measures to be used. Some of these social processes may also help explain why RRS implementation is such a complex process.

In Suokas' (2010) ethnographic study of standardised risk assessment tools in medical wards, she collected observation and interview data over a three year period from four hospitals involved in the Health Foundation's Safer Patients Initiative. She found that the tools had been designed for the 'average' adult patient on general wards, although the population on the wards consisted of predominantly elderly and frail patients, with complex multiple pathologies. The TTSs were successful in achieving accountability for risk management, and were embedded within clinical practice. However:

'it appears that early warning systems may have been successful in increasing compliance with formal rules, this did not necessarily improve responsiveness to risk management at a team level' (Suokas 2010, p.274).

Suokas notes that risk work emerged as a profoundly collective activity. She links the effect of these TTSs with the individualising effect of hierarchical accountability noted by Roberts (1996). This individualising effect was associated with pre-occupation with one's own performance and compliance with rules, with the potential for solitary and defensive approaches to accountability hindering teamwork, increased workload and discomfort to patients (unnecessary observations, alerts and referrals to intensive care). Other unintended effects included the introduction of a new set of rules with the systems that limited the discretionary powers of ward staff. Some staff were observed to engage in unreflexive use of principles and ritualistic compliance. Deep-rooted problems on the wards were observed including skills deficiencies and lack of organisational resources,

which restricted the moral agency of staff and their ability to influence actions and outcomes.

Health care organisations are complex socio-technical systems. Managers often pursue multiple and conflicting goals; clinicians' practices may differ from managers' goals for safety and quality (Tamuz & Thomas 2006). Hospitals are professional bureaucracies (Mintzberg 1979), where norms and routines are learned through professional socialisation and authority flows through professional hierarchies. Some professional beliefs and norms are not aligned with organisational or safety norms (Thomas *et al.* 2004, Leape & Berwick 2005). The basic interconnected nature of socio-technical systems means that the introduction of new safety processes or procedures is likely to lead to both intended and unintended consequences. As Vaughan (1999) notes, the same practices within organisations that contribute to safety and reliability, also lead to mistakes, misconduct and disaster.

'Training, often used to prevent errors, can create them; information richness introduces inefficiency, too little produces inaccuracy; teams have multiple points of view that enhance safety, but as they become a cohesive group they share assumptions, so the 'requisite variety' important to safety is lost' (Vaughan 1999, p.297).

Vaughan's (1996) study of the space shuttle Challenger disaster attempts to do this by exploring the contribution of organisational complexity, power relations and 'group think' to the launch decision. She highlights how norms and rules for maintaining safe procedures often express economic and political priorities. Official procedures are shaped to fit what seems politically or economically appropriate at the time in a process called 'normalisation of deviance'.

Vaughan's study highlights the importance of exploring system bias and organisational culture which is laid down at the top of an organisation and shapes the ground rules of the organisation. Existing clinical studies of rescue practice are largely devoid of this form of analysis. An ethnography which provides a useful resource for this, however, is Chapple's (2010) study of the ideology of rescue. She carried out research in two US hospitals, both fieldwork and retrospective interviews of clinicians who had cared for patients who had

died. In her research, Chapple argues that rescue is 'the gold standard' of acute health care (Chapple 2010, p.10). Rescue conjures up images of heroism and drama. Her work confirms previous studies articulating the dominant culture of heroism within health care which prioritises the glamour of rescue at the expense of the mundane (Seymour 2001, Chapple 2010, Zussman 1992).

Chapple notes that the normative position within acute care is to rescue, unless specified; resuscitation and escalation of care are perhaps the only procedures that require a special order to prevent their occurrence. She suggests that the supremacy of rescue is linked to the setting of patient and organisational trajectories. Potential as well as actual clinical instability influences bed management, the housing of patients on specific wards, access to specialist care and the allocation of resources (Chapple 2010). 'The urgency, speed and intensity associated with rescuing patients from instability are infectious'. It translates into the 'momentum and goal-directed care [which] pervades even the routine work of the hospital' (Chapple 2010, p.59). This supports Kaufman's earlier finding of the dominance of transience and propulsion within hospitals, 'moving things along' (Kaufman & Morgan 2005, p.236).

Most of Chapple's data is drawn from clinicians' narrative reconstructions of events; a useful addition to this work would be to collect data on the nature of rescue work as it unfolds within the context of medical work and organisational trajectories. Further study could also usefully extend its remit beyond dying to the enactment of rescue as a feature of routine health care practice. In this way, rescue work could be explored within the nature of the mundane as well as within the drama of collapse and crisis intervention. Heroic intervention and rescue is now an indicator of an organisation's success or failure. Measurements of mortality and failure to rescue provide a means (albeit contested) of evaluating performance (IHI 2003, Shojania & Forster 2008, Silber *et al.* 2007). Further examination of the cultural setting of rescue including the framing of performance 'success' at organisational level, and how this legitimises the exercise of power and decision making at micro-level is likely to provide an important contribution to this field of study.

3.6.4 Summary: sociological insights into quality improvement programmes

Social science studies provide a useful resource for evaluating the implementation, benefits and unintended consequences of quality improvement programmes. They draw attention to the importance of establishing how and why these programmes do or do not work. Social science literature also offers the opportunity to understand rescue and the RRS within an approach that conceptualises culture as an emergent property of its structures and processes. This would broaden the frame of reference from a policy oriented 'fix it' model to a sociologically informed model of rescue which would explore relationships between health care structures, practices, rescue work and the RRS. Previous ethnographic studies focusing on the doing of patient safety suggest that illuminating the nuances of everyday practice could reveal the hidden accomplishments of rescue work and their consequences for care of acutely ill patients. Further study of rescue could usefully utilise ethnographic fieldwork in organisations implementing a RRS, in order to generate high-quality descriptions and theoretical interpretations of the nature of rescue work and associations between interventions, processes such as jurisdictions, hierarchies, the exercise of power and decision making, and patient outcomes.

3.7 Conclusion

Social science literature (particularly ethnographic study) provides a rich contribution to the understanding of health care work. Sociological perspectives on the enactment and informal resourcing of safety work, and staff's agency to coordinate trajectories, shape and mediate hierarchical and jurisdictional boundaries within acute care settings provide a useful resource for additional insights into the frontline practice of rescue. Similarly, science and technology studies present detailed analytical frameworks for understanding how technologies can help provide coherence, and structure relations and social orders within the workplace, by acting as boundary objects and standardising care across geographical and occupational domains. These studies offer potential for opening up the space regarding safety tools such as TTSs and the IAT, providing further conceptual clarity regarding both their intended and unintended effects once employed in practice.

Additionally, sociological research offers potential to inform clinical interpretations of the problems associated with rescue. This includes ethnographic insights into the cultural context and complexities of health care practice which staff navigate on a daily basis, such as occupational and organisational norms and rules, inequalities in power, relations and

authority. Study of the management of acutely ill patients is likely to benefit from a greater understanding of the division of labour within rescue work, its associated distribution of tasks (with connotations of value and moral worth) and how structural and meso-level cultural factors translate into frontline practices.

3.8 Research aims and objectives

The study that follows is guided by these insights. It aims to provide a nuanced understanding of why rescue is hard to accomplish in practice, and why despite the introduction of safety strategies, problems detecting and responding to acutely ill patients are still occurring. These additional insights offer a potential resource for developing more effective strategies for intervention. The research is located upstream of existing ethnographic work on the social organisation of resuscitation. It extends its remit beyond the dying to the enactment of rescue as a feature of routine health care practice. In this way, rescue work will be explored within the nature of the mundane as well within the drama of collapse and crisis intervention. Framing study of rescue from a sociological perspective should illuminate how micro- and meso-level processes within health care work are closely intertwined, and additionally offer an important contribution to sociological understandings of patient safety by marrying the study of rescue-in action with analysis of the social and structural organisation of work, articulating how staff, tools and structures interlink.

The aim of the study is therefore to explore rescue practices in order to draw out the associated interplay of socio-cultural and organisational processes and the context of clinical work within medical wards.

Specific objectives are:

1. To explore how organisational and structural factors influence rescue work
2. To explore how rescue work is enacted within general medical settings
3. To examine how boundaries are negotiated and mediated in rescue work
4. To offer theoretical insight into the underpinning social processes and mechanisms of the RRS

The sociological literature reviewed in this chapter informs the design of this study by highlighting the benefits of situated ethnographic study. This will enable the exploration of

how rescue plays out in practice. The literature has also specified the necessity of studying micro-level ward work as well as meso-level organisational processes. Distributed practices performed by medical staff and outreach teams need to be explored in addition to bounded ward work. In the next chapter, a detailed consideration of the methods is presented.

Chapter Four: Research Design and Methodology

Ethnography is 'highly particular and hauntingly personal, yet it serves as the basis for grand comparison and understanding within and across a society' (Van Maanen 1988, p.ix).

4.1 Introduction

This chapter presents a critical perspective on the methods employed in the present study. As identified in chapter three, the aim is to explore how rescue plays out in practice in order to draw out the associated interplay of socio-cultural and organisational processes and context of clinical work within medical wards. The ethnographic approach to the study of medical work offers an effective means of uncovering how rescue is accomplished, and relationships between this work and other contextual factors. However, what counts as ethnography and as robust ethnographic methodology are highly contested. After detailing the origins and development of the PhD study, this contestation is reflected on in order to outline a position for this research. A discussion of conceptual and ontological / epistemological issues follows, together with consideration of those rules which are applied to the ethnographic enterprise, including the validity and generalisability of the data. The approach adopted is then described including selection and access to the field, fieldwork, field interviews and documentary review. The process of data capture and analysis is reflected on to illustrate how data were interpreted. The chapter concludes with a discussion of ethical considerations and reflexivity in the research process.

4.2 Context, origins and development of the PhD project

This research is part of a larger project and programme of work. I was lead researcher for the larger project which aimed to explore the management of complications within maternity and medicine. The key focus for the research was to investigate how clinical deterioration is constructed and understood within the workplace, and to explore the role of safety strategies and tools designed to facilitate detection of and response to acutely ill patients. The focus of the work was jointly agreed between clinical staff and the academic research team, within the context of a national policy imperative regarding poor management of deterioration in clinical practice, which was also recognised locally. The managing complications programme of work involved an ethnographic study to draw out

constructs of deterioration and safety tools, and to consider how the surrounding context influenced implementation and use of these tools.

During early exploratory discussions with clinicians and managers within the field it became apparent that boundaries around perceptions of what marked a patient as 'becoming unwell' were unclear. Constructs regarding rescue translated to the point of patient collapse and the period immediately preceding this, rather than looking at the significance of the wider context of health care work. Local policy and practice focus were both orientated toward a deficit model, and directed at staff lower down the multidisciplinary hierarchy. My selection of rescue as a topic for PhD study served several purposes: I had a personal interest in the subject because of my clinical critical care background; it had policy, practical and theoretical relevance; and importantly there was the ability to incorporate this PhD project within the wider envelope of the managing complications programme of work. This PhD research forms a discrete and yet embedded element to this work, the two projects proceeding for the most part symbiotically. Table 4.1 shows distinctions and overlaps between the two projects. Tensions in managing the two research studies concurrently were also experienced; these will be considered later in the chapter (see section 4.8 and 4.9).

4.2.1 Rationale for ethnography as a methodological approach

A number of medical ethnographic writings illustrate how this form of enquiry has contributed to the body of research on medical work (Bosk 1979, Fox 1959, Atkinson 1995, Mesman 2008, Mol 2002). Atkinson and colleagues (2007b) note that ethnographic accounts provide a systematic analysis of the various modes of social action and organisation. In addition, ethnographies of work practices can uncover 'the unacknowledged, the hidden, the insider knowledge, the unwritten but pervasive rules governing jobs' (Smith 2007, p.222). They can illuminate how seemingly complex jobs are routinised together with 'the tacit skills, the decision rules, the complexities and the discretion' utilised in routine and marginal work (Smith 2007, p.221). Ethnographic study enables observation of the defining features of professional work, in other words the unpredictability, variety, the formal and informal routinisation of tasks and activities by observing the unexpected (Bosk 1979) and opportunistically focusing on events as they arise (Buchanan *et al.* 1988).

Table 4.1: Principal features of the wider programme of work and PhD research studies

	Managing complications programme of work	PhD Research
Aim	To explore the management of complications and escalation of care within medical and maternity settings	To explore rescue practices in order to draw out the associated interplay of socio-cultural and organisational processes and context of clinical work within medical wards
Objectives	<ol style="list-style-type: none"> 1. To develop insight into the meaning and management of deterioration in two different settings (intra-partum and medical care) 2. To investigate how certain safety strategies and tools are adopted into the workplace and explore their impact on, and how they are shaped by the context of work 3. To explore which contextual features facilitate ‘mindful’ application of these tools / strategies 4. To examine patients’ and carers’ experiences and their possible contribution to detection and management of their care trajectories 5. To provide insights for future application and research regarding the detection and management of acutely ill patients in hospital 	<ol style="list-style-type: none"> 1. To explore how organisational and structural factors influence rescue work 2. To explore how rescue work is enacted within general medical settings 3. To examine how boundaries are negotiated and mediated in rescue work 4. To offer theoretical insight into the underpinning social processes and mechanisms of the RRS
Theoretical Perspectives	<ul style="list-style-type: none"> ▪ Professional jurisdictions and hierarchies, boundary work, utilisation of tools as boundary objects ▪ Medical uncertainty, cultural constructs of risk and safety ▪ Organisational and system influences on trajectories and pathways of care ▪ Sociological contributions to implementation science 	
	<ul style="list-style-type: none"> ▪ User agency and sociological constructs of ‘speaking up’ ▪ Standardisation within biomedicine 	

Ethnographic methods have been successfully employed within the timescales of conventional health service research projects (Pope & Mays 2009, Dixon-Woods *et al.* 2009). Atkinson (2007a) notes that ethnography can contribute to:

'a disciplined unravelling of the breadth and complexity of relations: it can ask questions unasked by actors on the social scene; it can compare and contrast in ways that insiders do not do; and it can be rigorous as others are not. It furnishes knowledge that is well worth having' (Atkinson *et al.* 2007a, p.31).

Ethnographic accounts of work can contribute to understandings of power, conflict and inequality in organisations (Smith 2007), and how these organisations structure hierarchy and authority (Kleinman 1996).

Ethnography offered this study opportunity for further insight into the enactment of rescue on the frontline, balanced with understanding about the broader organisational context. As acknowledged in chapter three, structural influences on rescue need further clarification and articulation. Ethnographic inquiry enables exploration into the impact of power, hierarchy and organisational structure at both meso- and micro-levels. It offers opportunity to add significantly to the existing evidence base regarding management of acutely unwell patients, which to date has focused on surveys and interviews with staff.

Discussion now moves to consider the defining features of ethnography and underpinning ontological, conceptual and epistemological assumptions, before a position is outlined for this research.

4.3 Ontological, conceptual and epistemological assumptions

The origins of ethnography lie in the writings of travellers aiming to inform their colleagues about other societies. Methodological concerns regarding the speculative and evaluative nature of early anthropological accounts led to the requirement that the anthropologist live among the people studied and adopt a scientific approach to the interpretation of evidence (Hammersley 1998). Sociologists also used ethnographic methods; the Chicago school of urban ethnography was the main force behind early sociological fieldwork. However, as Van Maanen (1988) points out, ethnography never achieved the high status in sociology that it had in anthropology, since status in sociology tends to flow towards the

theorists rather than the workers in the field. Ethnographies were perceived as low budget, modest products that were peripheral to the field, whereas in anthropology, ethnography was *the* field.

Since the 1960s and the wane of the dominance of survey methodology, ethnographic research has become more influential within sociology. This interest is linked to diversification of theoretical approaches including symbolic interactionism, phenomenology, and ethnomethodology (Hammersley 1998). Ethnographers in both anthropology and sociology now share the same broad view that fieldwork is their defining method. However, the sprawling, diffuse and diverse nature of this method (Lofland 1974, Atkinson *et al.* 2007a) has led to its adoption outside traditional disciplinary boundaries. Ethnographies are now found in fields such as political science, law, advertising, public administration, marine studies and business administration (Van Maanen 1988). Nevertheless, intellectual divisions persist about the role of ethnography in the social sciences, its disciplinary alliance with humanities and the arts as opposed to the sciences, the role of postmodernism and the value of studying 'at home' (Engelke 2008, Atkinson *et al.* 2007a).

Debates about what constitutes high and low grade ethnography proliferate. Hammersley (1998) notes that ethnography in its widest sense equates with qualitative methods. However, there is a danger that the term becomes so broad that it becomes meaningless. For example, in Dixon-Woods' (2010) review of four ethnographic, patient safety focused studies, little methodological detail is provided to enable readers to establish the ontological and epistemological frames of the individual studies. The lack of context provided, particularly about how patient safety is enacted in different settings, and use of observational checklists in one of the studies suggests qualitatively orientated research rather than the fieldwork of the ethnographer which involves 'the intimate, long-term acquaintance necessary to gain that understanding' (Woolcott 1995, p.68).

This study adopts a position similar to Atkinson *et al.* (2007a), where ethnography is defined not by disciplinary or developmental frames, but by a commitment to the first-hand experience and exploration of a particular socio-cultural setting through participant observation. Common features cross disciplines and traditions, notably that the researcher is the principal research tool (Allen 2004a). Observation and participation are to some

extent guided by circumstances and the analytic purpose at hand, but remain the central features of the ethnographic approach. They are supplemented by conversations, interviews and textual material (Atkinson *et al.* 2007a).

The notion of participant observation rests on the assumption that within the realms of social life only actions of individuals are observable, but even these are not observable in their entirety (e.g. the meaning attached to the physical actions is divorced from the actions themselves). The researcher may apply their own meaning to these actions, which may be different to that of the actors (Holy 1984, p.29). The only way to ascribe meaning and ways of interpreting actions is to *know* them and *share* them with the actors, 'which implies a research procedure in which the notion of participation in the subject's activities replaces the notion of their simple observation as the main data yielding technique' (Holy 1984, p.29). The researcher becomes an observing participant eliminating the distinction between the observer and the observed phenomenon, while also maintaining enough distance to allow analysis and interpretation of what is going on. The main purpose of participant observation is to gain access to 'the insider's point of view', learning what it is like to be part of the host community, learning what it is like to be differentially situated and living with different constraints and preferences (Wind 2008, p.80).

There have been debates about the relative merits or disadvantages of the insider status (Allen 2004a). As Hammersley and Atkinson (1983) note, it is an unavoidable fact that we are part of the world that we study. The view experienced can only ever be selective, a 'partial truth' (Clifford 1986, p.7). An ethnographic account provides no more than a deep slice at a particular moment in time (Willis 2010, p.562). Issues regarding the validity of such data are discussed further in section 4.4.

In addition, the assumption underpinning participant observation that it is possible to participate in the lives of the people studied, and for a while to become one of 'them', is problematic. Ethnographies of work, postcolonial and poststructuralist accounts are bound by different methodological criteria than in studies of exotic, 'other' cultures (Long *et al.* 2008). Contemporary ethnographic research carried out 'at home' (Peirano 1998) has brought with it increasing realisation that most people do not form neatly demarcated and closed social groups that can be entered and studied as cultural islands (Gupta 1992). The

nature of participation needs redefinition according to the field, the specific situation and on-going activities, and the personal characteristics of the ethnographer (Wind 2008).

One of the main issues facing those embarking on fieldwork in health care organisations is 'studying up' (Gusterson 1997), where participation can become difficult as the actors are in a more powerful position than the researcher. The scope for traditional full immersion and participant observation is also limited by the difficulties associated with the qualifications required to enter into many of the roles. The diversity of approaches is not necessarily due to 'methodological sloppiness', but due to 'real constraints governing the conditions under which researchers can and cannot conduct qualitative field research' (Smith 2007, p.227).

Green and Bloome (1997) provide a helpful definition of the methodological boundaries of ethnography. They argue that 'doing ethnography' provides a 'broad, in-depth and long term study of a social or cultural group' (Green & Bloome 1997, p.183). An ethnographic perspective enables a more focused exploration of particular aspects of everyday life and cultural practices while retaining cognizance of theories of culture and inquiry practices derived from anthropology and sociology. This in turn is distinguishable from a methodological approach which utilises ethnographic tools during fieldwork, but may not be guided by cultural theories or questions about the social life of group members.

4.3.1 Defining ethnography for the purpose of this research

The position adopted for this study is summarised as follows:

1. The study aligns itself with Willis's stance (2010) that high quality ethnographic research is achievable despite lack of full participation and relatively brief periods in the field, providing researchers restrict their studies to a specific topic or select a particular 'lens' through which to view the group they are studying. For this research, the particular topic is the construct of rescue as seen through the eyes of health care workers.
2. It adopts an 'ethnographic perspective' (Green & Bloome 1997) to its study of rescue, drawing on both anthropological roots (how cultures influence each other) and sociological roots (how social structures and norms influence behaviours and practices).

3. It retains the underpinning epistemological and ontological assumption of traditional ethnography which as Hammersley (1998) notes relates to naturalism, aiming to capture the character of naturally occurring human behaviour. The study relies on participant observation as its main strand of data collection in order to facilitate close contact with staff within the field and illuminate relationships to context. In this way it demonstrates commitment 'in some measure to reconstructing the actor's own world-view, not in a lordly way, but faithful to the everyday life of the subject' (Rock 2007, p.30).
4. Adopting the broadly interpretivist philosophical position of ethnographic study provides this study with a means of facilitating understanding of how caring for acutely ill patients is interpreted and understood by health care staff. Generating a 'thick description' (Geertz 1973) of the context is valuable, incorporating both the insider's 'emic' perspective (working *within* the conceptual framework of those studied) and the outsider's 'etic' distinctions (using an imposed frame of reference) (Headland *et al.* 1990). This enables the presentation of not an absolute truth regarding rescue practice, but an authentic interpretation and representation of the culture of ordering, sense making and decision making at both micro- and meso-level.
5. Lastly, this study aims to join other contemporary ethnographies, challenged to produce something new against a backdrop of pre-existing interdisciplinary social science literature (Hess 2007). What is included in ethnographic reports is not simply an account of what the researcher has seen or heard, it is 'a product of complex processes of understanding, as well as of social interaction between themselves and the various people participating in the setting observed, including those acting as their informants' (Hammersley 1998, p.27). This will be facilitated by not only learning the culture from informants, but also working alongside informants to make sense of what is going on.

Figure 4.1 summarises the salient features of this ethnographic study. Epistemologically it adopts an interpretive stance, incorporating both etic and emic perspectives. Theoretical frameworks are generated from the clinical and social science literature, leading to the drawing up of research concepts, categories and questions. Data collection involves participant observation, interviews and documentary review enabling exploration of the inter-relationship of structures, cultures and beliefs with rescue practice. Careful

consideration is given to my role as researcher within this process. Inductive analysis and representation of the data is the final stage which creates the ethnographic account of rescue.

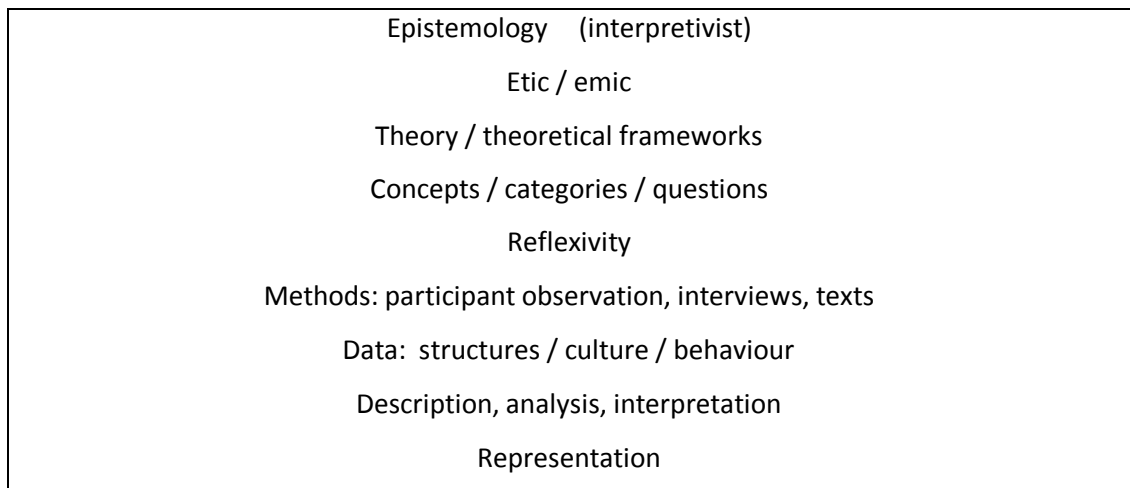


Figure 4.1: A conceptual map of ethnography, adapted from Street (2009)

The chapter now turns to consider issues regarding the validity, relevance and replication of ethnographic accounts.

4.4 Validity of the research

Internal validity refers to the degree to which research accurately represents the phenomena under investigation (Punch 1998). In other words, the extent to which the method 'fits' the research questions and can account for exceptional and contradictory cases (Silverman 1989). Any systematic research is limited by its data gathering tools, which in the case of ethnography, is the researcher (Fine 1999). Glaser argues that research should be evaluated on the basis of this design fit, rather than the truth or apparent objectivity of the data, or whether the findings are 'right' or 'wrong' (Glaser 1992).

In this study, the data were collected by a single field-worker, potentially casting doubts on the validity of the data (Bosk 1979). Field notes (including my reflexive accounts of encounters within the field) were dictated and transcribed to make them accessible to my

supervisors and facilitate transparency. These accounts included consideration of factors influencing validity of the data as noted by Brannen (1987); these included the effects of the observer on the observed, the effects of the observed on the observer (moving from 'outsider' status to accepted within a social situation), understanding the action setting (the degree to which the observer is able to understand what is going on) and different ways of seeing (inter-observer comparability).

The very act of observation distorts normal behaviour, and subjects may structure events to create an impression (Winkler 1987). However, the length of time I spent in the field went some way to mitigate this problem. In addition, as explained further in section 4.6.3, fieldwork involved shadowing a number of staff, together with observations of ward work and meetings. 'The best guarantees of normality are the other actors who enter the setting [as] they bring with them their usual expectations of the subject who is under observation and either extract normal behaviour or in some way react to the difference' (Winkler 1987, p.144).

Direct observation is no guarantee of understanding (Bloor 2007). Ethnographic 'descriptions are always selective: they focus on some aspects of phenomena and omit others. As a result, there are always multiple, non-contradictory, true accounts possible of any scene and we need to know the basis for particular selections' (Hammersley 1998, p.26). Judgement of knowledge claims are based on the plausibility and credibility of evidence (Hammersley 1998). The degree of inference and therefore potential for error is likely to be greater with some features of the situation more obvious than others, (e.g. in a study of rescue practice observing who records the vital signs as opposed to examples of hierarchical deference).

This study utilised several useful heuristics for verifying research quality. Firstly, the contemporaneous record of field notes enabled my supervisors to regularly review the methodological process of fieldwork including the role of participant observation, what situations featured in my accounts, who I was gaining access to, and what was being said. Secondly, the study utilised mixed methods to reduce the impact of inherent weaknesses in validity, which are more likely to result from employment of a single method, source or theory (Denzin 1978). Checking, qualifying perspectives, getting multiple kinds of documentation is important for ethnography, so that evidence does not rely on a single

voice. Data collection for this research included fieldwork, interviews and documentary review. This helped ensure that write-up included multiple staff perspectives and interpretations (Vogt 2002). Thirdly, acknowledging the potential effect of the research process and my individual characteristics as researcher were additional important factors to consider in assessing the strength of the evidence presented; this is considered further in section 4.9.

Ethnographic evidence provides at best only 'a partial truth' and yet it can be argued that what researchers see is 'right' based on their professional credentials and the evidence they possess (Engelke 2008). Atkinson et al (2007a) argue that sociological knowledge generated through ethnography is not superior to a subject's knowledge of the situation; it is *different* and fit for different purposes. The emergence of patterns in ethnographic writing speak for themselves and can be used as 'reasonably stable pieces of evidence' (Engelke 2008, p.9).

During data collection in the present study, observation and analysis were closely intertwined. Early findings were checked with staff during fieldwork and follow-up interviews. Once data collection was complete, emerging themes were presented to clinical and managerial staff, and academic audiences at local meetings and national and international conferences to test the validity of emerging interpretations (Morse *et al.* 2002). Papers published during the research process which drew from data collected from both the PhD study and the managing complications programme of work are detailed in Appendix 1.

4.5 Generalisability of the research

Atkinson et al (2007a) argue that ethnographic knowledge is necessarily provisional, bounded temporally and contextually, shaped by the purposes and the experiences of the researcher, and by interactions with others in the field. 'It can say little about what are called 'macro-structures', unless those macro-structures are approached only in their local manifestation'. Likewise, Becker (1971) questions whether different ethnographers visiting the same site with different questions at different times would see the same things.

I would argue alongside Hammersley (1998) that ethnography is concerned with making theoretical inferences rather than empirical generalisation. Kluckhohn and Murray's (1948) interpretation of generalisation is helpful as it clarifies the nexus between the one and the many. 'Every man is in certain respects a) like all other men, b) like some other men, and c) like no other man'. As Mitchell (1984) notes, the preoccupation with generalisability has resulted from inappropriate application of a particular kind of inference from quantitative data to case studies used for ethnographic purposes. The focus tends to be on ensuring a representative sample which is based on the idea of enumerative induction. In contrast, the inference from an ethnographic case study is based on analytical induction that the theoretical relationship among conceptually defined elements in the sample will also apply to the parent population. This analytical induction relates to the cogency of the theoretical argument linking the elements in an intelligible way rather than the statistical representativeness of the sample.

My aim was therefore to provide a good case study of rescue which would establish theoretically valid connections between events and phenomena. The validity of the sample depended not so much upon multiple case study sites as upon the proper specification of the informants, so that they 'could be accurately placed, in terms of a very large number of variables' (Mead 1953, p.654-655). During the analysis I asked how general principles deriving from some theoretical orientation manifested themselves in some given set of particular circumstances. The key was to demonstrate that the two organisations under study were 'telling' cases rather than 'typical' cases and that conceptual learning had occurred (Mitchell 1984).

In order 'to identify the necessary conditions among a set of theoretically significant elements' (Silverman 1989, p.62), this research also sought to explain variance. Deviant cases were explored further 'to refine the analysis so that the relationships described can be said to be analytically deduced from the data itself' (Silverman 1989, p.62-3). Nugus (2007) notes that transferability or generalisability requires: theoretical diversity; a detailed description; a sufficiently high level of abstraction to allow applicability to other settings (Punch 1998); and, opportunities for participants and others to challenge the research findings. Lengthy engagement in the field, triangulation of data, presentation of early findings to participants, and integration of theirs and other audiences' feedback facilitated this process.

The following section describes the specific methods employed in this study. Discussion firstly focuses on the field sites and access, and then considers data collection.

4.6 Methodology

4.6.1 Defining the field

The wider programme of work was based across two medical wards in two urban inner city hospitals. It focused on care of patients on general medical wards, as distinct from care provided within the acute admission period (i.e. in emergency departments and acute admissions units). Data collection for my doctoral studies was embedded across both sites. Comparison of cases across two organisations offered methodological advantages, notably the chance to identify differences and similarities as well as idiosyncrasies of each specific case (Vogt 2002).

One of the objectives of this research was to explore how organisational and structural factors influenced rescue work. Table 4.2 details structural aspects of each of the sites. Both organisations were structurally similar in terms of location, population served, admission rates and ward settings. Different safety systems were used within the two sites. A degree of structural similarity between sites helped interpretation of which findings were site specific and which would potentially be relevant beyond the study.

Table 4.2: Structural features of the two research sites

Contextual features	Westborough	Eastborough
Study site	UK acute teaching hospital	UK acute teaching hospital
Location	Inner city	Inner city
Critical care service	Large critical care department (80 beds)	Medium sized critical care department (60 beds)
General medical service	15,000 – 20,000 patients admitted per year 10 general medical wards	15,000 – 20,000 patients admitted per year 10 general medical wards
Study ward / beds	General medicine with respiratory speciality / 30 beds	General medicine with diabetes speciality / 28 beds
Safety systems / tools in use across medical service	<ul style="list-style-type: none"> • Track and trigger tool • SBAR tool • Access to a critical care outreach team 	<ul style="list-style-type: none"> • Track and trigger tool on all but two medical wards (including study ward) which were piloting an intelligent assessment technology

Further contextual details of the two organisations and the safety tools are provided in chapter five.

4.6.2 Securing access to the field

Access to the two acute trusts was facilitated by the commitment of key clinical leads to the wider programme of work. Access permission was obtained from the Divisional Manager and Clinical Director of medical services in both organisations. These leads were instrumental in selection of the two general medical wards (one with a respiratory speciality at Westborough and the other with a diabetes speciality at Eastborough) on account of factors such as clinical speciality, acuity and utilisation of safety tools. Once access had been secured and ethical and research governance approval obtained, time was spent meeting the ward managers and attending ward meetings to inform staff about the project. Flyers and information sheets were distributed about the project to raise general awareness (see Appendix 2). My critical care background and familiarity with nursing / medical work, routines and hierarchies helped build trust and facilitated entry into the field and access to various stakeholders in the early stages of the project.

However, while links to the managing complications programme of work helped secure entry, being associated with the wider programme of 'safety' work appeared to adversely affect relationships with a number of nursing staff on the study ward at Westborough, linked with selection of this ward by clinical and management leads (see section 4.9 for further consideration of this). Field notes regarding access, attitudes of gatekeepers at both Trusts to my role as researcher and experiences gained during fieldwork helped contextualise findings about medical work within a story about the organisation itself (Smith 2007).

4.6.3 Fieldwork

'How ethnographic. In Morocco only several days and already I was set up in a hotel, an obvious remnant of colonialism, was having my coffee in a garden, and had little to do but start "my" fieldwork. Actually, it was not exactly clear to me what that meant, except that I supposed I would wander around Sefrou a bit. After all, now that I was in the field, everything was fieldwork' (Rabinow 1977, p.11).

Fieldwork needs to enable sufficiently close contact with the setting and the staff being studied to assure validity of the descriptions (Hammersley 1998). Data collection took place over a 12 month period between January and December 2009 in the medical directorates of the two UK hospitals. Ensuring sufficient time for contact and relationship building was balanced against pragmatism and an awareness of the rapid and complex nature of change within both organisations. Bosk (1992) notes the time-delimited aspect of the study of work and its processes; much field work in organisations is historically specific. Studying current organisational and technological trends is problematic if published a considerable time after collected. There was pressure from leads within the two organisations to report back findings from the wider programme of work in a timely fashion.

Geertz (1973) argues that 'it is not necessary to know everything in order to understand something'. My background in nursing meant that I already shared an understanding of the socio-cultural context of hospital life. The 12 months of data collection gave me familiarity with the defining features of rescue practice and allowed identification of the unpredictability, variety and routinisation of health care tasks and activities included within rescue work. Because of my commitments to the wider programme of work I was also able to maintain links with the two organisations beyond completion of fieldwork. Fieldwork

included attendance as an observer at committee meetings; after the end of data collection, I continued attending committee meetings where care of acutely ill patients was the focus at each organisation for two further years. This built up long term acquaintances and gave the advantage of offering opportunities to check out preliminary understandings of my data.

Fieldwork involved observation of work on the two wards, together with shadowing of medical staff, critical care staff and senior nurses, which provided additional insights into practices across the directorates (see Table 4.3). Data collection involved approximately 180 hours of directly observing clinical interactions, management processes, ward rounds, multi-disciplinary team meetings, and informal situations such as coffee breaks. Observations of clinical activity took place during early and late shifts, weekends and night shifts. I spent an average of two days on the study wards between March and May 2009 to facilitate familiarity and relationship building. Between June and December 2009 I continued visiting the wards on average every week while additionally spending periods shadowing medical and nursing staff, and conducting interviews. This enabled me to keep a presence on both wards and continue with informal catch-ups, while broadening my inquiry to the wider directorate. Concurrent data collection in both settings helped distinguish points of similarity and difference between the two sites. In addition, I attended committee meetings where care of acutely ill patients was the focus, and observed a selection of mortality and morbidity meetings at one of the Trusts, collecting approximately 30 hours of meso-level data. My field notes were dictated and transcribed (approximately 70 hours of dictation).

Table 4.3 Data collection

	<i>Eastborough</i>	<i>Westborough</i>
Stakeholder meetings	9 with Head of Nursing, project leads, governance Leads, End of Life Facilitator	7 with Deputy Chief Nurse, Medical Director, critical care consultant, consultant nurse for ICU
Observations	<p>Ward work: 10 shifts</p> <p>Shadowing: 1 foundation year doctor, 1 senior house officer, 2 specialist registrars</p> <p>Meetings: 2 Mortality and Morbidity meetings, 8 Acutely Ill Patient In Hospital Committee meetings</p>	<p>Ward work: 8 shifts</p> <p>Outreach team: 1 shift</p> <p>Shadowing: 1 foundation year doctor, 1 second year foundation doctor, 1 senior house officer, 1 morning ward round across hospital</p> <p>Meetings: 10 Acutely Ill Patient In Hospital Committee meetings</p> <p>Medical Induction: 2 sessions with foundation year doctors</p>
Interviews	2 health care assistants, 4 staff nurses, 1 allied health professional, 4 managers, 5 foundation year doctors, 1 registrar, 2 consultant physicians, 1 critical care consultant, 1 trust lawyer	2 health care assistants, 3 staff nurses, 2 critical care nurses, 2 managers, 2 registrars, 3 consultant physicians
Data	<ul style="list-style-type: none"> • Escalation of care protocols • Audits of Trust wide observations • Mortality and morbidity data • Minutes of Acutely Ill Patient In Hospital Committee meetings • ICU admission audits • 7 months data from Intelligent Assessment Technology 	<ul style="list-style-type: none"> • Escalation of care protocols • Audits of Trust wide observations • Audits of escalation to outreach team • Mortality and cardiac arrest data • Minutes of Acutely Ill Patient In Hospital Committee meetings

Fieldwork on the study wards

While selection of a particular field is directed by a theoretical interest in a specific problem, the significance of the many events contextualising the problem can never be determined *a priori*. Much of my preliminary fieldwork on the two study wards was therefore 'undirected' (Jarvie 1964, p.215) and 'open-ended' (Holy 1984, p.18). This meant that rather than focusing solely on emergency episodes when patients became acutely unwell I learnt about the everyday reality and routines of each ward. I mapped the layout of each ward (see Appendix 3 for ward layout picture), and collected data on space, actors, activities, objects, as well as events and time goals (Robson 1993). I focused on my initial impressions, what events during daily shifts were perceived by clinical staff as 'significant'. This involved looking at meanings not as static categories but instead considering how staff members invoked those meanings in specific relations and interactions. Fieldwork involved attending to the 'when, where, and according to whom' (Emerson *et al.* 1995, p.28). My dual practitioner-researcher identity framed my starting view; I therefore tried to avoid using etic frames of reference such as clinical constructs of escalation and deterioration. I drew on Winkler's (1987) sensitising categories for what I observed: patterns (regularities in behaviour); transitions (spatial, geographical, temporal); transgressions of norms; omissions (what was *not* done); and, what information was freely volunteered.

Fieldwork within the hospital setting was not truly participatory, in the sense that I was neither a patient nor a member of staff. Although able to take part in aspects of the social life of the ward, I was not able to participate in 'medical work'; the medical procedures and the decision-making which are precisely the activities around which the social life of the ward is centred (Vermeulen 2004). As in Allen's study (2001), my research role varied from observer to participant. Sometimes I positioned myself at the nurses' desk and focused on understanding the unfolding 'work drama' (Hughes 1984). At other times, I helped with bed making and took phone messages. My role as researcher involved 'hanging around, asking weird and sometimes even dumb questions, drinking coffee, taking notes, chatting' (Wind 2008, p.83). Hanging around builds rapport, trust, familiarity and enables learning of emic categories, the defining features of the place.

I was careful to produce a 'fieldwork body', in terms of dress, demeanour, speech, which was both acceptable and plausible (Coffey 1999, p.65). I was anxious not to align myself with one professional group so dressed like a visitor in trousers or skirt and smart shirt, low

heeled shoes and understated jewellery. This set me apart from the uniformed nursing staff and health care assistants, and the medical staff in their white coats. However, at times I was mistaken for a junior doctor or medical student; in this attire I was generally accepted into ward rounds and meetings without question. At times, when I wanted to align myself with health care assistants and nurses, I wore a plastic apron suggesting I was willing to engage in physical work such as cleaning and making beds, and fetching water and meals for patients. I hung back during ward rounds, positioned myself on the periphery in handovers and meetings and was conscious to remain attentive and respectful at all times. During ebbs and flows of activity I was careful to avoid looking bored, judgemental or threatening.

Observation of ward activity and medical work enabled an additional opportunistic focus on events and interactions as they arose (Smith 2007). For a number of patients, I was able to follow through events and observe rescue trajectories over days and weeks.

Shadowing

Shadowing enables a glimpse of the threads of distinctions between organisational, professional and personal practices, techniques and approaches 'and the navigation of their various tugs and pulls' (DiPalma 2004, p.292). In addition to the unstructured observation of ward work, I shadowed a cross section of medical staff to gain insight into their 'routine' working day as well as their on-call episodes, which involved cover of the selected wards together with others within the organisations. Recruitment of medical staff to assist with this part of the research was done by email as well as face to face invitation (via meetings and during fieldwork on the wards). Critical care staff and senior nurses were recruited through similar means, so that I could spend periods observing their work. This provided me with access to 'backstage', informal communication opportunities such as in doorways, corridors and coffee rooms as opposed to that which occurred on formal ward rounds (DiPalma 2004). Shadowing these members of staff also enabled me to see how the two study wards compared and contrasted with others within the organisations.

Observation of meetings

In order to collect additional ethnographic material about the broader organisational context I attended management-level meetings about care of acutely ill patients, mortality

and morbidity meetings and two induction sessions for new medical staff, collecting approximately 30 hours of observation data.

Spaces of interaction: ethnographic questioning

During these observations I had to balance passively watching and accepting what I saw with seeking information and 'getting nosy' (Woolcott 1995, p.102). 'Ethnographic question-asking is a special blend of art and science; ethnography without questions would be impossible' (Agar 1980, p.45). My nurse status helped me judge when it was appropriate to ask questions and when it was better to remain quiet. Workload and 'busyness' played a big part in determining this. I was sensitive to the staff's absorption in their activities; at times passively observing their decision making, prioritisation, working patterns and team working felt sufficiently informative. At other times, lulls in activity provided opportunity to question and elicit further information. Coffee breaks, bed-making on the ward and walking between wards with the doctors provided space for 'chatting' about work.

However, 'asking does more than merely intrude – at least when it goes beyond exchanging pleasantries of the day' (Woolcott 1995, p.103). My particular questions in the field revealed to my informants that some everyday occurrences were of more consequence and interest to me than others. Questioning in the field involved balancing the finding out of what I wanted to know with enabling informants to still have opportunities to introduce and pursue their own topics.

4.6.4 Joining the observer and the observed: re-constructing the tale

During my observation work I avoided taking full notes, as this could be considered disruptive and disconcerting for participants, taking instead jottings or 'headnotes' which were audio-recorded immediately after the conclusion of the day's observations (Emerson *et al.* 1995) and transcribed. I tried to make these headnotes during quiet periods or when the staff member I was shadowing was busy with a patient rather than directing staff's attention to what I perceived was interesting. Information recorded in the field notes included initial impressions of the settings, key events or incidents, what those in the field regarded as significant or important, and contextual influencing factors, variations and exceptions to any emerging patterns (Emerson *et al.* 1995). Dictation of field notes immediately after leaving the setting preserved vivid impressions and observations,

facilitated access to accounts as fieldwork progressed and provided rich, textured, transportable documents (see Appendix 4).

4.6.5 Interviewing

Fieldwork was supplemented by semi-structured interviews (Denzin 1978). Understandings and interpretations of practice were followed up during in depth interviews with a range of staff, to 'test out' assumptions and clarify contradictory understandings. Combining observation and interviewing allowed the probing of 'reasoning and perceptions behind behaviours' (Brodkin 2001, p.329). Although there was some overlap, observations tended to precede the interviews to enable development of emerging interpretations. Staff members were recruited for interview by a mixture of email and face to face contact. The interviews were conducted in private spaces (offices, meeting rooms, coffee rooms) and lasted between 20 and 70 minutes.

Interviewees were purposively selected for theoretical representativeness, in terms of categories, substructures and networks from the social organisation (Johnson 1990). A broad range across occupational and professional groups was acquired. Respondents were also selected on account of their clinical role and place within the organisational hierarchies. Interviews were conducted with a variety of ward staff: seven ward nurses, two critical care nurses, four health care assistants, one allied health care professional, one trust lawyer and six departmental / project managers. Fourteen doctors were interviewed; five junior doctors (including foundation year 1 and 2 doctors and senior house officers), and nine senior doctors (including specialist registrars and consultants). The weighting of interviews in favour of senior staff was justified given that more time was spent shadowing junior staff with opportunities for informal conversations and exploration of the work observed (see table 4.3).

Interviewees were asked about the nature and characteristics of care for acutely ill patients and wider structural influences on care processes, team roles and communication across boundaries. Questions also focused on the implementation, utilisation, benefits and unintended consequences of the safety strategies included within each hospital's RRS, and the influence of organisational contextual factors regarding application of the RRS (see topic guide, Appendix 5).

The building of relationships within the field facilitated participation. I contrasted interviews undertaken with staff I knew with those recruited via email (particularly senior staff with whom I had little day to day contact with). With the latter, it was harder at times to move beyond what was public, the superficial, surface descriptions (Pope & Mays 2009). Having examples of events to share during the interviews facilitated the participants to move from 'front' to 'backstage' accounts.

Interviews can be considered 'spaces of interaction' (Rapley 2001, p.317). Interview data are jointly constructed during the interview. There is a shift of power from 'studying up' during observations to the redistribution of power with interviews, as the researcher becomes a seeker of knowledge, methodological expert, able to reconstruct and direct the interview. However, the participant is also the 'privileged knower' (Nunokoosing 2005, p.699) in control of what information is divulged. The interview data collected for this research were used to understand how respondents produced themselves in interviews, what was said and what was left unsaid and how this mapped to what I observed in practice. This then helped to illuminate structural, social and cultural influences on rescue practices.

4.6.6 Review of documentary evidence

Data collection also involved reviewing information regarding rescue work that was regularly collected at each organisation, and the role of this information at both strategic and ward level. This included observation audits, outreach team activity, cardiac arrests and mortality data, and seven months real-time data generated by the intelligent assessment technology. Protocols regarding care of acutely ill patients were also reviewed. This material was compared and contrasted with observation and interview data in order to corroborate or augment evidence from these sources (Yin 2003).

4.7 Analysis

All transcripts of observations, interviews, minutes of meetings, documentary data were imported into N-Vivo version 8. This facilitated content and thematic analysis. Analysis started with data collected from fieldwork and then moved to consideration of the interviews and written material. Lewins and Silver (2007) note that many researchers work

in grounded ways, without adhering strictly to the processes of Grounded Theory (1967). 'Open' or 'descriptive' coding was applied to the large volume of data to make it manageable (Miles & Huberman 1994, p.55-72, Strauss & Corbin 1990, p.62). I aimed in the first instance to work iteratively with the data, taking a 'bottom-up' approach, and being careful to avoid letting existing theoretical concepts over-define the analysis. Fragmented sections of data can be associated with misinterpretation (Smith & Firth 2011). I chose to include segments of text rather than utilising a grounded theory method of line-by-line coding, so that I could produce context rich excerpts, as seen in the ethnographic accounts provided by authors such as Fox (1959), Atkinson (1995), Mol (2002) and Mesman (2008). I also preserved particular patients' rescue trajectories which related to sequences of events involving care provision and interactions, over periods of fieldwork. These consisted of observations from ward rounds, handovers and informal discussions with staff, and while only offering a partial view of a patient's journey, they provided additional temporal and contextual insight into rescue trajectories.

Analysis was based on certain principles: immersion in the data to gain a sense of the central themes; developing a coding system; and, linking codes to form overarching categories or themes that can lead to development of theory (Morse & Richards 2002). During initial analysis, text was coded inductively into a mixture of 'free' nodes (Lewins & Silver 2007), which generated 23 categories. These included for example: 'teamworking'; 'local environment'; 'hierarchies'; 'it's an emergency'. Attention was paid to disconfirming cases and variation among phenomena in order to highlight 'the necessary conditions among a set of theoretically significant elements' (Silverman 1989, p.62-3). Writing memos formed an important part of the analytical process, enabling me to keep track of how emerging impressions were developing over time, and how data were related (Finlay 2002, Cutcliffe 2003). During this period (Jan-Sept 2010), I also worked on a coding framework that was guided by research aims from the wider programme of work. This adopted more of a deductive approach, as themes and categories of interest were to some extent predetermined (Lewins & Silver 2007). Analytical conclusions regarding the implementation, benefits and unintended consequences of the safety solutions formed the basis for feedback and presentation of a final report to the two organisations.

Thematic analysis involves an interpretive process in which data are systematically searched for patterns (Tesch 1990). Thematic analysis can provide rich insights into

complex phenomena and expand on or test existing theory (Braun & Clarke 2006). However, thematic analysis has been criticised for lacking depth (Attride-Stirling 2001) and for developing themes without necessarily generating theory. In the second stage of analysis (Oct 2010 – Sept 2011), I drew on the framework approach, which involves a series of interconnected stages that enable the researcher to move back and forth across the data until a coherent account emerges (Ritchie & Spencer 1994, Ritchie & Lewis 2003). This enabled me to link both inductive and deductive coding frames and to develop a conceptual framework (Smith & Firth 2011). The key to qualitative analysis is the critical thinking that accompanies *how* data are coded, links between codes and categories, and links between categories and themes (Ritchie & Lewis 2003). This stage of my analysis involved making sense of the core concepts, which had emerged from the refined categories and final themes, the clinical literature and sociological theoretical perspectives. Glaser (1998) recommends three codes of increasingly abstract categorisation: substantive, theoretical and core. Five substantive codes were generated: 'routine work'; 'identification of a problem'; 'asking for help'; 'responding'; and 'structural influences'. I developed three theoretical codes: 'enactment of safety work'; division of labour and boundary work; and socio-technical systems (see coding extract in Appendix 6). Rescue work formed the core code.

The findings chapters are organised around presentation of data relating to these core concepts. Chapter five presents findings regarding the organisational context of rescue and explores the 'structural influences' theme. Consideration of the structural role of the health care organisation as a socio-technical system continues as an underpinning theme in chapters six and seven, which enables the first objective of the study to be addressed. The second objective is met in chapter six which presents data related to the enactment of safety work and includes consideration of 'routine work' and 'identification of a problem'. Chapter seven focuses on the division of labour and boundary work, and presents data on asking for help and response, thereby addressing the third objective of the study. Findings about the intended and unintended effects of the RRS form a central thread across all three chapters, enabling the fourth and final objective to be met.

4.8 Ethical issues

'There is no ready panacea for the ethical dilemmas that accompany social research'. The onus for making decisions in practice rests with the individual researcher (Akeroyd 1984, p.154). Ethical approval was provided by a Research Ethics Committee (ref 08/H0808/178) (see Appendix 7 for REC form approval). Research governance approval was also granted by the two organisations.

Interview and shadowing participants were recruited through written and verbal invitation and through opportunistic encounters. Throughout the study, staff members were informed both verbally and in writing about the study. Consent was obtained before attending specific ward rounds and meetings, undertaking interviews and collecting Trust's documents (see Appendix 8). Anonymity and confidentiality was assured to all participants. While written consent was taken for interviews, and posters advertised the project aims and opt out clauses (see Appendix 9), it was impractical to seek consent from everyone I came into contact with during fieldwork. I had little control over who entered the field of observation. While consent was formally sought to attend meetings and ward rounds, this was impractical for those periods where I was 'hanging around' or shadowing others, where intervening in the work routine to introduce myself to others would have disturbed the very dynamic that I was there to observe. Allen (2004a) similarly found herself in clinical contexts where her research identity was not known to a number of people present, and chose to 'pass' in her perceived identity rather than disrupt the scene. As Murphy and Dingwall (2007) note, all research lies on a continuum between overtness and covertness. The emergent nature of research design and analysis further complicates the ethics of ethnography (Josselson 1996), as at the point of negotiating access, researchers typically do not have all the information required for fully informed consent.

Consent forms and background details of the interviewees were kept in a locked filing cabinet. The transcriber signed a confidentiality agreement and transcripts were assigned identifiers. Measures were taken to protect anonymity by removing identifying information and using pseudonyms. As this research was carried out in only two settings care had to be taken to ensure settings and participants were not identifiable, particularly for those in senior and distinctive positions. Care was taken with site specific identifiers (e.g. the particulars of the intelligent assessment tool) which could reveal the site's identity.

The nature of this research presented some particular issues. Firstly, I chose to package descriptions of the PhD research within the auspices of the managing complications programme of work to make its purpose appear less intrusive. This involved moving from the language of the sociological gaze to the clinical gaze in order to ensure acceptability (Anspach & Mizrachi 2006). I justified this intended silence in terms of the broad synergy between the two projects and the low probability of adverse effects for participants. 'Ethnographers rarely tell people they are studying *everything* about the research', 'within the same piece of research the degree of openness may vary considerably among various people in the field and over time' (Hammersley & Atkinson 1983, p.139).

My role regarding the two Committees which had been set up to oversee care of acutely ill patients in each organisation changed over the year of data collection. I moved from 'observer' to 'active participant' during the period as my authority within the group developed. I was particularly aware of a tension at Westborough between my research trajectory and that of the organisation. I was asked at every meeting for feedback on how the study ward was doing. As Mesman notes (2007), as data collection progressed, I became a relative insider of a part of the medical culture, with a means of accessing backstage information that the Committee did not necessarily have. I became the insider while they were the outsiders (Mesman 2007). However, I was not willing to act as informer or align myself with either the Committee members or with the frontline staff. Instead I resisted these calls to divulge information during the meetings and kept to the agreed research timeline of reporting back in Spring 2010. As Mesman (2007) points out, as researchers we are free to cross boundaries between cultures and positions, but our professional identities shape our position within these hierarchies.

There were additional difficulties of being asked opinions and deciding whether to intervene or not. Two of the junior doctors asked my view regarding treatment options and an ECG trace. On these occasions I declined to give an opinion; it is easier to stay on the sidelines and 'rationalise that decision as both methodologically and ethically scrupulous behaviour than it is to enter the fray' (Anspach & Mizrachi 2006). I was also bound by my professional code of conduct and on one occasion when I was shadowing an HCA doing the observations, found it difficult to ignore her poor assessment of a patient's condition. Rather than resorting to disclosure, I managed to negotiate and manage the situation locally (see field notes below).

[Extract from field notes, Eastborough, FN5]

We move onto the next patient, Sarah, where Helen, an HCA, asks how she is before she does her observations. Sarah says she's got 'tightness' across her chest. Helen does her observations and then asks if Sarah has any pain. Sarah again repeats, 'I've got this tightness.' Helen says, 'But no pain?' Sarah says, 'Is tightness and pain different then?' Helen says, 'Yes they are different.' Sarah also complains of feeling hot. I ask whether there's a fan I could get for her to give her a bit of air and Helen says no, they don't have the facilities here. Helen doesn't seem aware that feeling hot and constricted and chest tightness might be symptoms of angina. Helen pulls me to one side and explains that although Sarah is complaining of tightness this does not count officially as pain. Helen records Sarah's pain as 'unavailable information' on the PDA. I'm feeling uncomfortable and worried at this point, firstly because the information Sarah has given has been discounted because she hasn't answered the question in the right manner. The PDA appears to be structuring and routinising how information is gathered, and any information that doesn't fall into the boxes appears to be disregarded even though that tacit, subjective data might be as significant as the hard data that are being collected. Secondly, I'm concerned that Sarah's chest tightness is not being recognised as a warning sign. I suggest to Helen that perhaps this tightness could be one and the same thing as pain and ask if Sarah has a cardiac history, to which Helen says yes. I suggest that it could be angina. At this point I'm aware that I've moved from a position of researcher and observer to an active agent in the process. Helen mentions to a qualified nurse who has just walked into the bay that Sarah's got chest tightness, and then carries on with the observation round with another patient..... I see two qualified nurses go over to assess Sarah.

Others have drawn attention to these concerns (Gerrish 1995, Gerrish 2003, Johnson 1992), illustrating how nurse researchers' professional identities bring with them moral responsibilities that may be in conflict with the social norms of the group being observed. Allen (2007) notes that the situational ethics associated with ethnographic study does not always sit easily with the deontological ethics more characteristic of professional nursing practice.

There is a risk for participants and organisations regarding damage to self-esteem and reputation if portrayed in an unfavourable light (Bosk 2001, Murphy & Dingwall 2007). Publications from ethnographic fieldwork can, and do, create upset amongst those studied (Scheper-Hughes 1982, Ellis 1995, Mosse 2006). I had gained information and contextual insight in 'backstage' settings (Goffman 1959). Yet I was aware that participants may have temporarily forgotten the researcher's role or be unaware that an ethnographer is never 'off-duty' (Akeroyd 1984, p.145). I chose to use 'off the record' remarks alongside personal, critical remarks of specific individuals as a contextual backdrop.

4.9 Reflexivity

As the researcher is the principal research tool, the practice of ethnography 'requires careful attention to issues of identity and social status and the role of the researcher in the generation of data' (Allen 2004a, p.14). Binary distinctions between insider / outsider status and the relative advantages and disadvantages of each fail to reflect that insider-outsider positions 'are not fixed and stable but fluid and ambiguous' (Mesman 2007, p.290). As Hammersley and Atkinson (1983) note, we are part of the world we study. Researcher reflexivity requires consideration of the role of the researcher and the impact of the research process on the findings (Allen 2004a). Allen (2004a) notes this comprises several elements: how the field of study is filtered through the interpretive lens of the researcher; an acknowledgement that just by 'being there', the researcher will have an effect on the phenomena; and recognition that the field will have an effect on the researcher (Coffey 1999).

During write-up of my fieldwork I included notes about these elements. Regular review and sharing of these notes with colleagues enabled introspection and improved my ability to reflect on my experience (Holy 1984, p.33). One issue I was presented with as soon as I entered the field, was my identity as both researcher and critical care nurse (Henry 2003, p.233); I found myself occupying an 'in-between space of ambiguity, hybridity, fluidity'. The hybridity was performative in that I was able to utilise my professional background to gain entry and trust. It shielded me from unwelcome perceptions of my work as patient safety researcher with associated notions of scrutiny and surveillance. My role was similar to that of a 'halfie' (Abu-Lughod 2000). While I remained an outsider to the medical domain, my critical care identity fostered a sense of 'being one of us' which enabled backstage understandings and facilitated the development of relationships in the field. However, this

sense of 'double consciousness', allowing me to be both insider and outsider simultaneously (Henry 2003, p.235), brought with it divided loyalties and tensions. I had to be careful to avoid making assumptions based on misguided perceptions of my insider status. Cultural constructs initially perceived as shared (e.g. 'busyness' and 'deterioration') when checked out with medical staff were found to be different. My 'intimate, thorough and embodied knowledge of the work of nurses' (Wind 2008, p.85) proved at times outdated and in sharp contrast to that of the work of medical staff. Variances in ordering of medical and nursing work, and temporal-spatial occupancy of the modern hospital created different perspectives and priorities.

Once aware of my identity, the nursing and medical staff treated me to some extent as one of them, as was evident by their use of medical jargon when explaining things to me. My role was co-constructed and shaped in the field by power relationships, institutional markers and personal interests. My gender, ethnicity, authority and age at times proved more influential than the cultural identity associated with insider and outsider status (Narayan 1993) (see excerpt from field notes below).

[Extract from field notes, Eastborough, FN 9]

I'd been with [the registrar] two hours and I was aware that he seemed uncomfortable with me shadowing him. A couple of times he suggested that I go for a sandwich or accompany the senior house officer who was covering the wards. I decided to leave him to get on with his work on the wards and in the emergency department. We agreed that if a patient's condition deteriorated on the ward he would give me a call. I was aware how intrusive it was following him around. I was also aware of a hierarchy between our positions; between his role as a senior clinician and mine as a researcher. I was keen to protect our relationship because his support was likely to be advantageous for ongoing fieldwork and access to other staff. I felt intuitively that it was important I step away and give him a break.

My familiarity with hospital settings in general facilitated a sense of ease, yet I was struck with how I felt able to interact and settle into one of the wards much more easily than the other. The nursing team at Westborough appeared quite disparate and formal, and the absence of an obvious 'hub' (desk area which functioned as nurses' meeting point) meant it was difficult to know where to position myself. I was not entirely clear why we had been

granted access to this particular ward. The manager had not welcomed my arrival on the ward. My presence was either ignored or regarded with suspicion by nurses and health care assistants. This was not helped by the local culture of strict adherence to policies and procedures governing behaviour. Staff did not drink coffee at the desk areas and chat publicly, and I was discouraged from entering the patient bays or helping make beds 'as this was not my job'. Consequently I spent more time 'hanging around' with the medical staff. Building relationships with the doctors was facilitated by the utilisation of ward based firms: two teams of doctors were attached to the ward for a period of two weeks at a time, enabling me to spend time on consecutive days with particular individuals. I wondered how much my discomfort was visible to the nurses and whether positioning myself with the medical staff reinforced perceptions of me as 'the other'. However, working two night shifts and interviewing some of the nurses managed to foster relationships and enabled a move beyond disclosure of purely 'public' information to sharing some of what was backstage and 'private'. Allen (2004a) similarly noted the prestige associated with attending the ward at unsocial hours, and found that interviews were 'more conducive to the establishment of good field relations than the more fleeting encounters that had been possible in the context of daily work'.

In contrast on the ward at Eastborough, my role as researcher and my presence at the hub was quickly accepted. Selection of this ward was directed by the introduction of a new piece of technology; staff appeared to interpret my role as evaluation of the impact of the intelligent assessment technology rather than to scrutinise their practice. In addition, policies and guidelines were less rigidly followed here and staff saw my presence (and nursing background) in a positive light as an extra pair of hands. During periods of observation, I helped nurses and health care assistants with making beds, answered the phone and took messages and made coffee. However, I felt less able to engage with the medical staff as six different teams covered the ward. There was a constant stream of different doctors attending rounds and individual patients, making it difficult to build up relationships with particular individuals.

The researched may be portrayed as 'unveiled' and 'genuine' in their habitats; however participants are also open to the researchers' gaze and enter into 'the performative act of representing themselves' (Henry 2003, p.231). Some staff appeared more aware of this including a couple of junior doctors who were keen to demonstrate to me their knowledge

and power within the multidisciplinary team. Both ward managers were also keen to demonstrate how well their wards were performing. My research participants were not passive objects, but active subjects, who had the power 'to shape and control the ethnographer and the ethnographic encounter' (Kondo 1986, p.80). Some staff I worked alongside, while giving approval for me to conduct the observations, appeared distant and suspicious of the research, deterring me from feeling able to probe and ask further questions. I needed to maintain the 'interests of felicitous field relationships' (Anspach & Mizrahi 2006, p.718). Asking too many questions ran the risk of closing doors to future shadowing and interview opportunities. The 'dilemma of discretion' has been described by Anspach (1993) in which 'researchers avoid violating members' boundaries by asking questions and broaching topics that might offend them' (Anspach & Mizrahi 2006). The threat in these instances was that my marginal status reduced my understanding and interpretation of events, reducing the validity of the data. Where this occurred I attempted to reach other individuals across the professions and hierarchies to ensure that certain voices were not screened out.

'When it comes to analysis and writing, a sense of closure must be attained; the network must be 'cut, so as to say (Strathern 1996), implying a 'temporary objectification of relational knowledge' (Hastrup 2004, p.458). The pace of change within the two health care organisations was rapid and constant. It was important for me to exit the field and complete data collection for both the managing complications programme of work and the PhD simultaneously, as I fed back initial findings from the former to staff and then continued over the following year to work with leads from both trusts to consider the consequence of these for service delivery changes. I had competing agendas for the two projects; my PhD focused on an understanding of everyday practices whereas the managing complications programme of work was primarily geared towards evaluating the role of safety solutions. This at times created tension and disjuncture in terms of balancing the research aims, timescales and styles of narrative for the two projects. One example of this involved writing the end of project report for the two Trusts. Constructing the report involved firstly balancing the inclusion of additional sociological insights alongside the need for applicability of these for clinical staff, and secondly providing the structural context of rescue work to the feedback regarding the role of the safety tools, despite being only part way through the analysis of the former.

4.10 Conclusion

This chapter has outlined the position of this doctoral study as distinct from the associated managing complications programme of work. It has defined the features of ethnographic study and provided justification for use of this epistemological approach for the study of rescue. Using an ethnographic approach enabled inquiry to move beyond survey and interview accounts to highlight how rescue was enacted on the frontline including associated contextual inter-relationships. The inclusion of two sites enabled the distinction of differences and similarities between cases. The use of shadowing, participant and non-participant observation, interviews and documentary review provided multiple perspectives of rescue; feedback of early findings to the Trusts, and national and international conferences helped test the validity of emerging interpretations. The next chapter presents the first of three findings chapters. It presents the organisational, political and socio-cultural features of both Trusts and outlines how these influenced the provision of acute care services and shaped rescue work at ward level.

Chapter Five: The Context of Service Provision and the Shaping of Rescue Work

5.1 Introduction

Chapters five to seven present the findings from the ethnographic fieldwork. This chapter sets the context and provides a 'thick description' of each NHS Trust (Geertz 1973). This will highlight what was distinctive about each hospital. The general demographic profile and structural characteristics of each organisation are presented first. Discussion then focuses on how particular organisational, political and socio-cultural features of each setting influenced the provision of acute care services and shaped rescue work at ward level. This includes, at each organisation, the role of the Committee which had responsibility for managing care of acutely ill patients, the safety tools that were utilised, and data that were collected for quality improvement purposes. Importantly, these structures and processes did not necessarily act in a deterministic way; there was a dyadic relationship between these standardised rules, support structures and safety tools, and organisational culture and context.

This theme is developed further in chapter six which provides an analysis of how 'rescue work' was enacted in general medical settings. This analysis focuses on the situated process of rescue, who did what, when, where, and with what consequences. Lastly, chapter seven picks up the central theme of boundary work which permeated rescue work practices and looks at the various boundaries and social norms that influenced management of acutely ill patients. As in chapter five, findings regarding the role of the rapid response system are also situated within the analysis of the enactment of rescue work, and boundary work.

5.2 Demographic profile

Eastborough and Westborough were large and busy inner city teaching hospitals. Both Trusts served communities whose health was generally poorer than the England average. Over half of their residents lived in areas classified as being amongst the most deprived areas in England. In these areas, life expectancy was lower than in other less deprived parts of the borough. While death rates from all causes combined had improved over the past ten years, all rates remained higher than the England average. As a consequence of this demographic profile, the acute services within both organisations were characterised by

high patient acuity and workload, with the majority of patients presenting with complex social and physical needs.

Both Trusts had profiles of strong local and specialist services. Eastborough was recognised nationally and internationally for its work in liver disease and transplantation, neurosciences, cardiac and haemato-oncology. A recent internal report at Eastborough had recognised a pattern of increasing referrals for specialist medical and surgical services (e.g. trauma, cardiothoracic, emergency vascular and neurosciences including traumatic brain injury and stroke). Westborough's specialties included critical care, cancer, cardiothoracic, and renal. Both organisations served culturally and ethnically diverse communities. Each Trust admitted on average 15,000 – 20,000 patients per year.

5.3 Structural characteristics

5.3.1 Structure of clinical directorate and ward services

At Eastborough, general internal medicine was arranged in two Firms. Clinical services were covered by a range of consultant physicians who practiced in a specialised area as well as in general medicine. Firm 1 covered three general medical wards (two of which also had a respiratory and HIV specialty respectively), neuro-rehabilitation and two health and ageing units. Firm 2 covered two general medical wards (one with gastro-enterology and one with diabetes specialty), an acute stroke unit and one health and ageing unit.

Data collection for this research focused on medical Firm 2 which ran as four 'cells'. Each cell retained its own patients from admission with the exception of 'handbacks'. Each cell had its patient numbers managed externally by the allocation of handback patients from Firm 1; in this way each cell's numbers were kept approximately equal. Effort was made to place specialty-specific patients to the allocated Firm wards.

At Westborough, the medical directorate comprised ten medical wards, including a clinical decision unit which supported patients admitted via the emergency department. As the Trust had two admission wards, medical wards were no longer 'on-take'. A Firm-based system operated in that all Firms took turns in admitting patients. The two admission wards acted as repositories for new patients but were serviced by all the admitting teams.

Patients who needed ward care were moved where possible to appropriate specialty wards, but also ended up housed on other wards as outliers.

5.3.2 Study ward sites

The study ward at Eastborough was a 30 bedded general medical ward which specialised in diabetes management. Six consultants were based on the ward. On-call cover for the medical wards was provided by a specialist registrar (SpR) and either a Foundation Year two (FY2) trainee or a Specialist Trainee (ST)³. Additional support was offered by a twilight shift (2-10pm) staffed by a FY2 or ST.

The study ward at Westborough was a respiratory ward. Two medical teams (consisting of four and six consultants respectively) were based on this ward. The consultants were predominantly chest physicians with a few from general medicine. The teams rotated every two weeks from the ward to the acute admissions unit. At any one point the ward was covered by two consultant led firms. Change-over every two weeks was staggered between the two firms. Because of this two weekly change-over, during their hospital stay patients were handed from one Firm to another. So, for example, a patient in hospital for a period of seven weeks might be managed by four different teams (including the admitting team). On-call cover for the medical wards was provided by a senior registrar, a Foundation Year one (FY1) trainee and ST.

5.3.3 Critical care services

Eastborough's critical care service had about 60 beds. Critical care leads reported that their critical care service was relatively underfunded compared to other similar sized teaching hospitals within the area including Westborough. Critical care as a group was reported to have less influence over strategic decision making within the Trust.

'When you start at Eastborough the thing you really notice is that the acute care pathway and in particular critical care is relatively under-funded compared to comparable teaching centres. Our intensive care units are not purpose-built, the medical unit is operating as an intensive care unit but the bed space is too small, and when you go into the surgical unit again all the bed spaces are too small; that

³ In the UK, following an undergraduate program at a medical school (usually five years), trainees undertake a two-year clinical Foundation Programme in practice and then two to five years of specialist training.

unit should only have seven patients in it and has got eighteen, so you've got more than double the number of patients. It's a slightly political thing to say, but the ICU consultants have a lot less involvement in the running of the overall hospital than they do in most other Trusts. At Westborough, the ICU consultants are very involved in the management structure for the hospital; at B Trust, P, an ICU consultant, is medical director. The acute care pathway has a much louder voice in those Trusts' (Eastborough, Critical Care Consultant, 14).

There was no outreach or fully staffed Medical Emergency Team at Eastborough so there was diversity in the experience and capability of personnel responding to ward based acutely ill patients. These patients were largely managed by medical teams, but some were also seen by resuscitation officers or practice development nurses, or site managers, depending on what time of day help was sought, and how urgent the request was felt to be. The resuscitation officers did not provide cover out of hours and focused more on the period immediately before cardiac arrest and arrest response than on managing acutely ill patients.

At night at Eastborough, all divisions including medicine had a Clinical Bleep Holder (CBH), who was either a Senior Nurse or Night Practitioner. The main role of the CBH was to take charge of communication and escalation of clinical, non clinical and major incident issues out of hours. Issues dealt with by the CBH ranged from managing acutely ill patients to staffing issues and administration. At night on average there were a total of eight CBH's on site (excluding paediatrics and the emergency department). The main clinical skills of the CBH included identifying and intervening with sick patients, cannulation, phlebotomy, and interpreting ECGs.

Westborough had a large critical care department, with about 80 beds. An outreach team had been in operation since 2001, staffed by four critical care nurses and two physiotherapists. The team worked Monday to Friday, 8am to 8pm, reviewing patients on the wards who were scoring on the track and trigger system, and transfers from critical care. The outreach team staff also assisted with bedside and formal teaching for ward staff. At night and weekends, Site Nurse Practitioners (SNP) operated a similar service to the CHB at Eastborough, taking referrals for any patients causing concern, alongside administrative and staffing duties.

5.4 External influences

Professional associations such as the Nursing and Midwifery Council, General Medical Council and the Royal Colleges indirectly affected care provision of acutely ill patients in both Trusts, providing guidance regarding practitioners' fitness to practice and minimum care standards for ward care. Other influences appeared to have a more central steer in strategic decision making and priority setting at the two organisations. These included the regulatory bodies, Monitor and the Care Quality Commission (CQC), which imposed quality care standards and required the Trusts to account for their efforts to improve patient safety. Claims handled by the NHS Litigation Authority, and alerts and external reports provided by the National Patient Safety Agency (NPSA), National Reporting and Learning Service (NRLS), National Institute for Clinical Excellence (NICE), and National Confidential Enquiry into Patient Outcome and Death (NCEPOD) also shaped Trust decision making with regard to care of acutely ill patients. At the time of this research, there were several campaigns which provided guidance regarding the management of clinical deterioration; these included the Safer Patients Initiative led by the Health Foundation, the Patient Safety First Campaign and a programme run by the NHS Institute for Innovation and Improvement (NHSII).

Guidelines on care of ward based acutely ill patients were published by NICE in 2007. These included recommendations that physiological track and trigger systems should be used to monitor all adult patients in acute hospital settings, and that staff caring for patients on the ward should be competent in monitoring, interpreting and responding to clinical deterioration. Organisations were advised to implement a graded response strategy, which gave patients access to staff with critical care competencies and diagnostic skills.

Clinical leads from both Eastborough and Westborough reported that while there was existing local awareness of problems managing clinical deterioration in their respective organisations, publication of the NICE guidelines provided an important steer for decision making and forward planning.

'The NICE guidance came out in July 2007, concurrently there was a big drive within the hospital for quality improvement [...] And at the same time or just following on from it there was guidance from the NPSA, the Royal College of Physicians. So we

had these drivers but we also had a lot of people driving it within the Trust as well'
(Westborough, Manager, 10).

Figure 5.1 maps the external agencies and bodies influencing political decision making and priority setting at Eastborough and Westborough during 2009. In addition to NICE, the CQC, Monitor, the Primary Care Trusts and the Patient Safety Campaign played an important role in shaping management decisions regarding care of acutely ill patients during this period. The next two sections describe how the two Trusts responded to these external influences in addition to internal drivers for change, and the implications this had for care delivery.

5.5 Eastborough: the shaping of rescue work

5.5.1 Eastborough's Acutely Ill Patients in Hospital Committee

In 2007, an internal report was published at Eastborough reflecting on critical care data about activity and outcomes across medicine and surgery. The report raised concerns regarding the interface between critical care and the wards, and discussed the potential to reduce avoidable hospital deaths. A number of 'futile' admissions to critical care were deemed preventable given timely and effective review of patients' escalation and resuscitation status. Various track and trigger systems (TTS) were in use within different specialities. There was no Trust-wide system to identify acutely ill patients on the wards.

An audit of unplanned admissions to critical care from July 2008 to January 2009 demonstrated that 71% (15/21) of patients who deteriorated on the ward prior to critical care admission were monitored using a TTS. It was difficult to assess the response strategy for many of these patients as there was no formal and universally agreed strategy in place for patients identified as being 'at risk of clinical deterioration'. The time lag recorded from the onset of deterioration to referral and admission to critical care ranged from less than two hours to more than three days. The audit brought to light the need for a more uniform approach to assessing and improving the safety and quality of care delivered to acutely-ill hospitalised patients.

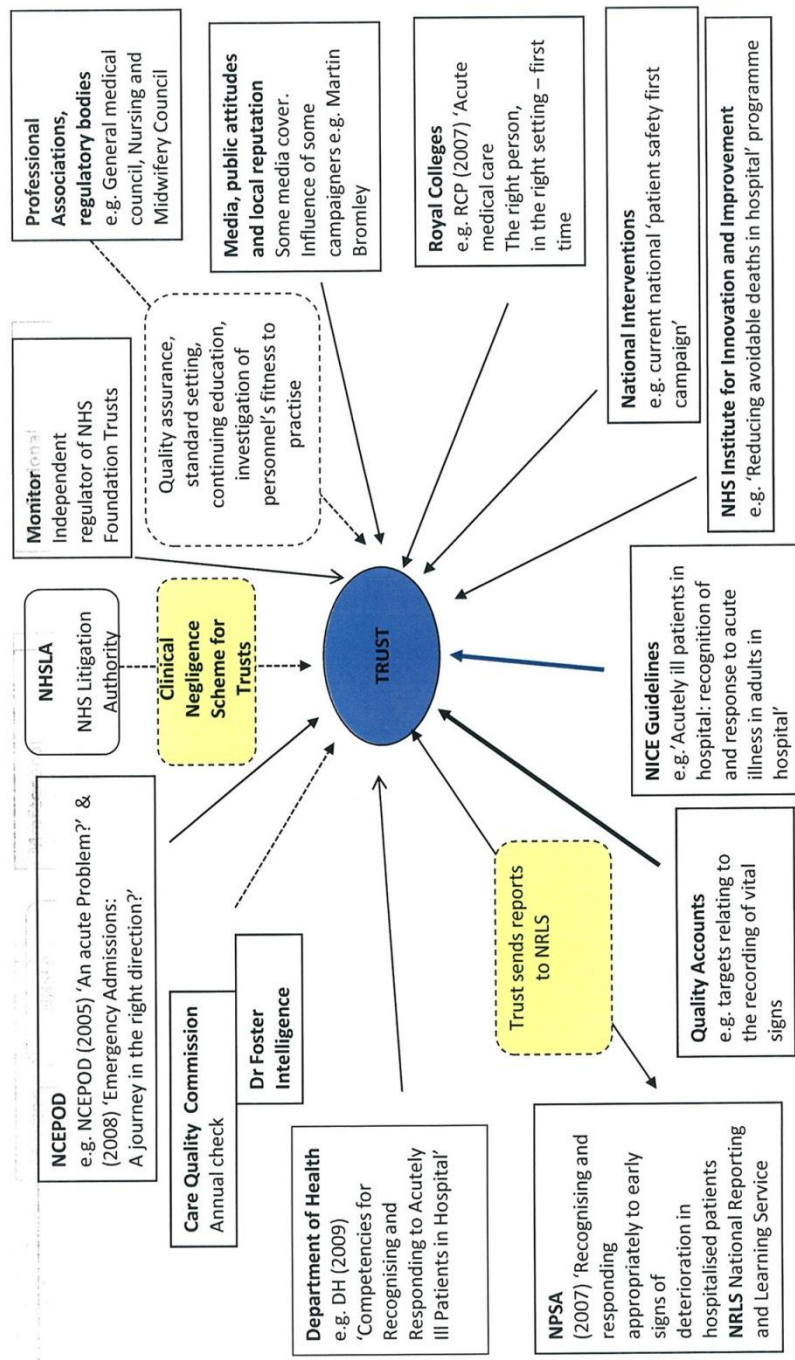


Figure 5.1: External influences on Eastborough and Westborough during 2009

This together with publication of the NICE guidelines led in early 2008 to the establishment of an Acutely Ill Patients In Hospital (AIIH) Committee interested in improving the service for ward based patients whose condition was deteriorating. The group met bi-monthly and was chaired by the Clinical Director with representation from the Deputy Director for Nursing, Head of Nursing for General and Emergency Medicine, Head of Nursing for Critical Care and Surgery, General and Emergency Medicine physician, Clinical Director for General and Emergency Medicine, and Head of Anaesthetics.

Eastborough's AIIH Committee reported to a Clinical Effectiveness Committee, which in turn reported to a Patient Safety and Quality Committee. A separate change management team was involved in quality improvement within the Trust (including initiatives targeted at improving care of acutely ill patients); clinical leads reported confusion regarding the role of this team, and where it fitted into the quality management structure. In addition, the main role of the Trust's clinical governance team was to monitor NICE guideline implementation. When the NICE guideline on acutely ill patients was published in April 2008, a representative from the clinical governance team joined the AIIH Committee to ensure that the Trust was responding to recommendations contained within this report. Yet managers noted it was unclear whether the clinical governance team's mandate included driving the organisational changes that were required as a result of implementation of these guidelines.

Eastborough's Committee members took on additional responsibilities to their existing clinical duties in order to head up various work streams (Figure 5.2). These work streams included the pilot of an intelligent assessment system, together with the revision and implementation of a Trust TTS. Their work also involved implementation of electronic records across medicine, mortality and morbidity meetings, care pathways, and routine audit and quality monitoring.

Observation of the AIIH Committee in 2009 initially illustrated low levels of buy-in at senior level, lack of a comprehensive strategy and lack of clarity as to its purpose. Poor attendance or representation at the meetings meant that feedback about particular work streams was often missing for several months at a time. During that year, the chair changed three times. The aim of the Committee was clarified in May 2009 as 'ensuring that patients whose condition deteriorates on the ward receive appropriate care; thereby contributing to the reduction of the hospital standardised mortality ratio' (Eastborough,

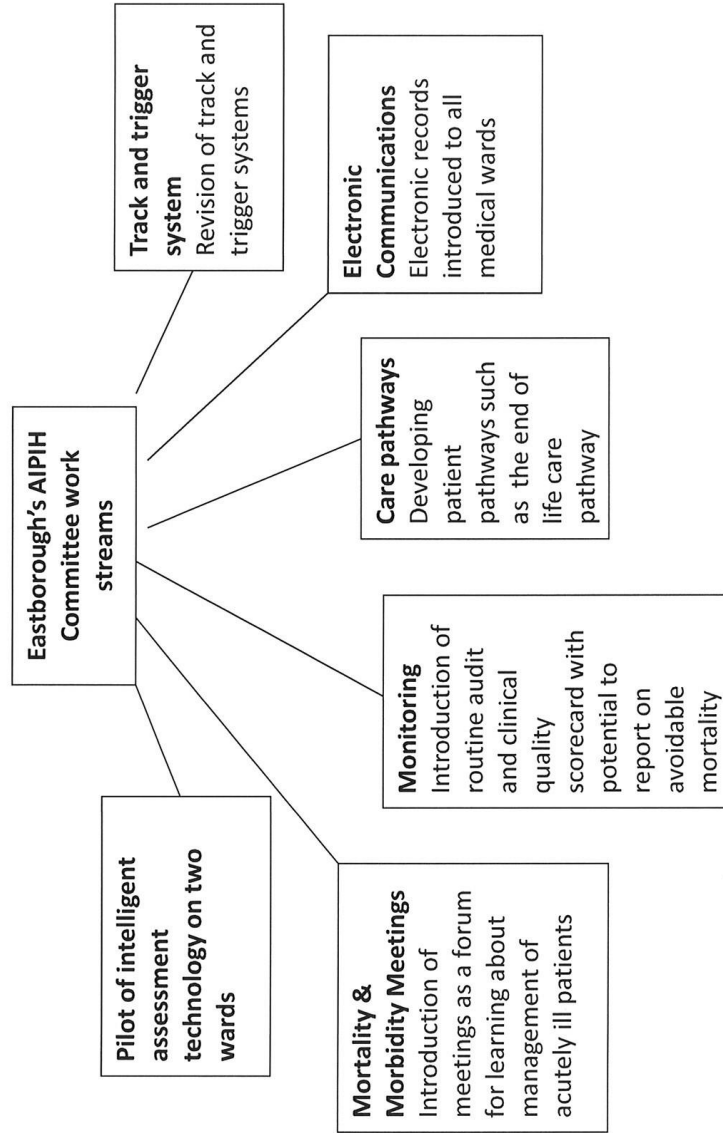


Figure 5.2: Eastborough's AIPH Committee work streams

AIPiH policy document: Minutes of the meeting, 2009). Terms of reference were drawn up and representatives from intensive care and palliative care were asked to join the AIPiH Committee. Meetings continued to occur every two months, with the same focus on specific work stream activity.

In a subsequent research interview, one Committee member reported a continuing lack of momentum to tackle ongoing problems with recognising and responding to acutely ill patients on the ward. She also expressed concern regarding leadership of the group and its authority to change practice.

'I don't think the meeting has a clear mandate of what it should be doing. [...] What distresses me is the Chair's decision that we didn't need to meet more than two-monthly, [...] I think it's almost like, oh we're ticking a box, we've got a group looking at it, but actually we're not really moving on or doing anything. I would like to have an outcome, there's nothing worse than going to a meeting where you're just sat there and I don't know what anybody's doing, I'm not clear what our next steps are and has it made a difference? I actually think the Committee can make a huge difference but I think it's about somebody leading it with the permission to do that. I can only push and go, "really, shouldn't we be making some decisions?"...' (Eastborough, Manager, 20).

During 2009 Eastborough signed up to the Patient Safety First campaign which was supported by the NPSA, the NHSI and the Health Foundation. The campaign aimed to shift the culture of the NHS from one of acceptance of error and harm, to one of action, through changing the behaviour of frontline clinical staff and senior managers (NPSA 2011). Organisations that signed up to the campaign were asked to issue a pledge to their staff, patients and community stating that patient safety was a top priority for their organisation. Following this they were asked to implement a leadership intervention and one or more of four clinical interventions (NPSA 2011) which included 'Reducing harm from deterioration'.

In 2009, the Chief Nurse who was instrumental in sign-up to the campaign left the Trust and support for the Safety First interventions dwindled. Her replacement prioritised instead the monitoring of mortality rates and clear, concise metrics. As one manager observed, other internal changes, such as the implementation of an electronic patient

records system and quality scorecards were deemed to be more important than the Safety First interventions.

[Extract from field notes, Eastborough AIPiH Committee meeting]

The manager notes that Safety First relies on the use of the global trigger tool whereas at this Trust they are focusing on quality scorecards. A new management lead has just started within the Trust, who feels audit and narrative is a thing of the past; his interest is in mortality data and clear, concise metrics.

However, the Patient Safety First campaign's deterioration metrics (which included the number of cardiac arrests calls, alongside other indicators such as rapid response calls per month) provided guidance for Committee members in terms of data to collect. Regular monitoring of cardiac arrests calls, and unplanned admissions to critical care commenced in May 2009 and the data were reviewed at subsequent AIPiH Committee meetings. During 2009, a scheme was also introduced where all hospital deaths were electronically flagged and reviewed by the patient's medical team in order to identify all anticipated and unanticipated deaths. Patients on the Liverpool Care Pathway were also recorded on a Palliative Care Scorecard.

5.5.2 Focus on mortality rates

In March 2009, Dr Foster⁴ alerts, which routinely track indicators of quality, efficiency and safety of care, such as the Hospital Standardised Mortality Ratio (HSMR)⁵, were triggered by apparently high mortality rates in patients admitted as emergencies to Mid Staffordshire NHS Foundation Trust. This prompted the CQC⁶ to carry out an investigation into Mid Staffordshire NHS Foundation Trust, and the care provided to these patients (HCC 2009). The implications of this high profile case were felt by both Trusts. Discussion at Eastborough's AIPiH Committee focused on their own Trust's mortality rates, which were generally higher than those of their neighbours (including Westborough), and consideration of whether these rates could potentially trigger a similar alert.

⁴ Dr Foster is a provider of comparative health care information within the UK

⁵The HSMR compares the actual number of deaths to the expected number of deaths, multiplied by 100. It is expressed as a relative risk where the risk of 100 represents the national average. An HSMR of more than 100 suggests that the local mortality rate is higher than the overall average; less than 100 suggests that the local rate is lower than the national average.

⁶ The Healthcare Commission, which carried out the review of Mid Staffordshire NHS Foundation Trust, was replaced by the Care Quality Commission in 2009.

A number of clinicians at Eastborough raised concerns regarding risk adjustment, and the quality of coding, and questioned the significance of the HSMR as a performance measure.

'There's quite a lot of tweaking you can do around the information that is sent centrally ... that will impact on your hospital's standardised mortality ratio. I am aware, or I am told, that for a long time and for a variety of reasons Westborough's coding has been better than ours. You'll make much bigger inroads into your estimated mortality by recoding, so by getting your data right. And anyone who tells you that they've improved their survival by 20% in the last year by some intervention you just don't believe them. [...] when you read the studies and the papers they all say, oh yes, 30-50% of deaths in hospital could be avoided or there's some avoidable error. But when you actually look at them those avoidable factors seem to disappear in front of your eyes, and it turns out that most of the people that die are elderly, frail and have multiple co-morbidities, and actually we haven't got a hope in hell of reducing our mortality by 30% or something like that; the reality is that you may, if you do things a bit better, improve things by, who knows, up to 5% perhaps?' (Eastborough, Consultant Physician, 16).

Doubts about the validity of the data appeared to provide legitimacy for some clinical leads to down play the significance of their HSMR and the scale of the problem of sub-optimal care on their general medical wards, and to question the scope for reducing it.

Eastborough selected reduction of mortality and morbidity rates as a key target for 2009/10 in their quality accounts⁷. 2009 was a developmental year for Quality Accounts nationally; they became a statutory requirement in April 2010⁸. Eastborough introduced mortality meetings within the medical directorate as a means to learn from avoidable

⁷ A Quality Account is a report about the quality of services provided by an NHS healthcare service. The report is published annually by each NHS healthcare provider and made available to the public <http://www.nhs.uk/aboutNHSChoices/professionals/healthandcareprofessionals/quality-accounts/Pages/about-quality-accounts.aspx>

⁸ The Commissioning for Quality and Innovation (CQUIN) framework was introduced in April 2009 as a national framework for locally agreed quality improvement schemes. The CQUIN payment framework enabled commissioners to reward excellence by linking a proportion of providers' income to the achievement of local quality improvement goals. It allowed commissioners to reward excellence by linking a proportion of English healthcare providers' income to the achievement of local quality improvement goals (DoH 2008b).

deaths. However, the Trust's emphasis on mortality was perceived by some clinicians to divert attention from other quality measures.

[Extract from field notes, Eastborough AIPiH Committee meeting]

The Chair of the Committee comments to a clinician that he is concerned that the mortality meetings on a monthly basis are too frequent. He says that this focus on mortality pushes other audit topics off the agenda; his concern is that mortality is only one indicator and there are other quality measures that are equally as important. This point is picked up by one of the ICU consultants who considers that the focus in the mortality meetings is on 'individual treatments and decision-making processes rather than on system issues'.

Issues arising from implementation of the mortality and morbidity meetings were reported to the AIPiH Committee, thereby enabling the linking of localised problems with managing acutely ill ward patients with system difficulties. One example of such an issue concerned the reluctance of senior clinicians to challenge their colleagues' provision of care. On another occasion, a consultant physician reported back on a discussion around the point at which a death is certified 'avoidable'. He noted a case where a patient's death was deemed to have been expected and unavoidable; however, scrutiny of the care received by this patient before his death revealed a point much earlier in his treatment trajectory where alternative treatment might have resulted in a different outcome.

5.5.3 The intelligent assessment technology

The Intelligent Assessment Technology (IAT) was introduced to Eastborough in April 2008. The inclusion of the IAT in the Trust's strategy to improve care for acutely ill patients appeared to reflect the organisation's strategic drive to stay technologically ahead of its competitors.

'Eastborough is very good at adopting new technologies; they try to be at the front line' (Eastborough, Manager, 19).

'I think all the chief executives that I've worked for have all felt we've got to keep moving forward, we've got to be at the forefront of things, and I think they've all

agreed that IT is going to be the area which can help us do that' (Eastborough, Manager, 18).

Management support for the IAT seemed to be driven more by its 'fit' with the programme for rolling out the electronic records system than its capacity to fill a gap in existing service provision regarding care of acutely ill patients.

'The IAT was brought about by two of our directors. We have a fairly sophisticated and functionally rich electronic patient record system here and it was very important from my perspective that it actually fitted in with that system. As time's gone on we've added more and more functionality to it. This was seen as another area really where we felt we could integrate the system in to that to provide more information for the care of the patients ... we didn't have any means up until this point of actually capturing the vital signs and producing the observation charts, or calculating the early warning scores' (Eastborough, Manager, 18).

The IAT was piloted on two acute medical wards, one of which was a site for this research. The decision to introduce the IAT was taken without consulting the senior nursing managers who were responsible for the medical directorate and pilot wards or the medical firms which used the pilot wards. There was also confusion over who was leading the project and driving the change.

'The IAT project was fascinating because nobody really was involved apart from x [a medical lead], so the first I knew about it was being called to a meeting in the boardroom where they said, 'this is what we're going to do'. And I said, 'Ooh ... Don't you think you should have involved somebody who's going to do the change, to get the buy-in? Because quite frankly right now I don't have any.' ... it also became clear after a while that nobody really knew who was leading it, I had assumed that the person in IT was doing it but they didn't think they were doing it either' (Eastborough, Manager, 20).

Training on utilisation of the system was provided for all the nurses and HCAs on the two pilot wards, but was only given to a few junior medical staff when the IAT was launched on

the first pilot ward. None of the medical staff received any training prior to the product launch on the ward used as a research site.

The IAT utilised personal digital assistants (PDAs), tablet PCs and the hospital intranet to standardise and replace traditional paper observation charts with real-time data and electronic charting (Figure 5.3). An inbuilt algorithm was designed to influence nurses' behaviour and improve compliance with a pre-set escalation protocol. The PDA directed staff to record eight parameters at each time point: pulse, respiration, temperature, blood pressure, consciousness, oxygen saturation, oxygen flow-rate or delivered oxygen concentration and pain.

The software had a number of in-built checks and prompts to reduce human error; if any of the values were abnormally high or low the nurse was prompted to check the accuracy of the value and to re-enter it. The PDA calculated the early warning score for the patient. Scores were registered as white (0-1), yellow (2-3), orange (4-5) and red (≥ 6) on the screen to record increasing risk (Table 5.1). The score prompted the time interval for the next set of observations and a set of actions (Figure 5.4).



Figure 5.3: The personal digital assistant and centralised monitoring screen

Table 5.1: Eastborough Track and Trigger System (for the IAT)

EW SCORE	3	2	1	0	1	2	3
Pulse	≤ 40		40-49	50-99	100-114	115-129	≥130
BP (systolic)	≤ 70	70-79	80-99	100-179		≥180	
Temperature		≤ 35.0	35.0-35.9	36-37.4	37.5 – 38.4	≥ 38.5	
Respiratory Rate		≤ 9		9-19	20-29	30-39	≥ 40
Oxygen Saturations (%)	≤ 85%	85-89%	90-94%	≥ 95%			
Inspired Oxygen %					≥ 8 litres/ 40%		
(AVPU) Level of consciousness				Alert	Responds to voice	Responds to pain	Unconscious
EW Score 0 to 1		Monitor observations 4 -6 hourly					
EW Score 2		Monitor observations 4 hourly; inform the nurse in charge					
EW Score 3		Monitor observations 2 hourly; inform the nurse in charge					
EW Score 4 to 5		Monitor observations 1 hourly; nurse should contact house officer or senior house officer immediately for patient review within 20 minutes					
EW Score ≥ 6		Monitor observations every 30 minutes; involve the registrar from the patient's team immediately in reviewing the patient and consider contacting the Consultant or Critical Care for advice.					

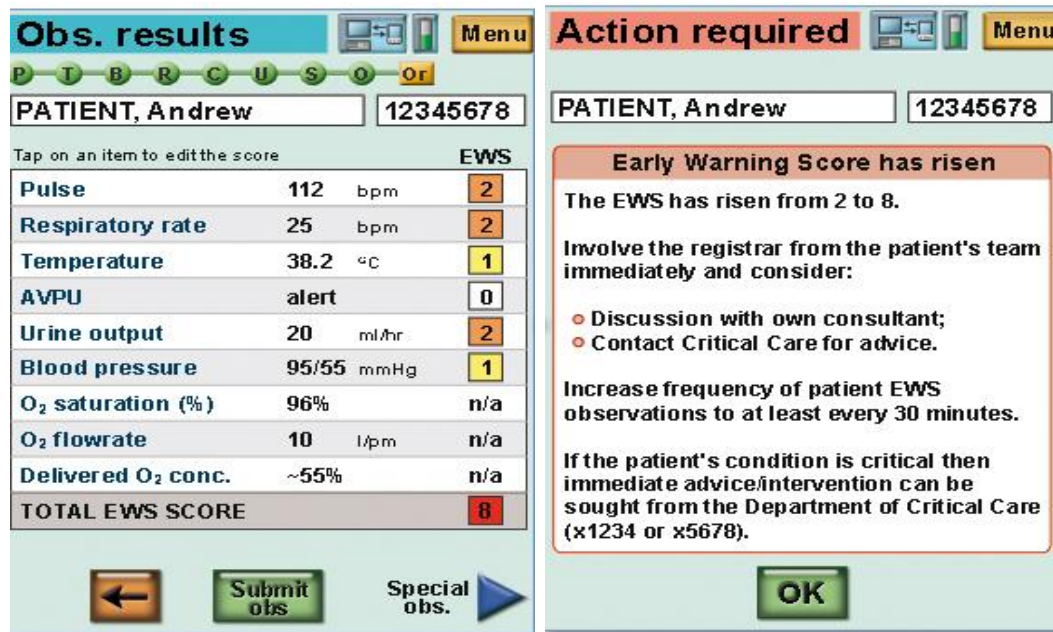


Figure 5.4: Instructions displayed on the PDA

On the central screen the system brought up a list of all patients on the ward, their scores, which nurse recorded the last set of observations and when the next set of observations were due. Any overdue observations were flagged. The system also enabled the user to select a particular patient and view a chart showing all their observations and recent trends in parameters.

5.5.4 Data management

The introduction of the IAT at Eastborough opened up opportunities for real-time surveillance of observation work. Review of the TTS incorporated within the IAT drew attention to the lack of escalation policy and observation standards at the Trust.

[Extract from field notes, Eastborough AIPHIH Committee meeting]

There is a discussion about Trust protocol in terms of adhering to observations. One of the nurse managers says, 'What is the Trust protocol?' Nobody round the table seems to know if there is a protocol or if there is, what it actually stipulates. Two senior nurse leads say they think 4 hourly recordings of observations is the baseline standard and express concern that the IAT stipulates 6 hourly observations as baseline. One of the physicians asks whether anyone knows who was involved in developing the algorithm for the IAT; nobody knows.

As the IT manager noted, introduction of the IAT revealed gaps in the system.

'My maybe slightly naïve assumption was that a hospital of this size with this many acute patients, would have a standardised alert system. So when I [found] [...] they didn't, I was like, 'Christ, you know, it's quite late in the project to be finding this out' (Eastborough, Manager, 19).

Utilisation of the technology offered opportunities to control the schedule and spatial ordering of work (Cohen 2011). Managers were able to log when the observations were done and who had recorded them. Early on during implementation, it was noted that on one of the pilot wards observations were not taken at night. On both pilot wards during the day managers perceived that there was 'over' recording of observations for some patients, as HCAs habitually recorded observations at 4 hourly intervals. If the HCA took one set of observations for one patient she would take another patient's at the same time to save time. This 'batching' of observations appeared to occur irrespective of patient need, and was perceived by managers as a sign of inefficiency.

'It gave us some really interesting data around what we did at night with regard to observations, how the patterns of observations went over the course of a day, the fact that we had batching at three or four different points in the day' (Eastborough, Manager, 19).

'You can see clearly the time of day they do observations and the dip at night time. I mean we found one ward that did none. [...] it was [also] very apparent that one of the wards wasn't doing any pain scores' (Eastborough, Manager, 20).

The IAT provided access to real-time data and illuminated certain aspects of observation work. It generated associations and reference points about the quality of observation work, such as adherence to protocol. It also generated universal rules, such as lateness values. For example, any recording over 8 hours for 6-hourly observations, and any over 1.5 hours for 1-hourly observations, was termed a 'breach'.

However, the categories and parameters of data that the IAT generated were determined by the parent company rather than by the system's users. Trust managers complained about the usability and transferability of these data for quality improvement purposes.

'What we wanted out of the system was the ability to get into that data to do our own reporting and we've not really been able to get that. They've provided various reports for us, but they've not actually given us access to the raw data at the moment. So that is an issue as far as I'm concerned' (Eastborough, Manager, 18).

Charts generated by the system needed to be adapted to a 'house style' to enable feedback of data to the wards.

'When I saw performance pack for the first time my initial reaction was, "Good Lord, this is rubbish, it's ... I mean it's literally like an Excel spreadsheet, 20 lines by 25 lines of little percentages and numbers, all over the screen. Now I'm, you know, used to working with data so I can pick stuff out, it doesn't make me baulk. [...] So what I've done is I've flipped it and I've created a little KPI [key performance indicator] sheet with four KPIs, four little graphs on it, which comes from their system, I just copy and paste it every two weeks and make a simple little Powerpoint presentation, which I then print out and take to a meeting with the ward managers and say, 'OK look, there's your graph going up' (Eastborough, Manager 20).

However, the complexity of data displayed on the system meant that it was difficult for managers to interpret the impact of the IAT on monitoring behaviour. Real-time data demonstrated that after implementation of the IAT, adherence to protocol remained variable. Percentage of 'late' observations on the research ward ranged from 30% to 70% (see Figure 5.5). Intervals of >4 hours were still reported for EW scores of 6-8 despite protocol stipulating that observations should be checked within 30 minutes.

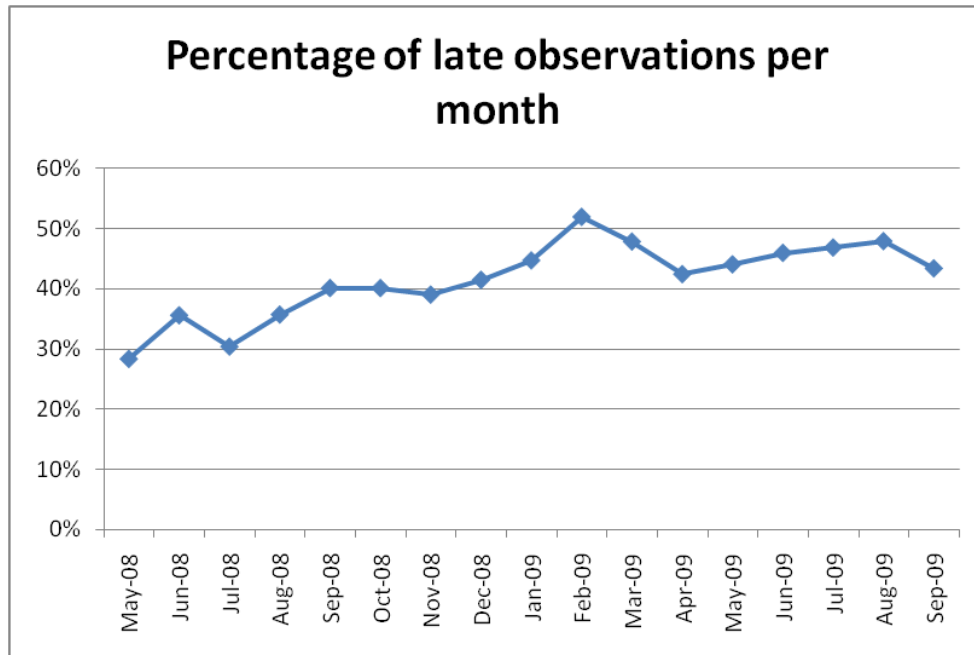


Figure 5.5 Percentage of late observations recorded at Eastborough

Over time, several of the AIPIH Committee members started to express doubts about the value of the IAT, given its high cost. Discussion with representatives from the parent company focused on proof of its impact on patient outcomes.

[Extract from field notes, Eastborough AIPIH Committee meeting]

K, a representative from the parent company has suggested that survival rates are likely to improve if more frequent observations are recorded on unwell patients as mortality doubles with every increase in absolute EWS (for EWS 0-5). J, a physician, disagrees, 'Just increasing the frequency of observations does not reduce an EWS and therefore will not reduce mortality. To a clinician like me, it is more interesting to know if unexpected deaths are more likely in patients who have not had appropriate observations done and did the teams react appropriately to a deteriorating EWS? We have evidence that the feedback of electronic data to the nurses may be improving their performance on the ward. Timeliness of observation measures may be quite interesting to the Ward manager but, to some extent, so what?'

Stakeholders involved with design of the product noted that the technology was not designed to regulate medical response as 'the system had too many false positives'

(Eastborough, FN, Stakeholder Meeting). One of the managers at Eastborough questioned the rationale for the system, given its failure to tackle medical response behaviour.

'[We're told] it's not a very sensitive tool and a lot of people just shift a 2 for a couple of hours and shift back down to 1, you get a whole load of false alarms and doctors won't believe in the system'. Well yeah, that's true, but the protocol is, at 2 it goes up, you escalate it. We should stick to that because that's the protocol, I'd rather have 100 false alarms and catch one patient who might die because we hadn't notice there was a deterioration than not bother the junior doctors, because hang on a minute, it's just their job' (Eastborough, Manager, 19).

As support for the IAT waned amongst AIPH Committee members, data feedback to the ward managers which originally occurred every week, became less frequent. Managers cited poor engagement of the ward managers and matrons as contributory influences.

'Well we had feedback weekly for a while and ... and then it was bi-weekly, it's sort of stalled at the moment, but I've been a bit crazy with other stuff in the last month so I haven't fed back very much. It ended up with me having to go and find the ward managers and sit down in their offices rather than what we wanted which was it to be four people in a room, two matrons and two ward managers and us, in a room talking about the data so they could see how each other are doing, a little bit of friendly competition, but also learn from one another. Their ability to get themselves out of their wards was such that we had to go and find them. And the matrons never really engaged to it at all' (Eastborough, Manager, 20).

'The consultants never bought into it. As I went on a ward round with a consultant and asked, 'so how's the system going, how are you using it?' 'Oh I don't know, the juniors use it' (Eastborough, Manager, 19)

This system was finally withdrawn from Eastborough in November 2009 after a period of 18 months. Future plans focused on launching a new Trust wide TTS in January 2010 with the aim of trialling an in-house IAT later that year.

5.5.5 Critical care outreach service

Eastborough's AIPH Committee was reported by a couple of managers to comprise a 'difficult' group, with tensions between the nurses and the physicians, the physicians and the critical care staff, and the critical care staff and the rest of the Trust. These tensions were longstanding and centred around territorial battles for limited critical care beds; physicians reported that it was often not possible to admit patients to critical care when needed, and when patients were discharged from ITU, they were 'dumped' onto the wards. Critical care staff also reported that patients were admitted when it was not always appropriate, and that staff on medical wards often delayed taking patients back from ICU, thereby blocking critical care beds.

A number of specialist medical services co-existed at Eastborough. Tensions expressed at the Committee over care of the acutely ill patient appeared to reflect inequalities in power and authority between specialist teams, and the exercising of their jurisdictional control.

'At Eastborough I have noticed that there are a lot more camps, so there's the liver ICU and their system, there's the cardiologists and cardiothoracic high dependency areas, there's the renal unit and they have a renal high dependency area, there's the neuro-sciences area, they do their own thing; everyone has their own protocols, they think they're special and they shouldn't have to do what everyone else is doing. Historically Eastborough has been run by physicians with a research interest and more of an interest in specialist medicine, rather than having input from intensive care consultants or people interested in acute medicine' (Eastborough, Critical Care Consultant, 14).

Critical care struggled to cope with the current demand for its service. Without clear evidence of impact on patient care, senior critical care leads were able to protect their boundaries and resist pressure to introduce an outreach services. Scepticism regarding the effectiveness of outreach was expressed clearly in an internal report written by these leads reviewing critical care activity and outcome indicators, including the Trust's HSMR:

'In answer to the problems identified in the NCEPOD report relating to the rate and outcome of unplanned ICU admissions, the solution proposed by the DOH was the deployment of Early Warning Scoring Systems backed up by Site Nurse

Practitioners and Patient at Risk Teams. However what this approach failed to take into account was that, buried in the 'small print' of the very same NCEPOD document reporting such appalling outcomes, was the fact that of the 200 Trusts taking part in the audit, 73% already had scoring systems in place, and 56% already had Patient at Risk Teams. Simply stated, that particular solution was already in place but not working in the majority of participating Trusts, at the very time the NCEPOD report was compiled' [Excerpt from Eastborough, policy document: Review of critical care activity and outcomes, 2007].

However, a number of incident and audit reports of poor quality care received by acutely ill patients on wards at Eastborough contributed to growing pressure for a change to the way acute care was provided. In mid 2009, the AIPHIH Committee commissioned one of the critical care leads to review care provision for acutely ill patients within the Trust. The resulting report detailed a number of concerns which included insufficient Level 1 monitoring capacity for medical, surgical or trauma patients across the Trust⁹, and lack of uniformity of approach or any attempt to generate common Level 1 standards, protocols, equipment or IT support. The report also recognised that Eastborough was one of the few Trusts not to have a critical care outreach team or fully staffed medical emergency team (MET). The current MET rota was only 50% staffed and operated only out-of-hours, and the general critical care areas were under resourced with respect to capacity and staffing. In addition, there was no routine follow-up of patients after discharge from critical care areas to the wards. The report articulated that the problem was multifaceted and therefore required system level change.

⁹ In 2000, the Department of Health recommended that the provision of acute hospital care should be classified based on the level of care that individual patients need, regardless of location. It identified four levels of care:

Level 0: patients whose needs can be met through normal ward care in an acute hospital; **level 1:** patients at risk of their condition deteriorating, or those recently relocated from higher levels of care, whose needs can be met on an acute ward with additional advice and support from the critical care team **level 2:** patients requiring more detailed observation or intervention, including support for a single failing organ system or postoperative care and those 'stepping down' from higher levels of care; and **level 3:** either patients requiring advanced respiratory monitoring and support, or patients needing monitoring and support for two or more organ systems, one of which may be basic or advanced respiratory support (DoH 2000)

‘Solutions must therefore be directed at the entire pathway and not at isolated pathway components. For example, the development of an early warning score will not reduce hospital standardised mortality without parallel investment in a mechanism to respond to patients who trigger this early warning score. Likewise, an escalation pathway will not succeed if there is nowhere to escalate the patients to’ [Excerpt from Eastborough, policy document: Acute care recommendations, 2009].

One of the interventions the report brought to the foreground was the potential merit of outreach for Eastborough in ensuring consistency of response across the organisation. This field note was recorded from one of the Committee meetings where the report was discussed including the ‘the elephant in the room’, i.e. the issue of outreach.

[Extract from field notes, Eastborough AIPiH Committee meeting]

One of the critical care consultants said that she agreed with the report’s findings; she said it wasn’t as if they didn’t know about this before, but the reason they hadn’t looked at it in the past was ‘they didn’t quite know what to do’. She was quick to point out that there were issues around bed occupancy, and staff numbers. Even if the Trust implemented an outreach service there weren’t the facilities to be able to cope with any more admissions to these critical care areas. The author of the report noted that he hadn’t used the term ‘outreach’ as this was seen to be controversial; one of the managers laughed and said ‘That was very wise’.

I caught up with this manager after the meeting to find out what she meant. She noted that outreach within the Trust was seen as very political. She said, ‘Haven’t you been aware of the fact that in all the previous meetings we’ve skirted round the issue, we haven’t really faced up to and talked about this?’

While there appeared to be consensus amongst the Committee members that the service for acutely ill ward patients needed to be improved, there was less agreement on the seriousness of the problem.

'I think ...it's an impressive report written by someone who's taken an awful lot of care, and done an awful lot of background reading and is obviously very well versed in the subject. I thought he painted too gloomy a picture, because there is a danger tactically in shroud-waving, and in always saying things are terrible, it doesn't always help you to get your way. [...] it went from one catastrophe to another in the reading, and I don't think it's quite that bad, and I'm sure there's many places that are worse. That's not to say there are no problems, but I just think you have to be a little bit honest and you mustn't just say everything's terrible in order to get what you want' (Eastborough, Consultant Physician, 16).

There was also lack of consensus amongst Committee members regarding the efficacy of early intervention by critical care. The lack of strong evidence base for the benefits of outreach served to provide a space for contestation and defending of professional epistemic boundaries.

'There's little hard evidence that outreach saves lives when it comes to the bottom line. I believe that if we can get the IT support and get all the audit and stuff built into the work processes, it is quite a big opportunity to make a difference' (Eastborough, Consultant Physician, 16).

'Some of the medical consultants have said when they looked at my data that the efficacy of intensive care is not that clear. For example there are many patients who would trigger on the ward with a high score, who don't get referred who do perfectly well' (Eastborough, Critical Care Consultant, 14).

By the end of data collection in December 2009, the AIPiH Committee's attention was focused on improving the Trust's TTS, including plans to develop an in-house IAT. However there was growing support for outreach, and discussions about the feasibility of introducing a model were starting to take place. There were also plans for extending the critical care facilities.

5.5.6 Summary: the shaping of rescue work at Eastborough

During 2009, the focus at AIPiH Committee level at Eastborough regarding management of acutely ill patients was on improving mortality rates, learning from avoidable deaths and utilisation of electronic systems to improve quality and safety. Group conflict, lack of

critical care resources, changes of chair, lack of clarity about the Committee's purpose, bi-monthly meetings, and poor attendance at the meetings appeared to limit its ability to change practice. Multiple TTSs were in place within the Trust. An IAT was piloted on two wards, but there were implementation problems (notably lack of buy-in by senior nursing and medical staff). Three issues contributed to a loss of management support for the IAT; control of the data by the parent company, difficulties interpreting its impact on patient outcomes, and cost. The system was withdrawn 18 months after introduction. Despite the publication of several internal reports and audits at Eastborough noting delays in response to acutely ill patients, there was resistance to the concept of introducing an outreach service. However, by the end of 2009, attitudes towards outreach were starting to change. The piloting of the IAT is likely to have contributed to these changing attitudes, as it focused the Committee's attention on system level management of acutely ill patients, and the importance of a response element.

5.6 Westborough: the shaping of rescue work

5.6.1 Westborough's Acutely Ill Patient in Hospital Committee

Westborough's Acutely Ill Patients in Hospital (AIIH) Committee was established in 2007 partly in response to the NICE guidelines and partly in line with the drive for quality improvement across the hospital. The Trust had a ten year track record of implementing patient safety initiatives. The impetus for this was largely driven by a senior management team within the Trust as few external incentives were in operation to encourage individual organisations to set themselves apart from their peers with regard to quality and safety initiatives.

'The basic NHS leadership model is pretty flawed. It's still the world of joining the committees of the Royal College ... hanging out with the Department of Health and so on. At lots of levels the incentivisation is poor. The Department of Health is primarily interested in picking out the completely failing hospitals and making the sort of slightly less than average' (Westborough, Manager, 11).

A few of the leads at Westborough were familiar with the process of quality improvement, including the work of the US based Institute of Healthcare Improvement (IHI). As one

manager explained, their previous success in tackling other patient safety problems had equipped them to appreciate the importance of consistency and standardisation.

'We ran a lot of pretty successful programmes to reduce harm events, and what was surprising was that effectively pressure sores disappeared as a problem, if you believe the data we went for months without a major hospital acquired grade 3 or 4 pressure sore. C-difficile infections disappeared as a condition in medicine, although not necessarily across the rest of the hospital. And hospital falls went down by about 50%. And linked to that was a massive reduction in length of stay. [...] So to this day it slightly astonishes me how effective it is just doing relatively simple things consistently. So suddenly one realised that actually basically our health system is bloody awful, secondly there's massive opportunity to improve it. Thirdly there's a methodology there to do it. ... what's really, really important in a more general sense is the recognition and response to acutely ill patients, [...] we can use the thoughts, ideas, principles of quality improvement and quality control here' (Westborough, Manager, 11).

Patient safety was reported and observed to feature highly in various narratives and initiatives across the organisation.

'There's a very heavy patient safety interest here at Westborough and it's quite well-advertised, more so than perhaps at some of the other Trusts I've been to; the junior doctors at the induction last week had a specific lecture on patient safety which is quite novel' (Westborough, Registrar, 8).

A project manager was funded for a year for start-up management. This post was dissolved in 2008. Two other posts were also funded; a data analyst for one year, and a clinical improvement coordinator, both of whom were still in post at the time of the research. The group was chaired by the Associate Medical Director with representation from critical care, medicine, the Chief Nurse, divisional directors and the project team. AIPiH Committee members were partly self selected and partly chosen on account of their roles and track record of quality improvement work. The Committee had a clear mandate and reporting structure.

'The [Committee] had a clear position in the hierarchy, it wasn't myself and my friends amusing ourselves, there was a clear team with a reporting line into the Patient Safety Committee' (Westborough, Manager, 11).

Several streams of work were introduced, including an escalation pathway, a review of critical care services, IT and out of hours support, children's services and care of those with hip fractures (deemed a 'high risk' group) (Figure 5.6). As the chair noted, the additional start-up resource helped in driving forward the changes that were necessary.

'We were fortunate because we'd stopped producing avoidable complications which was very profitable, our division had a good surplus, the Trust had a good surplus, and our foresighted and wonderful manager at the time, had enough money to say, "let's do this properly and create a project team", as opposed to the usual "why don't you see what you can do without any more time, tacking it onto your day job, and we'll hope for the best"..' (Westborough, Manager, 11).

The AIPiH Committee started work in acute patient services, and then rolled out the programme to the whole Trust. The project was set up across clinical specialities including children's services, elderly care, and surgery. Members of the AIPiH Committee reported that there was buy-in for service improvement for care of acutely ill patients at senior physician and nurse level. The Committee meetings were well attended, its aims and objectives appeared to be well understood by the group, and members reported back monthly on progress achieved within each work stream. A large scale training and awareness raising programme was launched to improve understanding of the RRS.

'We went to all the surgical audit days, we went to medical consultants' meetings, we went to clinical indicators meeting for senior nurses on a Friday, we went to the heads of nursing, we went to the general managers' meeting and told them what we were doing, ward sisters' meetings, matrons' meetings, and local training, it didn't matter if it was one person, I'd just go and say, 'I must tell you about this.' The Chair of the Committee and I now do walkabouts in all the wards just to check that everybody's got it. The NICE guidance that came out is in a turquoise greeny colour, and most of the time I live in that colour, I'm trying to get this subliminal message across' (Westborough, Manager, 10).

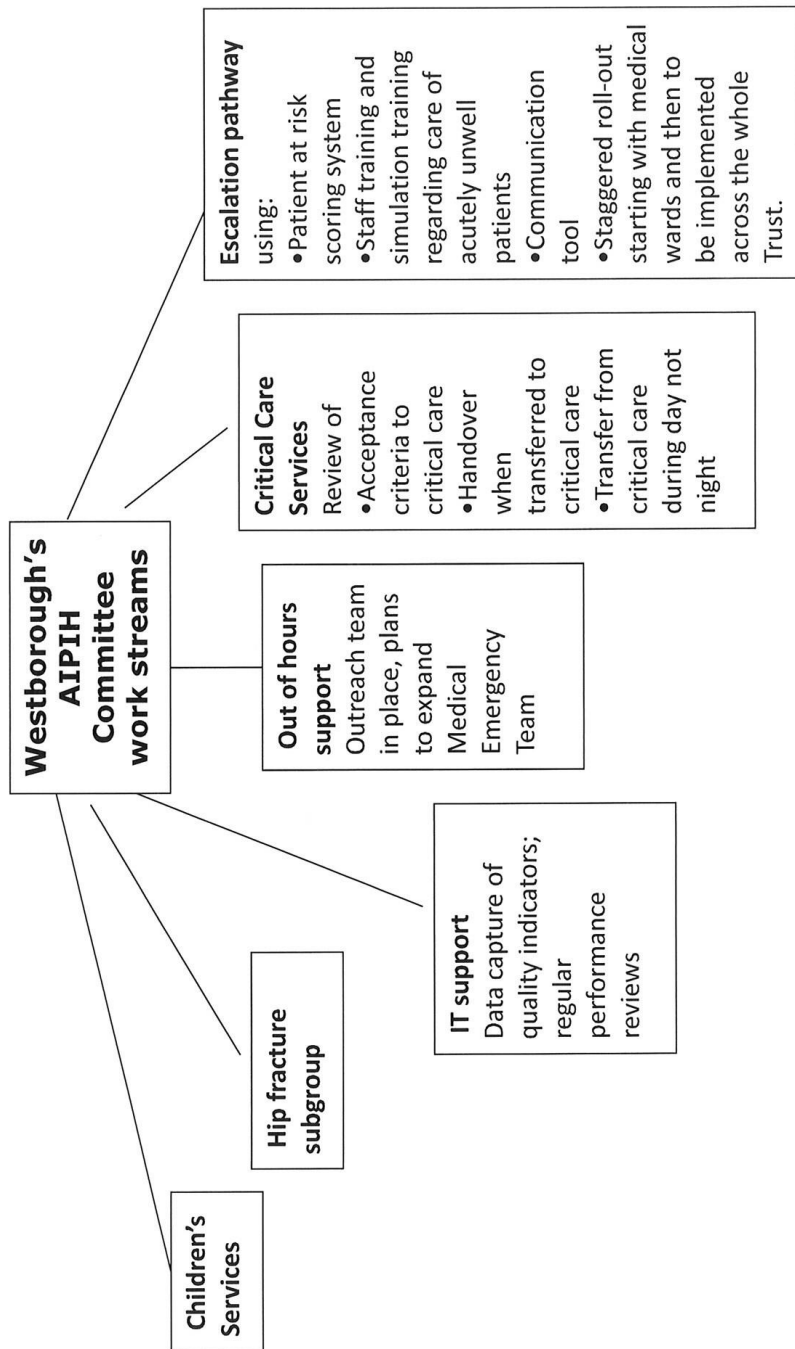


Figure 5.6: Westborough's AIPiH Committee work streams

The induction process for all junior doctors and nurses included orientation to the Trust's policy regarding escalation of care. A pocket sized 'patient safety war manual' was given to all new medical staff which listed care of acutely ill patients as one of the Trusts' top ten priorities, and included details of the TTS, communication tool and escalation pathway. Laminated escalation flow charts were also placed by all the ward phones.

However, despite Westborough's established patient safety track record and comprehensive RRS, which included start-up resource and support from managers and senior clinical leads, engagement in the acutely ill patient project was still reported to be variable across the Trust. Getting surgeons involved proved more difficult than medical teams; poor attendance of surgical representatives at the Committee meeting was observed.

'Getting engagement from surgeons in these non-surgical things is always difficult, and has remained so for our project. I mean we have a surgical lead who rarely comes to the meetings, but more to the point that surgeon is the surgical lead for almost everything is to do with quality improvement because no one else is showing much interest in it' (Westborough, Manager, 11).

5.6.2 Quality accounts

The implications of the Mid-Staffordshire case were also acknowledged by clinical and managerial leads at Westborough. Discussion at the AIPiH Committee focused on their 'high risk' services such as paediatrics, and the potential for this service to learn from strategies successfully employed within medicine to aid understanding of trends.

[Extract from field notes, Westborough AIPiH Committee meeting]

The Chair of the Committee highlights that HSMR is becoming high priority for all Trusts following from the Mid-Staffs incident; he notes that theirs is well below the national average apart from figures from paediatrics and oncology. Regarding paediatrics, he notes 'the high figure relates to the specialist service they provide as they take quite a lot of quite sick children from other centres. I think their SMR is quite similar to that of Great Ormond Street'. He notes that in medicine it has been helpful to look at data gathered via the global trigger tool and the audits in order to

find out what was going on; he wonders whether the same can be applied to paediatrics.

Westborough chose, in addition to achieving low mortality rates, to set managing acutely ill patients as a priority for their quality accounts and CQUIN programmes. They set their target as 95% adherence to the Trust patient observation standard, which appeared questionable given that they were already able to demonstrate achievement of meeting this target.

5.6.3 Safety tools

A CCOT had been in operation since 2001, and a TTS since 2005/6. However, these were reported to have been utilised previously on a rather *ad hoc* basis. Critical care leads commented that what made the difference when they were both re-launched in 2008 as part of a rapid response system was the additional Trust-wide buy-in, leadership and mandate of the escalation protocol.

'Essentially the Trust had always supported the critical care outreach initiative, but it was never really promoted to the level it is now. On the back of the NICE recommendations we suddenly had an acutely unwell protocol and escalation pathway that could be implemented. So in 2007, 2008 for the first time we were really supported, I say we as in the Site Nurse Practitioners and us, in getting ward staff to record observations and to calculate scores, and then to act on that score according to the escalation pathway. So it did bring about a big change. We'd been struggling away for years, and chipping away, but I suppose we didn't have a Trust-wide approach, we were too small, we needed the support of the seniority in the Trust, at ward level and Trust level' (Westborough, Critical Care Nurse, 13).

The purpose of the escalation protocol was to clarify the escalation pathway, set out the Trust's minimum standards for monitoring and recording physiological observations, and to define the competencies of the staff involved. The Trust standard included monitoring respiratory rate, oxygen saturations, heart rate (peripheral pulse), blood pressure, temperature, conscious level, and urine output (if fluid balance monitoring was required) for each set of observations. All patients were expected to have a full set of physiological observations monitored and recorded every 12 hours. The vital signs were used to calculate

and record the Patient at Risk (PAR) score, with every set of observations (table 5.2). The frequency of observations was triggered by the PAR score.

Table 5.2 Westborough Patient At Risk Scores

PAR SCORE	3	2	1	0	1	2	3
Temperature		≤ 35.0	35.1-35.9	36-37.4	≥ 37.5	≥ 38.5	
Heart rate		≤ 40	41-50	51-100	101-110	111-129	≥130
BP (systolic)	≤ 70	71-80	81-100	101-199		≥200	
Respiratory Rate		≤ 8		9-24		25- 29	≥ 30
Oxygen Saturation (%)	≤ 88%	89-90%	91-94%	≥ 95%			
Inspired oxygen %					≥ 8 litres/40%		
Urine output	≤ 20ml/hr for 2 hrs	< 1ml /kg over 2 hrs		> 500ml 24 hrs	250-500 mls in 24 hours	< 250 mls in 24 hours	Nil
Level of consciousness				Alert	Drowsy responds to voice	Acute confusion or agitation	Responds to pain only
PAR score 1 to 2				Monitor observations 4-6 hourly			
PAR score ≥ 2				Monitor observations 4 hourly			
PAR score ≥ 4				Monitor observations 1 hourly			
PAR score ≥ 6				Monitor observations every 30 minutes			

Patients that PAR scored ≥4 or more and transfers from critical care were reviewed by the CCOT. If patients scored 2 or 3, ward staff were expected to call the patient's own medical team. The outreach team was responsible for referral to the Medical Emergency Team (MET) if a patient triggered a PAR score ≥ 6. The Site Nurse Practitioners (SNP) at night took referrals for any patients scoring above a PAR score 2.

The structured communication protocol, SBAR ('situation', 'background', 'assessment' and 'recommendation'), was introduced in 2009 to facilitate transfer of communication across occupational boundaries. During early implementation and monitoring of the protocol

some of the safety leads perceived that the 'background' element of the protocol was difficult to articulate and would be better replaced by details of the PAR score. The mnemonic was therefore changed to 'SPAR'. The Trust protocol stipulated that 'SPAR should be used by all staff when referring patients to medical staff and acute team responders, and completed SPARs should be filed in the patient's health care record'.

5.6.4 Data management

At Westborough data were produced in a monthly performance report and discussed at each AIPHI Committee meeting. This report included cardiac arrest data; outreach, SNP and MET activity; review of escalations and mortality summary and HSMR index. Data demonstrated where cardiac arrests were occurring and outcomes. There was general consensus amongst Committee members that there should be zero tolerance for ward based cardiac arrests, as these occurrences often reflected poor end of life decision making or poor detection of and response to acutely unwell patients. This attitude appeared to have been shaped by IHI philosophy.

'The IHI has some quite interesting work on high reliability organisations, and one of the things I always remember is intolerance of failure at a sort of extreme degree, so in other words, in our sense, one cardiac arrest is one too many' (Westborough, Manager, 10).

All cardiac arrest cases were reviewed using the global trigger tool which enabled audit of the episode of care leading up to the event and identification of any identifiable triggers for harm such as lack of early warning score or readmission. Data showed that since June 2008, all patients with a cardiac arrest had had a PAR score assessment carried out prior to arrest. Rapid cycle reviews of care pathways of those patients admitted to critical care had generated additional insight into other risk factors such as lack of fluid balance. Logging of PAR score at the time of arrest and the acute period beforehand provided insight into the onset of symptoms and trajectory of the event. At risk groups were also defined through audit of this data. These included patients with head and neck cancer who collapsed after sudden catastrophic haemorrhage and patients with coronary events who presented with no early warning signs of impending deterioration. Review of patients' pathways prior to admission to critical care generated information about processes of care. However, evaluation of medical teams' decision making and actions was largely resisted by doctors

involved in the audits, on account of the mastery and specific knowledge associated with specialist practice.

'I'm looking at part of the acutely ill patients pathway, so I'm trying to collect data looking at patients who go from ward to critical care across the Trust, to see why they're being escalated, is it just because people get sick because that's what happens or is it because perhaps there's some areas of the process that we could improve. It is difficult to decide whether the care was appropriate because I'm not able to analyse a vascular team's care provision ... I'm not there to audit other teams ... I don't have the skills to do that but I also think politically that's completely inappropriate. What I'm there to do is to have a look at the overall pathway for those patients, to say they came in here, they went home here, this patient had one definitive procedure, this patient had three definitive procedures, this patient waited 15 days for an angiogram, or whatever it is. It's difficult because I don't think there's a standard of care there' (Westborough, Registrar, 8).

All new referrals to the outreach team and all outreach to MET referrals were reported including patients that remained on the ward or were moved to a critical care area. PAR team response rates were around 60-70% within the target time of 30 minutes. PAR scores at time of referral were noted. The majority of these fulfilled protocol, but small numbers of patients were referred to the outreach team and MET and were admitted to critical care with scores < 4, which suggested scores did not always demonstrate sensitivity as a marker of deterioration (Figure 5.7). Similarly, a number of patients were scoring under 4 prior to cardiac arrest (Figure 5.8).

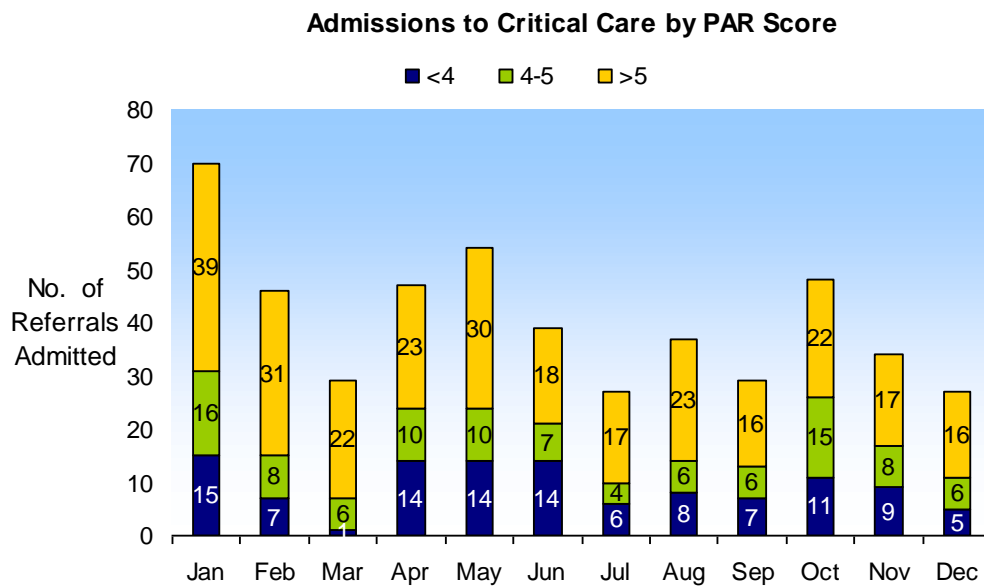


Figure 5.7: 'Patient At Risk' (PAR) score recorded prior to admission to Critical Care (Westborough, performance data, 2009)

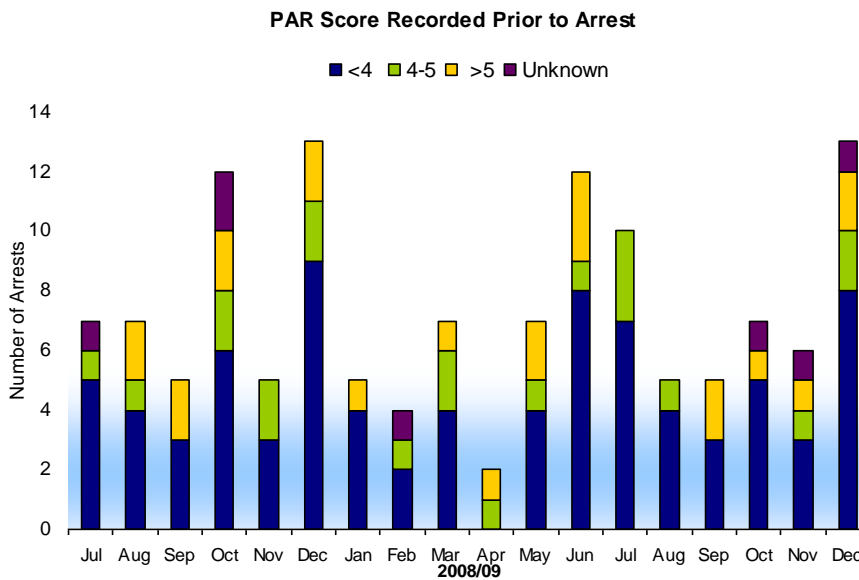


Figure 5.8: 'Patient At Risk' (PAR) score recorded prior to Cardiac Arrest (Westborough, performance data, 2009)

MET referrals (and their appropriateness) were reported as well as location of the patient at time of referral. However these data were acknowledged to be unreliable, as they were drawn from a number of critical care data sources. Often only partial details of patients referred to MET were recorded, and doctors would visit patients on the ward and only log their details if they decided the patient needed transferring to critical care. The label 'appropriate' was also acknowledged by a few Committee members to be subjective and of limited value. The Chair of the Committee (a physician) appeared to have little control over this data entry; poor completion also provided a means for critical care to resist peer scrutiny of the medical emergency team's performance in the escalation pathway.

'You've probably sat in the meetings where A from ICU is very protective and particular about her data; in a way she's quite right to be but the end result is we don't have any data [on MET referrals]. The fundamental question of what the hell does this MET team do, and how bad are the patients they're picking up, and what can we learn to prevent it happening next time is blocked because of that' (Westborough, Manager, 11).

Time and place of discharge from critical care was logged. Escalation per 1000 bed days was reported (all referrals to outreach and those referrals to SNP with PAR score ≥ 2). A single referral could be seen by more than one team (outreach, SNP or MET) so a number of escalations could be associated with one patient. Following the launch of the protocol, escalation rates rose initially from a mean of around 11 to 15 per 1000. Whilst it was suggested that higher rates indicated help seeking behaviour and referral to outreach or SNP, it was unclear what rate might be considered optimum and whether rates were expected to tail off over time as ward staff' skills improved in appropriate detection and response. Escalation managed within the patient's own medical team was not captured or audited.

There was a weekly meeting attended by the chief nurse, matrons and ward managers, to discuss performance indicators. Cardiac arrest data, audit results such as adherence to the escalation protocol were discussed here. Compliance with PAR and SPAR standards was reported weekly at the Trust Clinical Indicator forum. Monitoring and recording of physiological observations and adherence to Trust protocol was audited 6-monthly. From

April 2007 to July 2009 completeness of observations increased from 81% to 97% and observations with correctly calculated PAR score from 19% to 96%. From January to July 2009 escalation to outreach or SNP had risen from 33% to 76% and utilisation of the SPAR form rose from 8% to 58%.

As this critical care nurse notes, increased completeness of observations and use of the score appeared to be linked to performance monitoring and feedback of data to ward staff.

'In the past we used to deal with problems locally with ward staff and try and meet with them and say, you know, "This wasn't too good, perhaps you should have taken this forward." And the whole incident route, well I'm not sure what that achieves. Now, as I say, we've got somewhere to escalate these concerns to, and then the Committee can investigate and see, was it a near-miss, could things have been done better, what have we learnt from this? So I think that whole process has really improved things' (Westborough, Critical Care Nurse, 13).

5.6.5 Summary: the shaping of rescue work at Westborough

At Westborough, an outreach team and TTS had been in use for a number of years. A comprehensive RRS was implemented in 2008, drawing on IHI methodology, and lessons learnt from previous implementation of quality improvement projects within the Trust. There was strong nursing and medical sign-up to patient safety, as well as effective leadership at AIPiH Committee level. Additional resource enabled project and data management. A policy of zero tolerance for hospital cardiac arrests focused attention on management of deterioration and provided continued impetus for quality improvement. There was a strategic drive to collect data as a means to facilitate understanding of the local landscape of acutely ill patients. Data collection focused largely on completeness of observations, and escalation to outreach. No data were collected on response behaviour.

5.7 Conclusion

In order to better understand how rescue practices and the RRS work at ward level, it is important to explore the associated organisational context and culture. Figure 5.9 provides an overview of the socio-cultural and structural influences on the rescue trajectory. In response to a number of external policy drivers and internal pressures, care of acutely ill

patients on the ward became high priority for both organisations in 2007/8. Organisational structures and processes were closely bound with local cultures and social norms. Culture involves both system and practice, and is both 'the product and context of social action' (Silbey 2009 p.356). Constructs of safety of acutely ill patients were constructed and institutionalised within the two organisations. Over the data collection period, interpretations of rescue practice were constantly redefined by managers, safety and clinical leads. Times of critical self-reflection were observed at both the AIPiH Committees when local data or external policy direction unsettled established understandings and made space for change.

Each organisation's cultural identity and historical-political context proved important for shaping decision making and policy making at committee level. Westborough's pioneering status within the field of patient safety provided legitimacy and direction for its AIPiH Committee. A strong managerial lead was evident at this Committee reflecting the organisation's high degree of centralised control; a systems view of managing acutely ill patients was hierarchically imposed. At Eastborough's AIPiH Committee, managers and clinical leads (including physicians, critical care consultants and senior nurses) were observed to compete to legitimise their own interpretations of patient safety practices. The degree of central direction appeared less at this organisation, there seemed to be fewer formal hierarchies of authority, and more celebration of diversity and doing things differently. However, Eastborough's drive to stay technologically ahead of its competitors diverted organisational attention away from changing care of acutely ill patients at a system level.

Characteristics of the organisations that facilitated meso-level decision making and priority setting regarding rescue included structural features such as well resourced critical care capacity and staffing, project management support for implementation of the RRS, and clear and accountable governance structures for the AIPiH Committee. A high degree of consistency, coherence and energy in project management of the RRS helped maintain sufficient momentum for change. Active engagement of senior medical and nurse leads, and organisational learning experience of system level change helped facilitate action at committee level.

Conversely, lack of leadership and unclear goals was seen to adversely affect the remit and impact of the AIPH Committee, and implementation of the RRS. Competing group interests and bounded professional interpretations of the problem of failure to rescue, and solutions impeded the development of shared goals. Poor design features of the IAT and lack of clinical involvement in its roll-out limited its utility.

The next chapter enables the bridging of micro and meso-level perspectives. Having described the factors shaping decision making at committee level and implementation of the RRS at both Trusts, chapter six considers how local policy plays out in the enactment of rescue work at ward level. The ethnographic focus of the research facilitates exploration of not only what practitioners 'ought to do' as recorded in policy documents, but also what they actually were observed to do in practice.

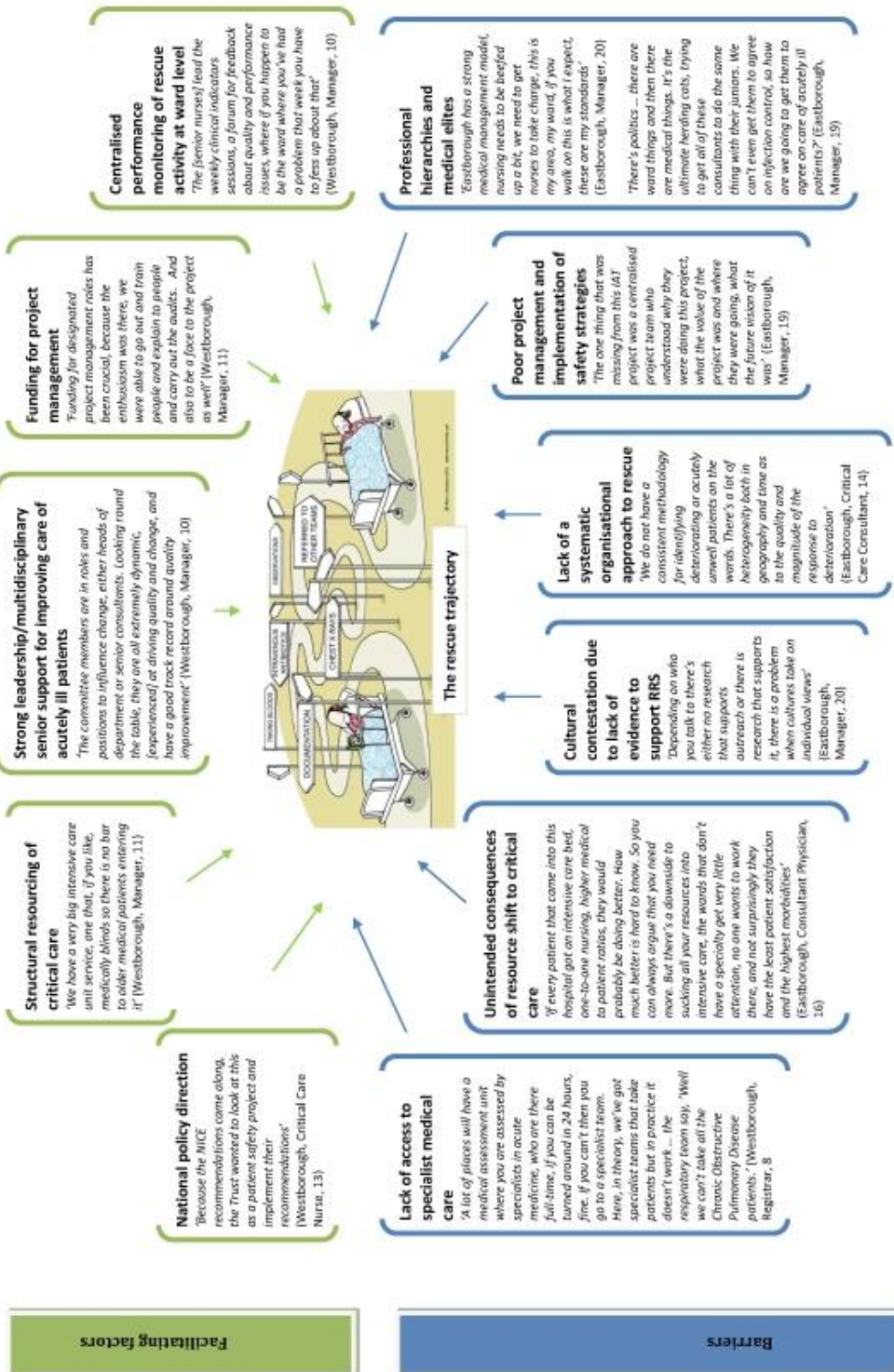


Figure 5.9 Socio-cultural and structural influences on the rescue trajectory

Chapter Six: The Enactment of Rescue Work

6.1. Introduction

The previous chapter summarised the two Trusts' demographic and structural characteristics. It provided an account of the governance of safety processes in relation to rescue work and ways in which the socio-political context influenced decision and policy making within each organisation. In this chapter, the focus shifts from meso- to micro-level activity within both Trusts, in order to identify how local policy translated into action at ward level. Whilst chapter five focused on the shaping of rescue work by Eastborough's and Westborough's AIPH Committees, the observation and interview data in this chapter are drawn primarily from field work on the two study wards. The chapter explores how rescue work is carried out in real time in the hospital setting, taking into account connections between organisational structures, staff, safety technologies and tools. It goes beyond the formal rules, policies and procedures concerned with managing clinical deterioration, capturing not only what was said about rescue, but also its everyday doing at ward level.

As outlined in chapter two, policy discourse regarding rescue of acutely ill patients demarcates distinct linear stages to this process. These include monitoring, recognition of warning signs, interpretation and timely institution of appropriate clinical management once deterioration is identified. This linear conceptualisation was found to simplify what is actually a complex social practice. The purpose of the present chapter is to surface and reveal more of this complexity, opening up the space around rescue while showing how much of rescue work is distributed, collaborative and reflexive.

Theoretically, this chapter adopts a focus on 'ontology in practice' (Mol 2002), the sociology of patient safety concerned with 'unpacking how patient safety is done and which possibilities and problems this produces' (Zuiderent-Jerak *et al.* 2009, p.1720). Such an approach shifts patient safety thinking away from a deficit model towards what Mesman (2008) terms 'exnovation', in other words the process of making existing team work strengths explicit. Importantly, it addresses Timmerman's (2006) call for orientation of analyses towards the normative political content of medical work, as well as exploration of the consequences of rescue work practices.

The findings are organised around four themes which characterised how rescue work was enacted within the two general medical settings. These are: observation work, articulation work, diagnostic work and managing clinical uncertainty. These themes emerged inductively from the data. Firstly, effective rescue relied on observation work, yet this task was perceived to be low status and that low status shaped its place within the world of competing health care tasks and work pressures. Secondly, rescue involved medical articulation work - the hidden but important collaborative, mundane processes which ensured safety and 'minding-of-the-gaps' in care of the acutely ill. Thirdly, caring for acutely ill patients was underpinned by much diagnostic work which involved assessment, evaluation and action (Büscher *et al.* 2010). This diagnostic work was not restricted to the professional work of medical staff, but was collaborative and included the 'mundane'. Lastly, underpinning escalation work was the pervasive theme of managing clinical uncertainty, with its features of medical individualism and clinical discretion.

6.2. Observation work: relationships between patients, staff, technologies and routines

As noted in chapter five, both Trusts utilised tools and technologies designed to facilitate risk assessment, monitoring and triggering of timely action for the acutely ill. The early warning risk score, the IAT and the escalation protocol were intended to overcome one or more of the following problems in ward care: incomplete or absence of taking observations, poor quality of vital sign charting, failure of staff to detect there was a problem and difficulties experienced by nursing staff in getting their concerns heard by medical staff. Previous attempts to represent nurses' and doctors' decision making processes in rescue work (NPSA 2007a, NPSA 2007b) have tended to underplay the amount of juggling work that holds these complex work practices together.

This section discusses the implications of the delegation of recording vital signs to HCAs, and the role of tools and technologies in shaping rescue practice. The surveillance role that data plays and how this shapes behaviour is also considered.

6.2.1 Delegation of the task of recording vital signs

Within the health service, recent drives to cut burgeoning costs and maximise efficiency have included the introduction of a new division of labour which designates some activities

previously done by nurses to lower-skilled workers. HCAs at both Trusts had been assigned the task of taking the observations, a role previously included within nursing jurisdiction. In the interviews, nurses from a variety of grades and positions rationalised this shift of responsibility on the grounds that nurses' increased workloads necessitated the 'dropping off' of certain tasks. While accepting this shift of responsibility as inevitable in the context of staff shortages, some senior nursing staff from both Trusts saw it as regrettable.

'A lot of HCAs do [the observations], yes. It's inevitable because of the staffing levels and the qualified nurse can't be doing absolutely everything. [...] I would prefer it if qualified nurses did them but it's not going to happen is it' (Westborough, Manager, 6).

Nurses were observed to automatically delegate to the HCA when vital signs needed checking, even when they were with the patient and in a position to check the observations themselves. For instance, on one night shift, a nurse was observed to ask a HCA to check a set of vital signs on a patient who had rung complaining of feeling breathless and unwell. The nurse had attended the patient and checked his respiratory rate, but then left the other signs for the HCA to check. Doing the observations joined other low status tasks such as feeding and washing patients, which were also considered the domain of HCAs. Heroic activities (such as drug and therapeutic interventions and resuscitation) performed by higher status professionals contrasted with low status work exemplified by the doing of observations.

At Eastborough, despite the senior nurse manager stipulating that HCAs should not be delegated large batches of observations, this occurred on a regular basis. Although nursing staff reported that they were expected to assist with taking observations, this task was afforded low priority amongst other routine responsibilities such as administering drugs.

'We are supposed to do them [the observations] once a shift. But it's whether we actually get round to doing them ... if you're doing all the drugs then that's not likely to happen' (Eastborough, Nurse, 5).

'We only have one health care assistant [who] works on this ward at night. And sometimes I have to end up doing all 28 observations, which is not nice, and even

though the manager said that everybody needs to combine and do them ... in the morning the nurses have to do the drugs and sometimes it takes so long to do it, I have to do all 28 observations' (Eastborough, HCA, 3).

Nursing staff and managers identified a distinction between the 'doing' of observations (which HCAs could be trained to do) and 'interpreting' work. This legitimised delegation of the doing to the HCAs. Senior nurses and managers at both Eastborough and Westborough perceived that the dynamap (a portable machine that electronically measured heart rate, oxygen saturations and blood pressure) increased the safety of the process of HCAs recording observations. The dynamap did not include measurement of temperature or respiratory rate. Patients' temperatures were measured using tympanic thermometers, while respiratory rates were recorded separately by counting respirations manually. The protocol at Westborough and the IAT at Eastborough provided prompts for inclusion of a full set of vital signs at each time point. Senior nursing and medical staff from both Trusts reported concerns regarding the accuracy of some of the recorded respiratory rates.

'I'm convinced that 90% of the time [respiratory rate] is not measured. It's one of the best indicators of whether someone's beginning to get into trouble. I'm saying it's made up because it's the one thing that doesn't get picked up automatically by the [dynamap] machine. [...] You go onto review patients, and what you see is respiratory rate 15, 15, 15, 15, 15 [then] 35. [...] Quite clearly they [the patients] haven't just become suddenly [unwell]. And you ask them [the patients], 'Is your breathing any worse?' and they normally go, 'It's been bad all day.' 90% is probably a bit harsh, but I think there's a fair amount of it not being recorded accurately' (Westborough, Registrar, 7).

Senior clinical leads' concerns about the reliability of the measurements were linked to the manual process of recording respirations. There was little acknowledgement of the limitations of the dynamap, despite observation data which demonstrated instances of low reliability readings of vital signs generated by ill-fitting blood pressure cuffs.

6.2.2 The shaping of practice with the intelligent assessment technology

At Eastborough, senior clinical leads also associated the IAT with attributions of trustworthiness and safety which were related to its underlying mechanism and performance.

'The IAT is so easy to use and it gives such clear instructions, [...] anybody can use it, [...] if you teach them how to do a set of observations, [they can] then tell me whether they need to do something with the patient or not. So it removes a huge potential for error at a swathe' (Eastborough, Manager, 20).

In addition, for those HCAs (and sometimes nurses) doing the observation work, the IAT added prestige and value to the task of doing the observations.

'I'm all for new technology, a new toy. [...] When you first turn up it's, 'ooh, it's a Dynamap', or 'it's a BM box', and then all of a sudden you're using things like that ... Yeah, it increases your worth when you can use it and when you're doing your CV' (Eastborough, Nurse, 5).

The IAT shaped a new routine of doing the observations which the field notes extract below illustrates. Of concern, however, was the observation that the new practices appeared to contribute to de-personalised, disembodied engagement with patients.

[Extract from field notes, Eastborough FN1]

The HCA M takes the PDA machine from its handset at the desk and a dynamap trolley to the patient. She parks the dynamap trolley next to the patient who is called Rebecca and asks if she can check her observations. Rebecca agrees. The trolley contains an electronic blood pressure cuff, an electronic thermometer and a saturation probe. M straps the electronic blood pressure cuff around the patient's arm, starts the inflation, attaches a saturation probe to the patient's finger and probes the ear to check the temperature. She then clips the PDA device around her left wrist with the Velcro straps like a watch, so she can use her right hand with a pen to enter the data. M enters Rebecca's name into the device then the device prompts her to enter various pieces of information. Firstly it prompts her to scan Rebecca's ID bracelet. However, M notes to me that 'the staff don't tend to do this

as frequently the patient doesn't have a name band' (despite the fact that Rebecca does have an ID band on). So she overrules this prompt and selects on the screen the particular patient and bed number. The machine then prompts M to enter in the heart rate and the blood pressure. This data is already flashing on the dynamap screen from when she had first attached Rebecca to the cuff. When the machine prompts M to enter in respiratory rate it offers a 60 second countdown time. As M selects this it starts counting 60 seconds down whilst she counts the number of respirations. Once the 60 secs are up it flashes and M enters the data. She also adds in Rebecca's saturation level, pain scoring, and conscious level. When it gets to the pain scoring M asks if Rebecca has any pain to which Rebecca says 'yes'. M then asks 'on a scale of 1 to 10 how bad is the pain, if 1 is hardly anything and 10 is the worst pain ever'. Rebecca says her pain score is 10. This value is entered into the PDA and then M moves onto the next patient. During the whole process Rebecca has her eyes closed and looks both uncomfortable and restless. M was explaining the VP system to me so does not communicate with Rebecca beyond the information demanded by the machine.

The electronic prompts facilitated completeness of monitoring. Yet, the handheld device became the focal point of the interaction, diverting the HCA's attention away from the doing of the observations. These prompts reinforced the mechanistic function of the monitoring process, and undermined the importance of embodied observation work which takes account of non verbal as well as verbal cues from the patient regarding their condition.

Another unintended consequence was that as HCAs recorded the majority of observations, the PDAs became primarily their property. HCAs used the PDAs both to enter data and to view the vital signs, while the Computers on Wheels (COWS) became predominantly the domain of the nursing and medical staff, thereby reinforcing hierarchies and divides between the mechanisation of the task and the utilisation of the data.

[Extract from field notes, Eastborough FN6]

Staff nurse L does not use the PDA and enter the data herself, she writes the observations down on a kitchen towel and then when the HCA J comes back from her break she gives the towel to her for J to enter the data.

Nurses were reliant on HCAs to pass on the commands for further escalation of care as they rarely used the PDAs themselves. This had the unintended consequence that the nurses were unfamiliar with the specific action prompts for escalation of care. The IAT effectively 'designed out' a level of exchange and co-operative practice between HCA and nurse. Prompts generated by the PDAs potentially removed the need for nurse supervision and direction of HCA observation work.

'previously I would have to go and ask, 'This patient, how often do you think I need to do these observations?' but now the IAT tells me exactly what to do, I don't have to keep going to the staff nurse, because I know myself I'm competent to do that' (Eastborough, HCA, 3).

An advantage of the IAT was that it was imbued with a new authority which influenced how staff worked. Part of this related to the inbuilt commands, which directed the recording of particular observations in a certain order.

[Extract from field notes, Eastborough FN2]

The HCA starts off by scanning the patient's wrist band, she collects all the data up on the dynamap screen, including counting the patient's respiratory rate, and then she enters it into the PDA. The blood pressure cuff didn't inflate properly so she has to redo that, so whilst she is waiting she enters the temperature data in first. The PDA is programmed to collect data in a particular sequence, it allows the HCA to over-ride the request for the heart rate (she is still waiting for the dynamap to check the heart rate as well as the blood pressure), click on temperature and enter data, but then it defaults back to heart rate and prompts her again for that information.

Entry of a low or high vital sign reading generated a prompt to check the accuracy of the reading, which helped protect against the recording of spurious readings. It also reinforced distinctions between those values considered normal and abnormal.

'It will tell you that this blood pressure is low, the values are low, do you accept that or not? So what I do is I will check the blood pressure three times to make sure, so if

it's low three times I'll accept. Yes. I check usually three times, both arms'
(Eastborough, Nurse, 7).

However, this new form of ordering proved problematic for staff who felt the IAT limited their power to choose when it was appropriate to check specific vital signs. One physiotherapist commented that it was no longer possible to just check a patient's saturations after treatment to judge how effective the treatment had been.

'You can't just put in somebody's saturations, you have to take the whole lot of observations: if you're thinking, actually your blood pressure's fine but we just want to see what your saturations are looking like, you have to enter everything all over again' (Eastborough, Allied Health Professional, 1).

Staff from Eastborough also learnt the boundaries of IAT practice i.e. what needed to be entered in order to generate an early warning score. The following extract from field notes illustrates how, despite inbuilt checks, certain vital signs could be 'legitimately' missed out of a data set if the omission was formally categorised according to a preset value ('patient refused', 'patient condition', 'equipment' and 'other').

[Extract from field notes, Eastborough FN5]

We go to the first patient to do the first set of observations. The blood pressure cuff over-inflates and the bladder bursts off the Velcro strap. The patient cries out as the inflation has hurt her arm; she also has a drip running positioned in the antecubital fossa. HCA H takes the cuff off and apologises, rubs the patient's arm and apologises again. She busies herself with other observations, checking her temperature and putting the saturation monitor on. She gets another cuff and asks if she can check the blood pressure but the patient refuses, gets very agitated and upset moving her arms up and down and moaning. H accepts this, reassures her and says, 'Don't worry, I won't do it,' and moves onto the next patient omitting the blood pressure for this lady and recording it as 'patient refused'.

The legitimacy associated with these opt-out categories normalised the non-recording of certain vital signs. Partial observations reduced the meaning and significance of the total early warning score, and adversely affected the function of this scoring system as a risk

assessment process.

6.2.3 Designing out paper charts

Any new mode of doing observation work runs the risk of valorising some aspects of care while marginalising others. At Eastborough, the duplication of documentation with the IAT was perceived as problematic rather than as a source of reliability, and so paper charts were designed out. The socially established practice of assessing a patient's condition traditionally included synthesis of recordings of the vital sign data alongside visual cues and reports from the patient. While visual displays of patient data opened up opportunities for staff to view the ward profile at a view, the system was still dependent on staff having access to the computers. Replacement of paper records with electronic charting meant that vital signs were essentially 'hidden' unless staff logged in and retrieved the charts. Access to the data was contingent on availability of the computers on wheels (COWS). During ward rounds and at busy times, staff complained there were insufficient COWS to enable necessary access to the charts.

'I'm asking the HCAs, 'What are the observations?' and they've got to log on, find the patient, get the last set of observations up and show me, whereas before I could just go to a piece of paper and look at the trend' (Eastborough, Nurse, 5).

Staff had to access the computers to receive direction as to when observations were next due. During emergencies, staff noted it was harder to access data.

'Sometimes you have an emergency, you've just taken this patient's observations and you see that the blood pressure has dropped, the saturations [have] dropped, you want to look at what it was last time. If it is there just by the bedside so you can easily pick it up and see it, but [now] you have to go and look on the computer. The [system] takes ages also for you to gain access, at times you don't even have [access] to any computers. You [have to] say, 'Oh, this is an emergency, can I just look through?' because we don't have enough computers on the ward' (Eastborough, Nurse, 6).

Only routine vital sign recordings were incorporated into the electronic system. Vital signs taken after a procedure were still recorded on a separate paper chart. Blood sugar monitoring was also recorded on an additional paper chart.

[Extract from field notes, Eastborough FN4]

All the patient's observations that are being taken because she is on a blood transfusion are being recorded on a separate paper sheet that is then left at the bottom of the bed; none of that data is entered onto the IAT. When I ask about this the nurse notes 'these are separate blood observations'.

These codified systems worked in parallel, offering different representations of observation work. Post procedure observations were left off the IAT, effectively omitting this stage from the electronic representation of the patient's trajectory. The two systems also fragmented and divided the complex social practice of observation work, bringing with them the added potential of division and hierarchy between electronic and paper representational forms.

As redundancy was not built into the system, when the system went down staff were unable to access data. In an attempt to work-around this, staff resorted to using paper records. Discontinuities of electronic recordings created concern for the HCAs and nurses regarding the implications of these perceived 'gaps' in care.

[Extract from field notes, Eastborough FN11]

HCA A is sitting at the nurses' station and is entering values from a bit of paper into the PDA. I understand this is because the system isn't working well, there's only one PDA in use so she'd done all the observations, written them down manually and now is entering the values retrospectively. HCA C comes over and adds that she is not sure that the PDA is taking any of the data that they're entering. HCA A notes, 'My observations are still showing up as overdue,' despite the fact that she'd just entered the data. The sister J responds, 'We must record all the observations on the TPR chart.' And HCA B comments, 'So at least we can show we've done the observations'.

Nurses and HCAs reported anxieties that discontinuities in monitoring could be construed by managers and senior clinical leads as attributable to human failure on their part to take the vital signs rather than due to system failure or malfunction of the PDAs. These fears were linked to the capacity of the IAT to generate real-time data and therefore offer managers a window into the doing of observation work. This is discussed further in the

next section.

6.2.4 Monitoring of observation work

Measurement of data is associated with consequences. The next section explores the performative role of data monitoring at both sites, and highlights both the intended and unintended effects of this process.

Electronic surveillance of observation work

As noted in chapter five, one of the IAT's perceived strengths was its ability to offer real-time surveillance of observation work. Utilisation of the technology enabled the temporal management of patient trajectories and offered opportunities to control the schedule and spatial ordering of work. Managers were able to log when the observations were done and who had recorded them. Early on during implementation, managers noted that on one of the pilot wards 'batching' of observations appeared to occur, irrespective of patient need.

Management scrutiny of the data, and feedback to the ward staff when monitoring was perceived to be substandard had a disciplinary effect and added value to the task of recording vital signs. Staff noted there was now a consequence when a complete set was not recorded or when observations were not recorded at night.

'[The IAT] can show you that we don't do the observations through the night. [...] I know in the morning Sister's going to check the computer first, so I'm going to do my observations because I don't want her saying 'you were on yesterday, why hasn't this been done?' (Eastborough, HCA, 3).

HCA's found the ward overview useful at the start of a shift in order to view their patients at a glance and to prioritise which ones needed seeing first. The electronic flags and time prompts for patients' observations helped to direct their work.

'Previously you'd have to go and look in the book, but now you can just go to the computer and everything just comes up in front of you and you can see which observations to do first... which blood pressure is needed to be done at such and such a time, it tells you the time when it's to be done, which is quite good' (Eastborough, HCA, 3).

The visual display of data also enabled nursing staff to pull up trends at a glance, assimilate vital signs data alongside the free text written in the electronic records and view blood results on one screen. The display became a feature of the start of each shift, directing the plan of work for the next few hours. Patient data at a glance facilitated greater situation awareness and enabled matching of skill mix and workload. Senior staff were also observed to use it for teaching purposes.

[Extract from field notes, Eastborough FN8]

As we come out of handover I notice that the three HCAs, J, M and K, are all grouped around the COWS machine looking at when their observations are due. Each of them is writing down on their bits of paper when their particular patients are due observations, and M says to me, 'This is a new thing instigated by Sister S, that we all check when our observations are done and plan our work.' I also notice when the Sister came out of report she went with K and looked through all her patients' data on the COWS. She said to K, 'There's one patient who's scoring an early warning score of 1, the observations are due at 10 am with all the others, so it makes sense to do hers earlier'. I notice S also checking with the other staff nurses, A and V, that they know the scores of all their patients.

The prioritisation of observation work was evident in the field work observations and also emerged within nurses' and HCAs' narratives, suggesting that the IAT helped raise the status of this work amongst other mundane activities. However, as discussed in chapter five, managerial review of the real-time data demonstrated that after implementation of the IAT, adherence to protocol remained variable. Percentage of 'late' observations on the research ward ranged from 30% to 70% and intervals of >4 hours were reported for EW scores of 6-8 despite protocol stipulating observations should be checked within 30 minutes. Compliance with protocol appeared to be influenced by workload. When activity levels on the ward were high, getting through the routine tasks such as washes and bed making still appeared to take precedence over the taking of patients' vital signs.

[Extract from field notes, Eastborough, FN14]

When I look on the screen [early afternoon] I can see that all the observations for the two bays are overdue, none of them has been done since six o'clock that morning. The washes and bed-making however have been completed.

Field work showed that established 4-hourly observation rounds reflected the 'negotiated order' of the ward; historically they were timed to coincide with other routines such as handover, the drug round and quieter periods in ward activity. The rounds had therefore become established as relatively stable organisational and social working practices. Introduction of the new technology attempted to create a new 'order' within the domain of recording vital signs on the ward.

[Extract from field notes, Eastborough FN4]

I print off the ward profile. The different due times for the observations is evident, whereas before they were done as batches at six o'clock, two o'clock, now there are huge variations in the due times, so 'ten to eight', 'ten to two', 'eight' o'clock, 'quarter past six'.

The additional 'work' required to change this practice and ensure compliance with individual patient's observation schedules may explain to some extent the persistence of late observation recorded on the system.

The scoring system within the IAT also seemed to legitimise lateness of taking observations when patients were officially ranked as low risk. The issue was not so much the prioritisation of monitoring those patients who had established signs of critical illness, but more the de-valuing of routine surveillance of those patients who were only considered at risk of clinical deterioration.

[Extract from field notes, Eastborough, FN1]

The print-out of the ward profile shows that seven patients are triggering. There are seven overdue observations. The overdue observations, with the exception of one, are on patients that are not scoring, so the observations of the patients that have higher warning scores are on track.

[Extract from field notes, Eastborough, FN5]

HCA H is looking at the PDA and laughing to herself. She says to me, 'Oh dear, all my observations are overdue. [...] We've been busy this morning with lots of washes and beds to make so the observations are late. However no one had a high

score and needed them doing urgently so we chose to get the washes finished first'.

Performance management of the IAT appeared to contribute to these patterns of behaviour. Breaches of protocol were normalised by senior nursing staff on the ward when the ward was busy, reinforcing a shared perception that this was the way it was bound to be when activity levels were high.

[Extract from field notes, Eastborough FN8]

One of the senior ward nurses notes to me that in the last couple of weeks all observations have been done within protocol, and that one of the nurse managers had asked her what had been different, why this was the case. The nurse says 'it is because the ward was quieter. If we go back to being hectic with high acuity on the ward then it is likely that the staff will breach again with the protocol.'

In addition, as noted in chapter five, while managerial scrutiny of the real-time data and feedback on performance had a disciplinary effect and reinforced the impact of the electronic flags and alerts, this performance monitoring was not sustained over time. As use of the data for quality improvement purposes tailed off and there were fewer consequences for breaches to protocol, the electronic flags appeared to lose their disciplinary impact. Episodes were observed where increasing the frequency of observations in response to concerns about a patient was not prioritised. Beyond the obvious consequence for the patient, there appeared to be little in the way of social sanctions when observations were not done. Medical staff were not observed to speak up and challenge this practice; to a large extent, poor compliance to protocol appeared to be 'the way things were done round here'.

Auditing of paper based charts

At Westborough, observation work was valued amongst other HCA duties. Field work observations highlighted that compliance to the escalation protocol was prioritised, vital signs were checked regularly, and increased accordingly when a patient's condition deteriorated and the patient started scoring.

[Extract from field notes, Westborough, FN1]

I ask one of the health care assistants when the observations are done. She says they're done at roughly about 6 o'clock, 10 o'clock, 2 o'clock. The most important round is about 5 o'clock in the evening ready to inform the night staff who come on and then they repeat them at 9 o'clock. She says 'even if they're busy the morning observations must be done by 12 o'clock'.

[Extract from field notes, Westborough, FN1]

Looking through the observation charts of Manuel I can see that observations are done quite regularly. The longest interval that I see was overnight, so the last one was done at 9 o'clock and then repeated at 6 am in the morning, but when there were episodes of his blood pressure dropping, the observations were repeated.

Monitoring observations was perceived to be of sufficient importance that nursing staff would step in to mind the gap when HCAs were not available or were too busy with other work.

'Yes I do [observations myself], yes. Particularly if it's not been done ... it depends, I think we're going to have to do some later because we are short of an HCA' (Westborough, Nurse, 4).

Doctors and outreach team members were observed to challenge nursing staff or HCAs when observations were not completed, or scores were miscalculated. This shared responsibility appeared to be facilitated by the visible presence of the outreach team on the wards, and artefacts such as the war manual, which was distributed to all medical staff detailing the escalation protocol, and posters which were displayed on all the wards detailing the escalation pathway.

This shared appreciation of the significance of observation work also appeared to be linked to an understanding amongst HCAs and nursing staff of the implications if this work was not done. This extended beyond the consequences for individual patients to the performance of the ward. At Westborough, compliance with the escalation protocol was reported weekly at the Trust Clinical Indicator forum. Charts were displayed within the main ward corridor detailing the latest audit results of completeness of observations and

documentation of the early warning score. All cardiac arrests were reviewed by a managerial lead from Westborough's Committee to see if protocol had been adhered to; if there was evidence of missing observations or lack of activation of outreach, despite a high early warning score, this was followed up at ward level and the ward staff were required to draw up an action plan. As evident in this extract from field notes, this regular performance review acted as an effective disciplinary force.

[Extract from field notes, Westborough, FN6]

I note to the nurses I am working with that I have seen the notices and charts on the wall regarding the audits. I ask what happens if observations aren't done, and J says, 'Well, we're told off.' I ask, 'Are individuals told off or is the ward told off?' and she says, 'The ward is told off, but I suppose there is always the issue that they could track back to the individuals, so the threat is always there.' And then she laughs and says, 'You know, they do love their forms here'.

However, while regular auditing and feedback of monitoring practice raised the profile of observation work and facilitated compliance with the Trust's escalation protocol, the disadvantages of a command and control regime were also noted at this site. A few nursing and medical staff reported that achieving compliance had become the over-riding organisational focus. Managing risk appeared more important than valuing safety as a positive construct.

'I think we've too much of this one size fits all at the moment. And let's deal with people at the lowest common denominator really. You must do your observations this often, you must do this, you must do that' (Westborough, Nurse, 3).

Hierarchical managerial control had the unintended consequence of introducing a new pathology, 'manipulating the data', to the process of performance management. Completeness of observations and use of the early warning score were audited 6 monthly. When the chart review was delegated to individual ward managers to audit their own charts, high compliance rates cast doubts on the validity of the data. False reporting was also noted in relation to the monitoring of infection control.

We've got to report 100% compliance because if you don't, the world comes in around your ears, and it's just not worth it. People come down from higher floors – I mean literally because they are physically on higher floors – and tell people off. The matrons were saying they are told that something's a problem, but not necessarily given help finding a solution. So actually we'd rather just not have the hassle and report 100% compliance with hand-washing and PAR scoring and tick the boxes because it's considered unacceptable to report below. There's a real danger with that as nobody believes the numbers or the credibility of the process' (Westborough, Consultant Physician, 9).

6.2.5 Summary: observation work

In summary, observation work was largely delegated to HCAs and legitimised on account of the technologies introduced to assist them with this process. The process of delegation was not in itself problematic when observation work was valued amongst other HCA tasks. This value was reinforced by a systems approach to managing acutely ill patients on the ward which included training not only of HCAs, but medical and nursing staff as to the organisation's way of doing things around here. This approach was supported by the use of artefacts such as posters detailing the escalation pathway, the visible presence of outreach on the ward checking up on at risk patients and systematic data collection regarding completeness of observations. These processes had a performative effect and generated social pressure to conform to Trust policy, enabling staff to speak up and challenge instances of poor vital sign monitoring and motivating nursing staff to step in to mind the gap when HCAs were busy with other tasks and unable to do observation work. However, adopting a hierarchical command and control approach was also reported to introduce instances of false reporting and to undermine staff's belief in the value of the data.

The technologies associated with observation work were imbued with interpretations of reliability, trustworthiness and safety. The IAT acted as a central mediator within the social organisation of health care work. This technology opened up the space around observation work, re-ordering it within the wider politics of rescue work. It prompted staff to check the accuracy of recordings, shaping definitions of values considered normal and abnormal, and brought to the foreground the importance of adherence to observation standards. The electronic displays of aggregated patient data had an effect in modelling behaviour. HCAs were observed to use the electronic flags and narrative prompts to direct their work while

ward managers used the electronic overview of the ward to identify high risk patients at a glance, contributing to their situation awareness, an important precursor for safety performance.

However, normative assumptions regarding the associated positive safety connotations and reliability of technologies such as the dynamap and IAT were not always observed in practice. Despite use of the dynamap, inaccurate blood pressure measurements were recorded as a result of ill-fitting blood pressure cuffs. The prestige associated with the technology may have reduced the symbolic value of manually taking supplementary recordings and helped explain poor practice with the recording of respiratory rates, despite the significance of this vital sign for predicting clinical deterioration in a patient's condition.

The IAT, in disrupting socially established batching practices of doing the observations, was observed to create additional work for HCAs. The PDA became the focal point of the interaction during HCAs observation work and reinforced the mechanistic function of the monitoring process. The inbuilt prompts to complete the set of observations in order to generate an early warning score appeared performative, potentially minimising the significance of individual vital signs. Differential utilisation of the PDAs and the computers on wheels reinforced hierarchical divides between HCAs, and nurses and doctors. The prompts for escalation of care designed out a level of exchange between HCA and nurse. Access to vital sign data was contingent on availability of PCs which, during ward rounds and peak activity on the wards, was problematic. Viewed remotely, observations were disconnected from the patient, removing the practitioner's capacity to contextualise these signs with supplementary data collected from visual cues and patient narratives. Remote access to vital sign data downplayed the observation chart's important role as a team structuring device and the face to face communication that previously occurred around the observation chart.

However, when reviewing the actual versus intended role of the IAT, it is important to establish the role of implementation on its unintended and adverse consequences. Because of Eastborough's piecemeal approach to improving care of acutely ill patients, including lack of support structures such as outreach, and processes such as medical training regarding the IAT, there was little shared social responsibility for observation work. Few staff outside the ward team spoke up and challenged poor monitoring practice. Managers

initially used real-time data generated by the IAT to change practice, but as managerial surveillance of the data tailed off over time, flags regarding overdue observations and high early warning scores lost meaning and significance.

6.3 Articulation work

Articulation work refers to 'work done in real time to manage contingencies; work that gets things back on track in the face of the unexpected, [work] that modifies action to accommodate unanticipated contingencies' (Bowker & Star 1999, p.310).

Early on in the data collection it became clear that junior doctors were involved on a daily basis in articulation activities, managing contingencies and providing the 'glue' to keep work practices functioning effectively (Berg 1999). The seemingly mundane nature of this task belied its importance and significance for rescue. The process of juggling low level mundane medical work contributed to ensuring the safety of acutely ill patients. However, in contrast to the observation work of HCAs and nurses which was codified and subject to various levels of performance management, this work escaped scrutiny at either Trust.

Routine and mundane tasks such as checking blood tests, ordering diagnostic procedures and chasing up results, ensured that patient trajectories were kept on track. This work facilitated timely diagnosis and decision making. This work lay under the radar in terms of what was recognised by the organisation as rescue work; what was evident were the consequences for patients when this work was omitted or delayed. This junior doctor notes the potentially serious consequences for a patient whose antibiotics were delayed because she was attending a particularly long ward round and unable to prioritise their provision.

'I was doing this massive long ward round with a registrar who took forever, like a twelve hour ward round, it was Easter and there were jobs that she was making me do here there and everywhere. They review every patient and that's fine, sick patients were being dealt with as well, but someone needed a cannula and they basically waited all day because I was on this ward round.[...] It turned out they had needed the cannula quite a lot, they did need the antibiotics' (Eastborough, Junior Doctor, 13).

The interconnectedness of clinical-organisational work meant that workload strains at one level of the division of labour were often felt further up and down the hierarchy. The junior doctor in particular performed a distinctive and effective intra- and inter-professional bridging function, absorbing and mopping up displaced tasks both from senior medical staff and from nursing staff.

'I had a person who was acutely unwell, she had hypokalemia (low potassium levels) with T wave changes on the ECG; I saw what the on-call was doing, sprinting from place to place, dealing with sick patients, and looking like she wouldn't be able to put in the time to deal with this thing, and I took the whole hypokalemia management through from start to finish for that patient, stayed on a lot longer than I should have done' [I: Because she wasn't able to?] 'She didn't say, I just felt I couldn't trust her to do it ... she looked too busy, but she wasn't saying it in words. It's not like anyone formally acknowledges these things' (Eastborough, Junior Doctor, 13).

This lengthy field note from a shift spent shadowing a junior doctor illustrates how this largely invisible work kept temporal organisational trajectories on track.

[Extract from field notes, Eastborough FN11]

N (an FY2) is working in the doctor's office which is adjoined to AZ Ward. He is working on the PC. There is another PC next to him where there is another FY1 working. N is busy looking at all the bloods for his patients. He comments, 'No one in the rest of my team did this job.' His job is to look through all the patients' bloods to make sure that they are all OK, if there are any of concern then the bloods need to be ordered for the next morning. He also sorts out a urology referral which had been requested on Friday (it's 5pm Monday). The other FY1 chips in at this point and says, 'Well no one ever gets a referral through on a Friday. You can guarantee that you've got to chase it up the following week'. N's priority is that there is a consultant ward round tomorrow and he notes to me that the consultant will be upset if the referral hasn't been done.

By this time it is about six o'clock. The other FY1 is still doing some jobs. As she starts packing up to go I comment 'Oh you're going home at last,' and she notes

that she was here until ten o'clock last Friday. She says, 'The ward felt very unsafe.' She tried to handover to the FY1 who was doing the twilight shift but the FY1 was too busy with patients, so in the end she had to stay and sort out things herself. She says 'I felt it was unsafe to go and just leave this workload for the FY1 who was left doing the twilight'. She notes that the senior house officer was busy doing inappropriate work that the FY1 should have been doing, and meanwhile the FY1 was doing jobs that the nurse should have been doing. She gives the example of administering calcium chloride and doing repeat ECGs which in the end she ended up doing for the nurses.

Later, I'm out on the ward, waiting for N to finish his paperwork. Another FY1 comes up to see a new admission from A&E, she's covering the post-take patients. She asks the two HCAs that are sitting at the desk whether this patient has arrived. One of them shrugs her shoulders and doesn't actually reply, the other one looks at the whiteboard denoting the list of patients on the ward which does not list this name. She has no idea whether the patient has come up or not, and suggests that the doctor finds the sister in charge of the ward. The doctor spends time looking for the sister J to see if the patient's arrived. J says no so the doctor goes back to the PC to check the electronic patient records (EPR), checks where the patient's supposed to be, on the EPR system it's indeed registering as the ward we are on, so the doctor asks the HCA for the number of the bed manager. The HCA doesn't know the number, so the doctor goes to find a nurse to locate the number of the bed manager. She then bleeps the bed manager, waits for more than five minutes, there's no answer. At this point she's visibly irritated and leaves the ward. Ten minutes later the new patient arrives on the ward.

It is half past seven, N and I are still on A ward. N's been busy sorting out a referral and blood results for his own patients. He goes to cannulate a patient on A, which is one of the new jobs he's picked up. As he collects his tray and his cannula to go and see the patient there's two more bleeps: one is about a patient who is due for spinal surgery tomorrow, the patient is supposed to have a spinal CT this evening but when the porter arrived to take the patient down to CT it was during suppertime so the patient refused to go and the porter left. The nurse points out that this patient needs surgery tomorrow, they won't do the surgery without the

CT and 'can you sort it out?' N is plainly frustrated and irritated with this, but comments to me that this is really important, he's got neurology surgery tomorrow, the surgical team will be upset if they don't have the CT results as they need the image to actually direct the surgery. N then spends 40 minutes trying to sort this out, he rings the radiologist first, it was the wrong radiologist so he then has to be put back through switchboard; switch is apparently incredibly slow out of hours. He gets through to the second radiologist, again is told it is the wrong one, this is after he'd given a full history and explained the scenario, is then told to bleep somebody else, so he then bleeps this third person and there is no answer.

Fieldwork showed that there was a general cultural acceptance at both organisations that juggling mundane tasks inevitably meant that certain jobs dropped off a junior doctor's radar, sometimes with adverse consequences for patient care. Learning about prioritisation was part of the socialisation process of the neophyte. Making 'low level mundane' mistakes was to some extent seen as inevitable and therefore normalised by senior medical staff.

'I remember mentioning to my registrar that I got really upset about something I hadn't done with a different patient, on an on-call weekend, and he was just like, 'Ah you can't worry about that'. You can tell someone that it's bad for them to worry, but it's not a way of fixing it really' (Eastborough, Junior Doctor, 12).

Observation showed that there was a disjuncture between the organised nine-to-five model of service provision and the reality of the complex and unpredictable nature of clinical work. Juniors felt pressured to conform to cultural norms of 'production'. These norms included ensuring all discharges were managed in a timely fashion, including scripting all the drug orders for discharge before the pharmacy department shut. Timely discharge was an important organisational priority so that beds were freed up ready for medical admissions. Occasionally, medical patients unable to be housed on medical wards were placed on surgical wards, thereby blocking admission for surgical elective cases. When this occurred, there were social sanctions; managers would visit the medical wards, and ask why certain patients had not been discharged.

'you're under pressure from everybody, because if you don't get patients home the surgical bed managers can't get their elective patients in, so literally everybody, the

surgeons, the nurses, the bed managers, are saying you have to get these patients home within the next half an hour. So for that however many hours you're doing all the discharges [rather] than prioritising the sick patients' (Westborough, Junior Doctor, 9).

There were also competing structural-temporal orders, as shift patterns and handover directed work flow and priority setting. Junior doctor workload often increased towards the end of nursing shifts as the nurses tried to complete all their tasks before the next shift arrived.

6.3.1 Summary: articulation work

Increasing specialisation and the division of labour within medical settings requires junior medical staff to juggle work to keep patient and organisational trajectories on track. In contrast to the observation work of HCAs and nurses which was codified and subject to various levels of performance management, low level medical work escaped scrutiny at both Trusts. Omissions and delays in routine medical work such as ordering tests and chasing results occurred with consequences for patients' trajectories. However, junior medical staff largely managed the consequences of this distributed work, and competently detected and compensated for any gaps that occurred in care pathways. The dominant ideology of rescue tends to focus on the 'heroic act' of saving the patient at the point of collapse. Yet it is the upstream mundane work that occurs earlier on in patients' trajectories that enables seniors to make appropriate decisions and engage in effective remedial activities further downstream. This highlights the importance of opening up the space around rescue work to illustrate its unbounded, collective nature, and value the work of the lower level 'unsung heroes'.

6.4 Diagnostic work

This section addresses the diagnostic processes that embody the nature and status of different types of rescue work. Diagnostic work determines both the accuracy of interpretations associated with observation work and appropriateness of subsequent actions. Findings regarding the following are presented; the benefits of 'knowing' the patient in shaping constructions of acute illness, and the interface between tools and patients. This latter sub-section considers how tools shaped interpretations of

deterioration, and draws attention to markers of clinical deterioration which were either marginalised or not recognised by the early warning systems.

6.4.1 'Knowing' the patient

In this study, 'knowing' the patient was identified as an important aid in enabling early detection of subtle changes in a patient's condition; 'regulars' were often admitted to the respiratory ward at Eastborough and the diabetic ward at Westborough. Previous admission and continuity of care enabled staff from both hospitals to situate and make sense of patients' individual signs and symptoms.

'just because most of them [the patients] are regular then you know them from handovers, and just by being with them, taking care of them, so you literally know them, and when something goes wrong you can say, 'You know George you don't look really well today' (Westborough, HCA, 1).

HCA's and nursing staff across both sites reported relying on tacit signals and intuitive awareness that patients were unwell. Ongoing relationships enabled sense making and coherence in interpreting subtle signs and symptoms.

'sometimes you have patients that just say they don't feel right, or they don't seem right because perhaps they're a bit more in their shell on a particular day or they just don't seem quite themselves, and yes, you do have that feeling. [...] You can get a lot from just looking at a patient in terms of how ill, unwell they are at that given moment' (Westborough, Nurse, 4).

'That's something I've learnt was listen to your intuition. Because I found more often than not that it was telling me things that I should have been listening to anyway, so since then I think I do listen to it, I don't just dismiss it straightaway. [I would] just keep an eye on them, keep going back to them. [...] Yeah, it's just like looking for other signs like they're not being themselves' (Eastborough, Nurse, 5).

Labour substitution with regard to observation work privileged HCA's in terms of early detection of clinical deterioration. Their position of knowing the patients put them in a

relative position of power in detecting subtle changes and early warning signs in comparison to the nursing staff who possessed less of this knowledge.

However, the practice at Eastborough of delegating large batches of observations to the HCAs had implications for loss of this privileged knowledge. As this manager reports, when HCAs were required to check the vital signs for all the ward patients, the process risked becoming a mechanistic task as opposed to a means of building on embodied knowledge.

'the health care assistants can pick up [changes in a patient's condition], you don't have to be qualified to work with somebody for three days in a row and then think, you know you're not the same as you were yesterday[..]. But I think if you pull the health care assistants off and you make them do all the observations on the ward, then the observations might be OK to the letter of the law or just on the edge but because they don't actually know the patient they're not going to pick it up. [..] So it's not as simplistic as saying, well the problem is the health care assistant does the observations. No, the problem is the health care assistant does the entire ward observations and cannot put them into any context for that individual person' (Eastborough, Manager, 20).

Similarly, the ward layout and housing of patients within bays made it harder for nurses who were often based at the work station, writing in the notes, drawing up intravenous drugs and sorting out referrals, to see their patients. One nurse explained that this put the onus on patients and relatives to speak up on behalf of other patients.

'[Patients' speaking up] is very important. And much more because ... the type of layout that we have in hospitals now does not really allow for close monitoring of patients, so I think most of the time the patient has a lot to do with alerting the nurses, and the relatives also, when they are visiting. [From] the nurses' station now, you cannot see any patients, all you can see is the wall. Not like in the old days where you have it at the centre of the ward and it's an open ward, so that makes it easier for close monitoring. So I think the role of the patient and the relatives is quite important' (Eastborough, Nurse, 6).

Also evident at both Trusts was the improvisational practice and translation that accompanied the routine observation work. HCAs and nurses were skilled in making sense of visual cues, intuition and tacit signs, knowing when these signified a problem or a spurious finding. This was enabled by knowledge of what was expected for that patient. Nurses and HCAs were observed to 'work-around' triggers when these were not felt to be significant.

'if I think it's just borderline, their saturations are 94% and their breathing 20, and they've just been outside for a cigarette or they've just done the stairs assessment, then I'll go, right, I'll ignore that [reading], because I think this patient's breathless anyway because they've just worn themselves out. Which probably I shouldn't, but ... you go back half an hour later and you can see they're breathing all right, and you don't redo their observations because you can see them. We're always told not to trust the machines; use your powers of observation, not what the machine tells you' (Eastborough, Nurse, 5).

Work-arounds were observed to reflect the intelligence and flexibility of the frontline workers. They were utilised more frequently by experienced HCAs and senior nursing staff. However, work-arounds also brought with them the risk of consequences of violation of the rules associated with the TTS. These consequences appeared to be more keenly felt at Westborough where there was a strong management culture of monitoring conformity to standards.

Paradoxically, having a longstanding relationship with the patient also legitimised professional discounting of a patient's intuitive early warning senses about their own health, in the light of professionals knowing what was best for them.

'[Patients do speak up] because they know their bodies better than anyone else; when it's truly sincere you can tell, there are some telling they're not well simply because they're anxious about going home and things. We know, you know, from being with them especially the ones that we're used to, we actually ignore those ones' (Westborough, HCA, 1).

In summary, it was clear that through observation work, HCAs and nurses fulfilled an important diagnostic role, enabling them to make sense of embodied knowledge and tacit signs that patients were unwell. This process was largely facilitated by continuity of patient care, although knowing the patient legitimised professional discounting of patients speaking up about health concerns. The taking on of large amounts of observation work by HCAs reduced contact time with individual patients, potentially reducing the benefits of this important work.

6.4.2 Mediated diagnosis: the interface between tools and patients

The sensitivity of the track and trigger

Codified data forms an important part of diagnosis. The IAT and protocol together with the specific EWS helped shape constructs of deterioration. This research demonstrates how the discipline of the TTS reflected only a locally situated, partial codification of deterioration. Codifications within the scoring systems at the two Trusts were different in terms of trigger points. At Westborough, if a patient presented with a blood pressure of 80 systolic, heart rate 112 and temperature 37.2 the score would register as 4, prompting the nurse or HCA to take hourly observations and call the medical team and rapid response team. At Eastborough, a patient presenting with the same vital signs would score 2, prompting 4 hourly observations and only an alert to the nurse in charge.

Across both organisations the scoring system was acknowledged to be less accurate and predictive for some patients' conditions. As Berg (1997b) has observed in his studies of how technological systems work in health care practice, these systems redefine parameters, and carve out 'significantly different cut off lines' (p.100). Implementing a Trust-wide TTS at Westborough brought with it the benefits of familiarity and standardisation across the organisation. Yet, this generic system was felt to be less sensitive to deterioration in certain patients' conditions. For instance, patients with chronic respiratory disease often had a high respiration rate and low saturations and thus triggered when stable and 'well'. The TTS was less able to discriminate between this state and when their condition was deteriorating. Conversely, oncology patients were perceived to routinely over-trigger as their condition and treatment was often associated with a rise in temperature, which did not necessarily require escalation of care.

'The TTS is very generic, and it was designed that way so there wouldn't be a PAR score for oncology patients and a PAR score for renal patients, it was designed so that it could be used across the board, people are supposed to use common sense, for want of a better word, to make it applicable, to put their patient into it' (Westborough, Critical Care Nurse, 14).

'With COPD (chronic obstructive pulmonary disease) patients ... I think sometimes they're a lot harder to pick up on, because they've already got low saturations, they've already got high respiratory rates. Sometimes they take a lot longer for the score to kind of pick up a problem. Whereas someone young who comes in with TB you pick it up quite quickly because there's nothing else wrong with them, so there's no reason for them to be like that' (Westborough, Nurse, 3).

Shaping interpretations of deterioration

At both Trusts the early warning score shaped staff perceptions of patients being unwell. Both the electronic system at Eastborough and the protocol at Westborough ensured that HCAs and nurses were socialized into taking a full set each time observations were checked. Attention was structured to the composite score.

'Before when we did the observations, you write, 'the temperature's high' and you forget about the rest. [With] this PAR scoring it makes you aware [of] the heart rate, the respirations, the blood pressure, the bottom [value] ... I never used to really care about the diastolic [value] really, but since this PAR scoring started I look at everything' (Westborough, HCA, 1).

This composite score shaped constructions of acute illness. A positive score legitimised tacit signs of being unwell. The score enabled monitoring of trends over time and objectification of 'improvement' or 'deterioration', as this manager and nurse observe.

'I think it's interesting just looking at an observation chart, and you think 'oh that's not bad', and then you add up the PAR score and you think, 'hm' ... And then when you compare it with a previous set, though there's not major differences there is a difference, and you think, 'uh-huh', especially if it's an increasing PAR score' (Westborough, Manager, 6).

'The PAR system makes it more black and white and kind of objective'
(Westborough, Nurse, 4).

The score blurred distinctions between the doing of observations, interpretive work and remedial action. The tool was imbued with social and moral authority. A positive score was associated with a heightened expectation of vigilance. The IAT at Eastborough and the protocol at Westborough provided a normative script of what actions needed to be taken as a result of an abnormal numerical value.

'I think [I'd worry] from [a score] of 3 actually. I'd start watching the signs from 3'
(Eastborough, HCA, 3).

'When someone PAR scores I panic and think, 'something is really, really wrong' [...] even when this person has been PAR scoring 5, 4, whatever for a while now. You still panic. You just keep on doing observations upon observations, until you see things settled' (Westborough, HCA, 1).

Missing markers

However, not all risk markers for clinical deterioration were contained within the early warning scores. There were a number of additional criteria which were considered by senior nurses and medical staff as valid in terms of signalling a patient was unwell. These included blood results and markers such as urine output which were excluded from the risk assessment.

'Blood results, [...] are quite easily forgotten about when [patients] aren't triggering, I need to tell [staff], someone needs really close monitoring because they've got really low potassium, they're on a cardiac monitor, but they may have a PAR score of zero. It's usually the inexperienced staff, some junior medical doctor staff as well, but quite often a lot of the junior nursing staff [who] don't appreciate how ill people are when they're [...] not triggering' (Westborough, Registrar, 7).

As this next extract from field notes demonstrates, these various monitoring systems (blood test, fluid balance and blood sugar monitoring) operated independently and could create a sense of disjuncture between the patient and constructs of acute illness.

[Extract from field notes, Eastborough, FN1]

We were on a ward round with Dr H. We see Alan, one of Dr H's patients. He is a diabetic gentleman, who seems quite disorientated; his response to questioning is slow. The consultant makes the point, 'You're not yourself'. Alan is restless, in pain, and his blood sugar is high when the nurses check it. Dr H notes that he is showing signs of a chest infection and needs intravenous fluids. Alan's observations are triggering a score of 2 because of his raised temperature and high pulse rate. During the medical review 5 values are detected as 'abnormal for him' i.e. a high blood sugar, high temperature and pulse rate, pain and disorientation. Only the high temperature and pulse rate trigger the score. The disorientation has not been noted in the nursing observations; this only emerges after lengthy questioning from Dr H who knows Alan from previous admissions. The pain is recorded on the nursing observation chart, but not weighted and added to the score and the blood sugar is recorded separately.

HCAAs, nursing and medical staff from both organisations reported recognising the importance of tacit signs of clinical deterioration, such as colour change, poor skin perfusion and restlessness. However, seniority and experience distinguished those who took these tacit signs seriously by acting upon them, and those who, despite noting these alternative markers, largely prioritised and relied on triggers to shape their understandings of acute illness.

'there are some patients that actually their observations never quite hit [the warning band] anyway, but actually you look at them and clinically think, just looking at you, you look wrong although your numbers are looking right' (Westborough, Physiotherapist, 1).

'I personally don't find the scoring systems very useful, but I've had much more experience so can look at someone and say, you're sick, I don't care what the score is' (Westborough, Interview, Registrar, 17)

Patient reports of feeling unwell were reported to be taken seriously by a number of staff, including HCAs, ward and critical care nurses. Nurses and HCAs noted instances where a patient's sense of being unwell preceded their clinical signs of deterioration in condition.

'This lady earlier on in the day shift had said to one of the nurses, 'I don't know what's wrong but I just don't feel very good, I just don't feel quite right.' They checked everything, but she wasn't scoring. I wasn't actually on that side, I was doing something for another patient ... I forget now, I think I was taking a commode ... and I just sort of looked and thought, oh, she doesn't look too good. I mean by that time she was feeling quite panicky and then she started to get sort of quite clammy and cold and sweaty' (Westborough, HCA, 2).

However, observation data also showed how HCA, nurses and junior medical staff's attitudes to the significance of these patient reports varied. The early warning score provided legitimacy for those observations that were included in the score and devalued patients' embodied constructs of deterioration as these were excluded from the formal risk assessment. Subjective signs appeared secondary against the formalised emphasis on technological 'objective' data. This is illustrated in the next field note extract which details how Alan tried to speak up and communicate that he was not feeling well. His concerns were informed by his 'embodied' knowledge of living with diabetes for a number of years, but were largely discounted at the time as other 'hard data' regarding his condition were within normal limits.

[Extract from field notes, Westborough, FN3]

I help one of the student nurses make some beds. We notice that Alan is lying in bed with his eyes closed, the student asks if he could sit out of bed so that she could make the bed. Alan says, 'I'm feeling generally unwell, a bit sick and dizzy.' The student nurse checks his observations and the early warning score is 0. She checks his blood sugar and it's 7.5; she gets H the staff nurse to review Alan. H says to Alan 'All the observations are OK. Are you bored?' Alan says, 'No I'm not bored, I'm just not feeling right.' The student nurse says, 'Watch daytime TV, it's very boring in here, you need to find something to do.' Alan repeats, 'I'm not bored, I feel rough, I just feel terrible. What's my temperature?' The student nurse says,

'Oh it's fine, it's 36.' Alan suggests maybe it's his antibiotics. The student nurse and the staff nurse are checking his sliding scale insulin intravenous regime and they increase the pump from 1.6 ml an hour up to 6 ml an hour. We make the bed. As we turn away to wash our hands, Alan collapses whilst trying to get back into bed. He later describes it to me as, 'I went all giddy, like walking on quicksand.' We help him back into bed. The student checks his observations, they're all within normal limits. His blood sugar is 6.5 which Alan says is too low for him, so they stop the sliding scale insulin infusion. S phones the junior doctor, describes Alan's collapse, uses his expression of 'walking through quicksand', and notes that his observations are OK. S says to H and me, 'the doctor's completely disinterested. He says someone will be up to review him soon'.

Alan's condition deteriorated over the following few days, and he was recognised as acutely unwell once he developed a raised temperature and his blood sugar levels became difficult to control. His sense of feeling unwell provided an important early marker of impending clinical deterioration. This marker, however, was not taken as seriously as those indicators that contributed to the formalised risk assessment.

At Eastborough, a patient satisfaction survey from the directorate had flagged a number of patients' concerns regarding poor pain management. This led to the inclusion of a pain score in the routine observations, including the algorithm for the IAT. However, the pain rating was not incorporated into the aggregate score for the TTS, so although this data was collected it was not attributed the same importance. Instances were observed where this information was not interpreted or taken seriously.

[Extract from field notes, Westborough, FN2]

The HCA comes to the prompt for pain, and says to the patient, 'Have you any pain?' The patient says, 'Yes I've got a stomach ache, I've had it a while now.' A: 'Have you got pain right at this minute?' Patient says 'Yes'. A says, 'On a scale of nought to ten what is it?' The patient says jokingly 'A hundred,' and laughs, and then carries on, 'No seriously, about five.' And that is the end of the questions. No further information is collected regarding the description of the pain, whether it has been experienced before, its location or whether the patient is on any pain killers.

The system did not ask for additional information regarding the significance of the pain score, and the score itself did not have a consequence in terms of triggering automatic alerts. This undermined the importance of pain as a marker within the diagnostic process. The act of attributing a pain score and entering this into the system became a largely mechanised process.

6.4.3 Summary: diagnostic work

For the most part, knowing patients facilitated diagnosis and early detection of changes in their clinical condition. This knowledge privileged HCAs as they were most likely to have the most patient contact. Structural factors such as the ward layout and housing of patients within certain bays influenced nurses' abilities to watch over patients and displaced responsibility onto neighbouring patients and relatives to take on this role. The TTS helped HCAs and nurses with informal diagnostic work, blurring boundaries between the doing of observations, interpretation, and remedial action. The early warning scores enabled monitoring of trends over time and the objectification of constructs of 'improvement' and 'deterioration'.

TTSs are designed to enable early detection and escalation of care by providing an additional structural aid for staff to utilise at their discretion. Work-arounds (adaptation of the underpinning rules associated with TTSs) reflected the intelligence and flexibility of experienced frontline workers, and their ability to negotiate the complexities of health care. The tools brought with them a partial codification of deterioration. The authority of the early warning score marginalised the importance of 'softer signs' such as pain and patients' reports of feeling unwell which were not added into the score. While all those HCAs, nursing and medical staff interviewed reported recognising the importance of these tacit signs of clinical deterioration, in practice, these signs tended to be acted upon only by experienced HCAs, senior nurses and medical staff. This finding suggests that less senior staff were, to some extent, controlled and constrained by the very technology installed to facilitate working routines and improve clinical outcomes for patients. What is less clear is the extent to which this is a design or implementation problem.

6.5 Managing clinical uncertainty

This last section addresses the fluidity and uncertainty that characterises the nature of medical work. The implications of this for rescue work are considered, in particular, the management of diversity within diagnostic work, and the temporal-spatial consequences of diagnostic work.

6.5.1 Managing diversity within diagnostic work

The fluidity and multiplicity of managing clinical uncertainty characterised the nature of much disease management within rescue work. This involved searching for coherence amongst a plethora of diagnostic findings. Often clinical markers contradicted; an order had to be imposed which was influenced by a number of diverse factors, such as the hierarchy of particular pieces of evidence, and informed by acceptance of the uncertainty of medical work. Coordination work was required to line up opposing truths. Multiple markers, historical and technological data were used to develop understandings of acute illness. This field note extract from a ward round illustrates the sense making that went on routinely as medical staff attempted to 'work on' the particulars of an as yet unidentified disease.

[Extract from field notes, Westborough, FN11]

We carry on the ward round; I wait in the background. The first patient they see is confusing for them in terms of the picture that he presents. He's a gentleman who was admitted after collapsing at home; they are querying whether it is a cardiac or neurological problem. The ST1 notes to the registrar, 'The picture is odd'. The MRI scan shows some degenerative changes, which the ST1 and registrar are surprised about. This does not appear to make the diagnosis any clearer or help them know how to deal with his symptoms.

The line between diagnosis and action appeared blurred at times. Searching for diagnostic markers entailed balancing risks on an individual basis. At Westborough, a rotational model of medical cover was in use on the study ward. Teams rotated every two weeks from the ward to the acute admissions unit. This rotational care model and frequent changeover of team enabled stock taking and 'a fresh pair of eyes' for reviewing patients' cases. This model also revealed how patients' conditions became an articulation point, coordinating engagement of different teams and accommodating different approaches to care. Diversity in clinical management decisions due to teams' speciality based epistemologies was evident.

[Extract from field notes, Westborough, FN3]

We see an 'old' patient of Dr B's on the ward round, he has managed her care on previous occasions. He is not in agreement with the treatment that was started last week by another team. He pulls up the X-ray on the screen and asks why the antibiotics had been prescribed. He comments that her chest X-ray is actually better than it had been for years. He stops the antibiotics that had been started and openly disagrees with the clinical judgement that prompted the prescription.

Patients struggled to make sense of this multiplicity as illustrated by the following field note extract.

[Extract from field notes, Westborough, FN5]

The team see a young patient who is in with an abscess on his foot; the patient comments about the number of different doctors that have reviewed him since admission. He was reviewed while in A&E by the orthopaedic team; this team decided that he didn't need an operation to drain the abscess, but he needed a course of intravenous antibiotics, and then could go home with five days oral cover with an outpatient appointment for an ultrasound of his foot. However, when Dr P sees him, he contradicts most of these decisions. He says the patient needs the operation to drain the abscess, the IV antibiotics can be changed to oral, but he will keep them as IV because they are 'pretty horrible to swallow'. He discontinues a second antibiotic that was started yesterday and informs the patient he will not be able to go home as the abscess needs sorting out. Lastly he notes that an ultrasound is not appropriate, the patient needs an MRI instead.

This patient struggled to understand why different medical teams interpreted his symptoms and subsequent treatment so differently. Concepts of medical individualism and clinical discretion underpin this finding. Different physicians, and teams with different clinical perspectives (in this case one from orthopaedics and another from infection control) varied in their interpretations of the significance of certain clinical signs, and appropriate treatment. This diversity also had implications for the timely and appropriate management of critical illness as well as reducing patients' confidence in their medical management.

6.5.2 Temporal and spatial consequences of diagnostic work

In his study of the emergency department, Nugus (2007) notes that diagnosis is an important moment in the clinical-organisational trajectory. 'The diagnosis does not merely emerge. It is an active process by which doctors enact a culturally recognised set of events as the agreed method by which the doctors intend to transfer patients from a state of ill health to health' (Nugus 2007, p.130). Getting the diagnosis right was important for both the emergency doctors in Nugus' study and those in this research. On the wards there was an important temporal consequence to this coordination work. Time spent waiting, working out the pieces of the puzzle, and making sense of contradictory markers, was critical for some patients in terms of deferred decision making and treatment.

'One can wait and think, 'perhaps there will be a little bit more information in the next so many hours when you have this other test [back]'. One can be guilty of waiting for a result from another test before making a decision, whereas the right approach would have been – and sometimes we realise this with hindsight – would be to instigate x or y. You do the test, which may or may not add, but you don't wait. There are some patients who can't afford to wait' (Eastborough, Consultant Physician, 15).

Another temporal consequence of diagnostic work related to the division of labour. Juniors were responsible for daily monitoring and surveillance of their patients, but their apprentice status sometimes prevented them picking up subtle trends over time. In addition, their close engagement in the day to day detail of mundane work made it hard for juniors to select out markers of importance. Review of patients by seniors during ward rounds prompted identification of the significance of particular markers within the clinical picture.

'If you are junior and relatively inexperienced you can be so absorbed in what you're doing and the number of tasks that you have to do that it can be difficult to stand back and say to yourself, these are the parameters now, we've gone from here to here, that is a change that has not responded to x, y and z, I need to be escalating this. As somebody becomes more senior they will find that easier to do; you could argue that when you are a consultant and you're not seeing the patient every day it

becomes easier to see significant changes, because you can see patterns, you can see trends' (Eastborough, Consultant Physician, 15).

This expertise was temporally-spatially bound; observations revealed the role of serendipity in governing reviews at critical points. At other times, reviews were contingent on juniors calling for help, which proved difficult when signs and symptoms were unclear or when markers provided a contradictory picture. Observations showed the importance of distributed diagnostic work and decision making, and the collaborative role of the multidisciplinary team and peer group in minding gaps in this process. This next lengthy extract details discussions within a team, managing a patient who had been recently admitted with breathing difficulties, to illustrate how the junior doctor's perceptions of the patient's acuity of condition were shaped by her interactions with the team.

[Extract from field notes, Westborough, FN11]

K (an FY1) comes back with an arterial blood gas print-out from a gentleman who is struggling with his breathing. The team (another FY1 and a ST1) group round this bit of paper. They exclaim how surprisingly good the result is. K however sounds worried, 'But he looks awful and he's really tachypnoeic [high respiratory rate]'. H (FY1) and L (ST1) keep looking at the blood gas result, seeking reassurance. L is questioning whether the patient has chronic obstructive airways disease or whether he is asthmatic because this could possibly explain the results. She queries whether the patient is tiring, but they compare the blood gas with a previous sample and H says, 'I think these results are OK'.

Unlike the other two team members who had not examined the patient, K had been with him since admission and was aware how much of a struggle it was for him to breathe. This knowledge led her to question the significance of the blood gas result which suggested that his condition was stable. She seeks alternative advice from other medical staff.

At this point we are sitting in the doctors' office on the ward; K checks out the values of a normal arterial blood gas with one of the other doctors there to make sure her understanding is right. This prompts L to check, 'What did your registrar M say?' K replies, 'he did tell me to ring when the blood gas was back, he has written a plan in the notes'. K rings him and goes through the values. She points out that it is

better than the last gas that was checked. He suggests reducing the oxygen level down to 24%, to handover to the nurses that the antibiotics should be started, and to watch the patient in case he showed signs of tiring.

At this point K discussed with the nurses the best mode of administering oxygen for the patient. K wanted to administer it via nasal cannulae (plastic tubes which supply oxygen via the nostrils) as the patient had complained that the face mask was drying out his mouth. However, the nurse pointed out that nasal specs do not administer sufficient oxygen. She suggested humidifying the oxygen via the mask. It is only through serendipity that N, another registrar entered the office at this point and K asked him about modes of delivery of oxygen, prompting him to enquire about the condition of the patient, both the blood gas results and his respiratory rate. When N heard that the patient's respiratory rate was 50, he immediately assessed the patient, ascertained his resuscitation status and made plans to refer the patient to the medical emergency team. The important point of distinction regarding this patient's condition related to the subjectivity of determining at what point he was showing signs of 'tiring'. Unlike the junior doctor, the registrar was able to synthesise all the data regarding this patient and appreciate that this point had come and the patient needed urgent intervention.

K and N are discussing the patient's blood gas results again. K is confused why his blood gas results were maintained. N notes that the only reason his blood gases are good is because he is managing to compensate by breathing more rapidly. The critical decision is determining the point at which he is getting tired as once beyond this, his condition is likely to deteriorate rapidly.

Handover provided a formal means for juniors to learn about rescue work and how to prioritise appropriate clinical markers. The dialogue between juniors and seniors had an important performative function. By discounting superfluous information and focusing on pertinent markers, seniors role modelled the clinical decision making process. The next extract illustrates the educative and collaborative role of the handover process.

[Extract from field notes, Eastborough, FN11]

In the evening handover, N, the FY1, tells the oncoming senior house officer (SHO) that a patient needs a troponin test at two o'clock in the morning. The SHO replies,

'Don't worry about that, you don't need to check it at two o'clock in the morning, it's not going to change the treatment. Leave it, that's one more job that can be done in the morning'. N explains that he was told this blood test needs to be done during the night shift. The SHO rationalises, 'The patient should be on the Acute Coronary Syndrome (ACS) protocol anyway so it's immaterial whether they have the blood tests done at two o'clock or later on in the morning; the patient is being effectively treated'. N reflects on this and says, 'I'm confused now, because you're right, the patient should be on the ACS protocol so I'm not really sure why they asked for that.' At this point the senior nurse chips in and says, 'But I know this patient, this patient's got pyelonephritis and haemetemesis, so the treatment for ACS which is heparin is actually contraindicated.' The registrar notes 'Oh right, the patient can't be on heparin, that needs looking into'.

Observations showed the disparity between levels of supervision and role modelling during day and on-call shifts. Junior staff were generally left to cope on their own at night and weekends. Recognition of clinical deterioration was essentially bound by the junior doctor's breadth of knowledge and skill.

Critical care staff from both organisations expressed concern about the capabilities of ward medical staff to appreciate the complexities of acute illness, particularly in terms of gauging the 'tipping point' when intervention was urgently required. They noted both the importance of calling in specialist help *before* the signs of critical illness became established, and the difficulties associated with determining this point. These staff were involved in reviewing the care of those patients who had been unexpectedly admitted to critical care, and were able to find evidence of delayed recognition and response to clinical deterioration in a patient's condition.

[The critical care nurse is reviewing a patient's observation chart who had had a cardiac arrest on the ward with me] 'Here is the point when you would want to be calling specialist help, because your patient's become hypotensive, tachypneic with a respiratory rate of 30 and a blood pressure of 90, and they're scoring 5, 4. But critical care doesn't get called. And then suddenly the score goes down, but the patient is still unwell ... it's this respiratory rate again, that's what I'm saying; the respiratory rate is a very bad sign. Because the score's coming down, [...] they feel

reassured despite evidence of the patient in the bed clearly not looking well' (Westborough, Critical Care Nurse, 13).

'A lot of the critical incidents centre around junior doctors seeing very sick patients on the ward and often recognising that they are very ill but not escalating them immediately to intensive care. Here's a direct quote from the notes, 'This patient has septic shock, does not need intensive care yet.' Well any patient with septic shock needs to be in an intensive care unit. There's a fundamental lack of understanding of basic physiology. Here is a medical registrar's account of a patient who died 23 hours after admission with multi-organ failure. It's written, 'The patient is cardiovascularly stable'. The patient's blood pressure was 100 systolic, but he was scoring very highly, he was tachycardic, and also his GCS was falling, they hadn't measured his lactates, they didn't really know about organ perfusion, and there was clear clinical evidence of deterioration. What they were saying was they thought 100 systolic seemed OK, except when you know that this patient's normal systolic was 170. And that's just a fundamental lack of understanding' (Eastborough, Critical Care Consultant, 14).

However, a physician also levelled criticism at these accounts of suboptimal care, judging they were subject to hindsight bias and did not represent generalised care across the directorate.

'if you only look at the people that go wrong then you will believe the quality of care is shocking. And that's why I'm always slightly sceptical of reviews by the critical care team, because they only see the patients that get sick and have gone off' (Eastborough, Consultant Physician, 16).

6.5.3 Summary: managing clinical uncertainty

Rescue work was underpinned by the handling of clinical uncertainty and the distributed nature of disease management. Much diversity in clinical management decisions was observed due to teams' speciality based epistemologies. Co-ordination of patients' treatments was temporally and spatially bound. Medical staff were involved in searching for coherence amongst a plethora of diagnostic findings. This at times led to delays in intervention. Serendipity often governed reviews at critical points in patients' trajectories.

Junior staff found it difficult to establish the tipping point when patients' required specialist help. Handover and role modelling provided important learning opportunities for junior staff in recognition of these tipping points. Observations showed the disparity between levels of supervision and role modelling on day and on-call shifts.

6.6 Conclusion

Rescue work is a complex social process. Safety tools and technologies at both organisations were associated with normative positive expectations of 'safety'. They were observed to shape rescue practices within the care of acutely ill patients. While some of the social processes associated with their utilisation acted to enhance safety, others introduced new risks. Opening up the space around rescue work practices on general medical wards beyond these safety solutions additionally illustrated the largely hidden but contributory influence of articulation and diagnostic work. HCAs, nurses and junior doctors were observed to preserve system safety by using their clinical discretion to mind gaps in care, and keep patient and organisational trajectories on track.

This chapter has highlighted the close relationship between organisational cultures and quality improvement activity. While there was less centralised direction at Eastborough, which enabled adaptability and enactment of jurisdiction at a local level, the lack of leadership and poor implementation of the RRS normalised diversity in rescue practices, and led to missed opportunities for early detection and response. Westborough's high degree of control over and coordination of the processes involved in their RRS helped set standards and shaped a shared consensus of responsibility for rescue. However, imposition of their centralised view on safety threatened to design out the organisation's ability to uphold and improve safety locally, suppressing staff resilience and adaptability in rescue work. Figure 6.1 summarises the ward level influences on the rescue trajectory.

Having considered the nature of detection and diagnostic work in rescue, the next chapter focuses on boundary work and the processes involved in escalating care. It explores the hierarchies involved in calling for help, and factors governing response behaviour, including relations between critical care and general medicine, and the influence of temporal-spatial boundaries.

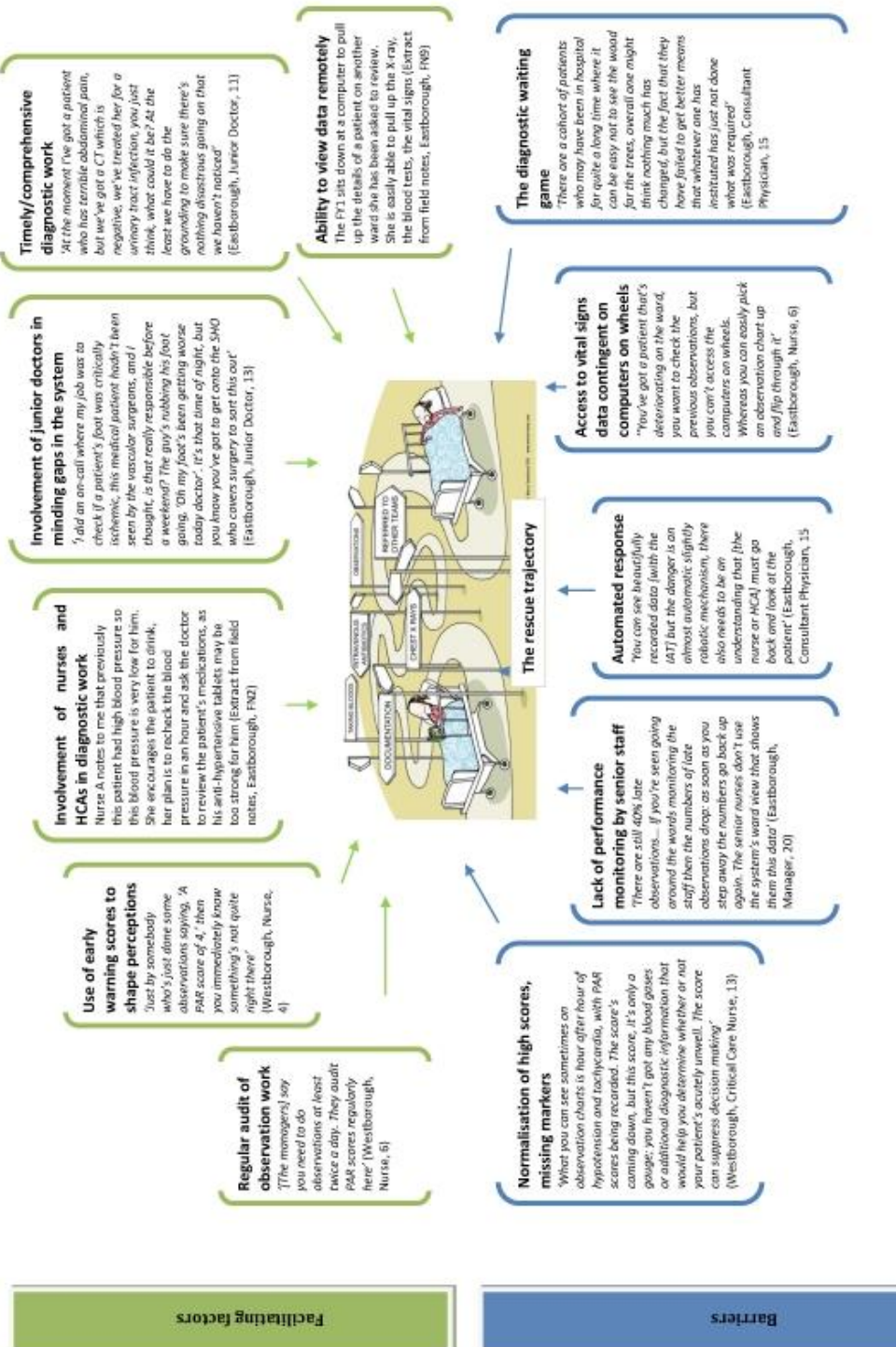


Figure 6.1 Ward level influences on the rescue trajectory

Chapter Seven: Boundary Work

7.1. Introduction

The previous chapter focused on how rescue work is enacted at ward level, exploring in particular the nature of detection and diagnostic work. This chapter widens the focus to explore the social and organisational processes of escalating care across boundaries. Hospitals are staffed by diverse occupational groups, each with their own cultures and hierarchies. Rescue work needs to be understood within the wider systemic context of health care practice. This chapter highlights the consequences of intrinsic characteristics of complex organisations, and illuminates the importance of, and interplay between organisational structures, processes and tasks. Findings from this study resonate with Vaughan's work (1999) on the 'dark side' of organisational life, and the causal relationships between the environment (in which organisations operate), organisational structures, processes and tasks. Those same organisational characteristics that contribute to safety can also introduce risks and have unintended adverse consequences. This chapter illustrates the negative impact of 'structural secrecy' on safety (Vaughan 1999). The division of labour, hierarchies, and specialisation that underpinned much of rescue work had adverse consequences for the distribution of knowledge. Internal segmentation created silos of activity and difficulties with coordination.

Chapter two acknowledged the role of boundaries and hierarchies in contributing to cases of failure to rescue within policy discourse. The problem is generally framed at the level of speaking out and asking for help. Safety solutions have therefore focused on raising staff awareness about warning signs heralding acute illness, staff training in emergency handover, and implementation of tools such as structured communication protocols to formalise the process of help seeking behaviour across boundaries. This chapter explores both the reality of seeking help in everyday practice, and the other intertwined part of the escalation of care process; listening and response.

The chapter is organised into four sections. The boundary between nursing, (and HCAs) and medicine is addressed first. Data are presented that show the importance of jurisdictional control and the division of labour, and occupational and professional hierarchies. The findings show that safety tools provided license and mandate for nurses to escalate across the nursing/medical boundary, and that these tools shaped organisational perceptions of the nature of the problem of failure to rescue. The importance of shared repertoires and

standardised scripts in facilitating team interaction, and the shared logic of escalation work is also discussed. The second section considers medical intra-professional boundaries and highlights the social norms which influenced asking for help within and outside medical teams. Thirdly, relationships between critical care and general wards are analysed to consider the consequences of these for the care of acutely ill patients. The last section presents data relating to the influence of temporal-spatial boundaries on rescue work in general medical wards. The chapter concludes by pulling together the systemic consequence of the ways in which care provision within the Trusts was differentiated. Compartmentalisation and bureaucratisation of work, and divisions of labour ensured the need for effective coordination and management of rescue work across spatial, temporal and occupational boundaries.

7.2. The nursing / medical boundary

Delayed escalation of care across the nursing – medical boundary has been highlighted as a problem in the literature. Findings from this study open up this process further to explore issues such as the consequences of HCA involvement in observation work, and both the positive and adverse effects of RRSs on occupational hierarchies and rescue work.

7.2.1 Jurisdictional control and the division of labour

In chapter six, it was shown how hands-on care was seen as a legitimate task to delegate to the HCAs because of the implementation of NVQ training and utilisation of technological devices which were perceived to improve the rigour of the process of taking and recording the observations. Certain types of health care work were divided up, and tasks such as the observations, were delegated to the HCAs. Because of this, HCAs had greater opportunities to influence decision making and were frequently observed to participate in diagnostic work.

As noted in the previous chapter, the compartmentalisation of work and further division of labour meant that for periods of time, HCAs had a monopoly over information regarding the observations. Other members of the health care team were dependent on the HCAs both documenting the data so that it was accessible for others to view and alerting staff further up the hierarchy about vital signs that were of concern. This had implications for organisational structural secrecy; at times knowledge regarding observations was partial

and incomplete due to missing charts and recording of observations on scrap paper rather than on legitimate charts or sections in the health care record.

While HCAs had jurisdiction in some aspects of diagnostic and rescue work, nurses were ultimately held accountable for patient care. The HCAs generally held the situated knowledge about the patient's condition yet the usual practice was for nurses to escalate care to the medical team (and additionally the outreach team at Westborough). This further division of labour and hierarchy created problems as information had to cross additional boundaries. This is illustrated by a HCA's experience at Westborough.

'I did some observations on my patient; she was really deteriorating, really going downhill. The doctors had the Cardex [folder containing the charts], so I couldn't put the observations in the TPR chart so I just wrote it down on a note, you know, and gave it to the staff nurse, saying 'Can you let the doctors know, as they have the Cardex'. In that time she completely forgot. Later on in the afternoon, [the doctor] came straight to me and said, 'Are you in charge of this patient?' So I said 'yes'. 'Did anybody do observations for this gentleman?' I was panicking and said, 'Yes I did it, and I gave it to ...' [...] He was really upset. He told me, 'Do you know how important these things are to us?' I was like, 'Oh I'm really sorry, I'm really, really sorry, I'll make sure it doesn't happen again' (Westborough, HCA, 1).

This research supports findings from other studies that, through their judgements and reports, HCAs control aspects of everyday work and influence processes such as diagnostic work (Kessler *et al.* 2010, Cohen 2011). Trust between the HCA and nurse emerged as a theme which extended beyond normative hierarchical influences and related to perceptions of expertise. Nurses reported trusting certain HCAs to recognise acutely unwell patients and act appropriately, whilst HCAs trusted certain nurses to respond appropriately. Outside of these trusting relationships, nurses and HCAs modified their behaviour accordingly, often increasing surveillance and checking up on their colleagues. This was particularly the case when these colleagues were temporary or new staff.

'Sometimes you see an agency nurse who probably doesn't calculate the score properly, and won't do the observations properly, so you've got to have a level of

trust I think. But I do trust most of the health care assistants here; I know that they know what they're doing' (Westborough, Nurse, 3).

'I always tend to go to the nurses I know that once I say the blood sugar's low or the blood pressure's low they will go back there and check it and write it down. [I] have a sense of who I can trust' (Westborough, HCA, 1).

In chapter six, it was noted that all staff were involved in diagnostic work. This research also augments previous studies (Gjerberg & Kjølørød 2001, Johnson 1972) which demonstrate that control over diagnosis is the key to inter-occupational authority. The following excerpts illustrate the contested nature of diagnosis within escalation work and its relationship to the division of labour. This occupational and hierarchical privileging of diagnosis challenged lower level staff and non medical staff to come up with a way to frame their recommendations and advice in a socially acceptable format.

'How can I put this delicately? ... [with] some staff nurses, certainly newly qualified staff nurses, you have to approach them in such a manner that [they think] it's their decision' (Westborough, HCA, 2).

'People have that rigid mindset that no, only doctors can do that and only nurses can do that. [With] the NIV [non-invasive ventilation] patients, a lot of the time I manage them, I take blood gases, I take overnight oximetries and analyse their results. So then the doctor's like, 'What do you mean you've taken this and you've done that?'.... if you recognise a patient that you think you'd be able to help, getting people to admit the same thing can be frustrating' (Eastborough, Physiotherapist, 1).

In her study of nursing work, Allen (1996) found that two hierarchies, a formal one based on occupational status and an informal one based on experience, shaped allocation of ward nursing staff. Similarly, in this research, staff from both Eastborough and Westborough described how these two hierarchies influenced escalation work, in terms of both asking for help and response behaviour. The temporal-spatial order of health care work privileged those with knowledge afforded through day-to-day continuity of patient care, as distinct from staff who were higher up in the hierarchy, but whose knowledge of patients'

conditions was limited by only sporadic patient contact. Continuity of care provided legitimacy for lower level staff to speak up and enabled them to defend the authority of their knowledge.

'That doesn't necessarily mean that I would be able to comment on [everything] about that patient, but for a very small little area I probably have slightly more knowledge just because that's what I do all day, whereas [the doctor] spends four months doing it and it's not necessarily [the doctor's] specific area as well' (Eastborough, Physiotherapist, 1).

While diagnostic work was undertaken by all staff groups, considerations of appropriateness were shaped by occupational jurisdiction. Staff who 'stepped out' of line were exposed to social sanctions.

[Extract from field notes, Westborough, FN2]

07.00hrs: During the nursing report, M, a staff nurse, talks about a patient who went down for a ultrasound guided biopsy yesterday. The procedure was done via a mediastinal approach; M notes that in the last week they had another patient who developed a pneumothorax post procedure and was very poorly. M tells the other staff she was keen to ensure the lady who had the biopsy yesterday had a chest X-ray after the procedure to rule out a pneumothorax. She reports that the doctor was very dismissive of this request, but she did negotiate to get the X-ray request written up overnight.

14.00hrs: During a multidisciplinary meeting the FY1 stops and asks the sister 'who organised the chest X-ray for the patient in bed 2?' He notes 'the on-call doctor didn't ask for a chest X-ray, yet one has been done'. The sister says, 'You're making quite a serious allegation there,' and he says, 'I know I was called yesterday and made it clear she didn't need a chest X-ray.' The sister said she would follow this up with the nurse concerned.

Here the nurse was perceived by the junior doctor to have breached normative expectations. Similarly, an experienced nurse noted that nurse led referral action was not considered permissible.

'I've got another patient on the ward who is in quite a lot of pain; pain is as the patient says it is as far as I'm concerned. When I referred this patient to the pain team I got told off by the consultant' (Eastborough, Nurse, 8).

7.2.2 The significance of rapid response systems for shared repertoires

Ward staff (both nursing and junior medical staff) from both organisations utilised a repertoire of vocabularies and scripts to try and create a shared picture of a clinical emergency. Nurses and medical staff at both Eastborough and Westborough acknowledged that nurses' use of broad narratives in their descriptions when calling for help was problematic. Broad narratives were reported to make it difficult for medical staff to appreciate the clinical urgency of the case or to prioritise cases when several calls for help came in at the same time. In order to secure a response, nurses were expected to deliver a concise, clear account of why assistance was required.

'When I was a more junior nurse I would look at how the patient looked and I would use my intuition and say, 'Mm, the patient doesn't look right,' and eight times out of ten I was right, the patient was deteriorating, but I don't think you get that across to a doctor, the doctor wants to see the observations, wants clinical signs' (Eastborough, Manager, 8).

'Doctors want to know why they should come and see this patient now instead of in an hour, two hours later, so you need to really be clear what's wrong with them and why they need to come now and how urgently they need to come' (Westborough, Nurse, 3).

Junior nurses were generally respectful of the professional boundary which separated them from junior medical staff and when seeking help, asked for the doctors to attend, acknowledging the hierarchy implicit between them. Nurses described building up a repertoire of alternative strategies so that when faced with problematic encounters, they were able to work-around the problem. Experienced nurses from both organisations appeared able to *demand* a response from the medical staff, perhaps because their greater experience balanced out the inequity due to professional hierarchy.

'if I think a patient's unwell enough to be reviewed then I don't care. [I will say] 'You need to come and see this patient now.' And if they don't come within five minutes I will bleep them again and say, 'When are you going to be here?' (Eastborough, Nurse, 8).

[Extract from field notes, Westborough, FN6]

On a nightshift, E, the nurse in charge and I are discussing the nurses' role in escalation of care. She notes she has witnessed others being bullied, where doctors have said they have been too busy to come, often saying that there were other patients just as sick. E comments that these nurses were too descriptive in calling for help and not assertive enough. She contrasts this with her behaviour; 'I just come to the point, I'll say, Patient's drowsy, hasn't passed urine, is scoring and is clammy. If the doctors say they are too busy and can't come I'll say, Well, I'll find someone who can'. She notes one recent instance where she called the registrar and the registrar said, 'Why isn't the F1 coming to see the patient?' She explained that the F1 said she was too busy to see the patient, and the registrar said, 'Well that's fine, I'll take it up with the F1 and sort it out,' and five minutes later the F1 was on the ward.

Differences between the organisations in terms of rapid response systems appeared significant in terms of shaping cultural norms regarding response behaviour. Westborough's rapid response system, which provided aids for detecting clinical deterioration, calling for help and responding to acutely ill patients, appeared to create a collective sense of responsibility for escalation of care. Underpinning junior and senior ward staff's accounts was a sense of shared minimum standards of care and local faith in the responsiveness of the organisation to the critically ill.

'If I went to a staff nurse and said, 'Look, an hour ago this person was scoring 1, now they're scoring 3,' I would expect them to go on and relay that to the Outreach team. If I felt they didn't then I'd go to someone else' [I: And have you ever had to do that?] 'Sometimes' (Westborough, HCA, 2).

'if the doctor doesn't come as soon as I'd like, it's the doctor's decision, but at the same time it's my patient and my ward and I would still feel responsible for them. If

I felt strongly I would contact someone else rather than just [accepting] 'oh I've spoken to whoever and this is the situation' (Westborough, Nurse, 5).

O'Neill (2010) notes in her ethnography of a non medical call centre, that diagnostic work is achieved in and through the ongoing interaction between expert and customer. Customers are active participants in the process; both parties are involved in reflective fault finding, evaluating questions and suggested actions in the light of their own interpretations of the problem and solution. This creates a shared logic of troubleshooting which O'Neill argues represents an interactional achievement. Escalation of care as an interactional achievement emerged as a theme across both sites, but particularly within the data set from Westborough. Rather than there being a pre-ordained order to the actions involved in escalating care, the stepped sequence of events involving intra- and inter-professional dialogue and collaboration revealed the shared logic intrinsic to the process. This next interview excerpt illustrates the interconnected nature of intra- and inter-professional escalation work.

'Someone was saying, 'I don't feel very well.' It wasn't my patient, it was on nights, there were two of us working and my colleague said, 'Can you come and give me a hand? I've got a bit of a feeling,' which sounds really silly, but just something wasn't OK. We did observations and it quite rapidly became obvious that she wasn't well, so we called the Site Nurse Practitioner and the doctors and said, 'I think you need to come now.' They were nearby so they came straightaway. They called other people and we ended up with pretty much the crash team ... I think if we'd left it and not done anything I think she would have probably arrested, but because we got there just in time I felt we'd just stopped it. One of our ward doctors was doing her first ever night shift and she was quite unsure, she felt like she hadn't managed very well. But because everyone else was there they managed it for her. And actually she did everything that she needed to do by referring on for help, because she was an FY1. Everyone came so quickly it didn't feel like we were on our own' (Westborough, Nurse, 5).

The interviewee suggests that there was a shared understanding regarding the urgency of the situation amongst the nurses, nurse practitioner, cardiac arrest team and medical staff. Additionally, there was congruence amongst the group in terms of the appropriateness of

particular behaviours, both in seeking help and managing the response. The importance of spatial-temporal influences is acknowledged; in this situation, location of the ward and immediate access to senior staff were perceived to aid effective management. In another example, a junior doctor arrives onto one of the wards at Westborough at night to script a drug chart and while he is there, discusses with a staff nurse her concerns about another patient. They share their 'mental maps' of the case and reach a shared consensus about a plan of action.

[Extract from field notes, Westborough, FN6]

The FY1 asks, 'Is there anyone else I should be worried about?' S says, 'Well Fred in bed 25, his blood pressure's low,' and shows him Fred's chart. FY1: 'Mm, not really a trend downwards, not that much lower. What's the history?' S gives a very brief history. The FY1 asks, 'What would you like to happen? What are your plans for her?' S replies, 'Well, I'd like to re-check the blood pressure in an hour or so, and I'm thinking about fluids as the patient's been nil by mouth?' The FY1 is reading Fred's notes; he notes, 'I tell you what, why don't you recheck and ring me with the results. The blood pressure is a bit low but the heart rate's not up so the patient doesn't sound like he's under-filled, but let's review.'

At Eastborough, the lack of an organisational rapid response system normalised heterogeneity of response and appeared to create a generalised acceptance of different standards related to escalation of care. While some escalation interactions proceeded without any problems because of a shared logic inherent within the process, others were more problematic. Breaches in shared logic were evident across a number of boundaries; these breaches related to differences in understanding and judgements related to the appropriateness of both the call for help and the nature of the response. Rather than treating referral as an interactional dialogic process, interview accounts from nursing and medical staff identified instances where responsibility for effective and timely rescue of the patient was discharged at the point of handover rather than shared across occupational boundaries.

'I think often when a nurse makes a call ... it seems that they're just calling and then they've done their part. So they'll call and you'll say, 'OK, well I'm just seeing this patient. How unwell ...' You're trying to get more information and they're not that

willing to give it but then they're like, 'Can I write down your name?' so they write down, 'Spoken to Dr. so-and-so at this time, told them ... asked them to come and see patient'. And then their bit is done, but they haven't been that helpful in helping you to prioritise' (Eastborough, Junior Doctor, 9).

Similarly, there were examples of medical staff discharging their responsibilities also at the point of handover.

'The patient was acutely unwell; she was in a side room. She'd been fed her breakfast, that was at half-eight, nine o'clock, she was fine and then the team reviewed her an hour or so later, informed me that the patient was unresponsive and that they were contacting the ICU team to come and review her, but then when I went into review the patient myself the medical team had just left her. It was then down to us to get her in the recovery position, to make sure that her airway was patent, so I wasn't best pleased about that' (Eastborough, Nurse, 8).

These examples illustrate the significance of strained inter-professional relationships during aspects of escalation work. A lawyer from Eastborough noted how cases of failure to rescue were often linked to a breakdown in communication during escalation work.

'[We've had cases] where people get paged and they don't come directly or it's not communicated to them how urgent or acute the situation is. It's one person's word against another. And then quite often the person who paged the doctor would say, "Well actually I did say to you that it was quite urgent." The doctor may say, "Well I didn't get that impression." So not saying that anyone's not telling the truth but it could just be a difference in perception of how serious the situation might have been' (Eastborough, Lawyer, 21).

While the majority of junior medical staff reported that nurses' repeated calls for help were appropriate, a few perceived these calls to be generated by 'over reactive' nurses. The two accounts below contrast these different perceptions.

'Nurses don't generally demand, ever, but you do know when nurses are more worried because they're more insistent, 'Please will you come and see the patient.

How long are you going to be? This patient really needs to be seen.’ And they’ll keep on at us, so if you’re on one of the wards at the weekends doing something else and you’re like, ‘OK, I’ll come and see them,’ and you don’t they’ll come back to you again. I don’t really mind that, if a patient’s sick then it’s better that they alert us to the fact that they’re quite sick’ (Eastborough, Junior Doctor, 10).

‘I have had some very bad experiences of nurses who are ... I don’t want to use the word hysterical, but over-acting, over ... you know ... overdoing it generally. Nothing is going to really change from the treatment plan that you have already set, it’s just the normal fluctuation, and not even that sometimes. Having to reply to your bleep ten times in one hour – which has happened to me many times – you’re not helping the doctor, you’re not helping the patient, you’re not helping anyone. [The nurse] will be a person unable to control her own self. It’s about stress and personal character’ (Eastborough, Junior Doctor, 12).

In addition, lack of response from medical staff to requests for help appeared to be normalised by a number of nurses and HCAs at Eastborough. Medical response delays incurred during acute situations were excused on account of the work pressures faced by these higher status staff.

‘Sometimes the doctors don’t come straightaway, they are busy somewhere; one doctor is shared amongst so many patients’ (Eastborough, HCA, 3).

‘I couldn’t blame the doctors that night [for not attending], it’s just the way it panned out, maybe it was that time of the night whatever’ (Eastborough, Nurse, 5).

7.2.3 The role of safety tools: providing license and mandate

The IAT at Eastborough and escalation protocol at Westborough formalised inter-professional responsibilities and actions during the management of acute illness. Potential problems regarding lower level staff’s lack of knowledge were addressed with protocols that specified trigger points and action plans. Early warning scores were reported by a wide number of HCAs and nursing staff to provide the license and legitimacy needed for them to escalate care across both hierarchical and occupational boundaries.

'The IAT does the calculations for you, and it prompts, and it gives you permission to go that stage further and say to the doctors, 'The early warning score is this and you really need to come and review this patient.' (Eastborough, Nurse, 8).

However, findings from this research also illustrate that, as solutions in their own right, these safety tools were limited. Speaking up was facilitated with the tools only when other additional socio-cultural processes were harnessed. This was evident at Westborough where the TTS was utilised as only one element within a comprehensive, hospital-wide rapid response system. The effectiveness of the TTS was enhanced by senior medical and nursing support for it. The tool was promoted by the outreach team and its utilisation was facilitated by the organisation's inter-professional programme which trained staff 'how to call for help at this Trust'. Mandatory regulation, audit and feedback of practice provided additional disciplinary power. This high profile, system wide approach which included a Trust wide protocol, served to standardise the organisational approach to escalating care and normalise use of the TTS.

'The early warning score has been here ad infinitum. What gave it legitimacy is the protocol, it's clear in the protocol, this is your score, this is the escalation pathway you should be following dependent upon that score. It's there for everybody to see' (Westborough, Critical Care Nurse, 14).

'Patients cannot be moved, transferred anywhere [within the hospital] without a full set of observations and a PAR score, so it's standardised all round the whole Trust. [...] I was speaking to a pharmacist the other day and they said when they hand over in pharmacy they always say, 'This patient with a PAR score of ...' So pharmacists are using it as well! It just seems to be the way of communicating now' (Westborough, Manager, 10)

Early warning scores at Westborough were observed to be part of the verbal and written vernacular. These scores had become embedded within the culture and were routinely part of handovers and documentation. The scores and protocol were observed to structure discussions regarding the acutely ill patient between HCAs, nurses, doctors and physiotherapists. This was also borne out by documentary review of patients' records where scores formed part of both nursing and medical narratives. The scores were

routinised within the discourse of biomedical knowledge and formed part of the frame of reference for patient assessment. This was particularly advantageous given temporal and spatial influences on rescue work and the transitory nature of nursing relationships with medical on-call staff.

'The score is useful. [...] if you're handing over the phone in the middle of the night to someone you've never met before [...] they don't know your judgement and your experience, so it's kind of a physical... this is quite clear' (Westborough, Nurse, 5).

'The movement of doctors around, that makes things difficult because you get a whole load of new staff in and they don't know you ... and that's where the PAR (patient at risk) system comes into its own because they've really only got what you're saying, they haven't got any other reference from what you said before about other patients' (Westborough, Nurse, 4).

At Eastborough, the IAT enabled remote viewing of vital sign data and trends alongside blood results, which facilitated shared understandings of clinical deterioration in a patient's condition even when the doctors were busy on other wards.

'When we can look at the observations on a computer it's really helpful, if there's a quick trend you're like, I'm coming over right now' (Eastborough, Junior Doctor, 11).

However, the lack of a comprehensive rapid response system with senior nursing and medical engagement at Eastborough limited the technical and socio-cultural power of its TTS. The multiplicity of TTS in use, and lack of staff education and training regarding the tools contributed to poor utilisation. Observations showed early warning scores were notably absent from organisational routines. Whilst the scores had become naturalised into the pilot ward as part of the routine of using the IAT, they were missing from important coordination practices such as handover. The scores did not feature in handover practices across the medical directorate.

'The nurses don't often phone you and tell you what the score is. I think in the whole year I've been told the score once'

'I've never had it handed over to me' (Eastborough, Junior Doctors, 10&11).

7.2.4 The role of safety tools: providing a diagnostic aid

At Westborough, it was acknowledged formally (via the protocol) and informally by critical care nurses, managers and medical staff that the scores were an adjunct to clinical judgement and needed to be used alongside other markers to trigger an escalation response. Staff therefore had the jurisdiction to determine contingencies and work-around the standards incorporated within the protocol and IAT. This caveat potentially offered ward staff the flexibility to escalate care without the legitimacy of the score.

However, while the protocol outlined the discretionary powers of staff to work with the tools rather than be directed by them, observation of practice found that only critical care staff, ward managers and medical staff had the mandate to work flexibly with the TTS and protocol, and override standards set by these tools in individual cases. Clinical and strategic leads noted the importance of maintaining standards across temporal and spatial boundaries. This required the implementation of a generic safety net without the risk of junior staff applying contingent standards, even if this meant that some relatively stable patients over-triggered as a consequence.

[Extract from field notes, Westborough, FN10]

I ask S, a critical care nurse, how the outreach team responds to nurses' calls regarding scores that represent what is considered a 'normal' set of observations for chronically ill patients, for instance, patients who routinely may trigger for low saturations or high heart rates, yet are clinically stable. S replies that she would rather be called to all PAR scores over 4 in order to make the decision herself that this was normal for the patient. 'If we allow nurses to make individual judgements, it gets quite messy'.

Not surprisingly, adherence to the official calling criteria set by the TTS was found to be a social norm for HCA and ward nurses.

'There are occasions when they're PAR scoring 4 and you feel as if it might be down to something like pain and you think that perhaps you're jumping the gun almost to get the medical team involved. But it's best to err on the side of caution I think, so generally I forget that thought and carry on' (Westborough, Nurse, 4).

The TTS at Westborough acted as a differentiation point between one group comprising critical care and medical staff, and another (ward nurses and HCAs). It distinguished differences in professional skill and power. It made visible those distinctions which previously were unarticulated and separated those staff skilled in detection and formal diagnostic work from those who needed discursive aids to help with recognition of the acutely ill. Differences in expectations and behaviour between the hierarchies and occupations regarding utilisation of the TTS created inter-professional tensions. When nurses and HCAs kept to the rules and obeyed the organisational social norms they were criticised by a number of medical staff for adhering to these rules.

'an annoyance of ours is [when] we get handed over someone who's chronically scoring with a score of 8 or 9 ... and you ask the person who's referring the patient, 'Well why ...' I mean it's just because someone's come on a shift at say ten o'clock, noticed that someone's got a score of 8, but the score's been like 8 to 12 the last three days, but you still get referred the same patient' (Westborough, Registrar, 7).

An additional problem for ward staff who were more tightly bound to these formalised standards was that without the 'objective' authority of either the score itself or a worsening trend in scoring, when junior nursing staff tried to escalate care using alternative indicators such as a tacit sign, a patient's or family member's concern, or an intuitive sense that the patient's condition was deteriorating, they struggled at times to summon a response. Status and professional boundaries reinforced existing power relations and acted as disciplinary mechanisms.

'If people who score 5 or 6 continuously for days and days, and then they just don't look as good as they did yesterday, then that's harder for you to tell someone, ... If I said, 'Mr B looks a lot worse today but their observations are exactly the same,' ... it's harder for someone to see where you're coming from' (Westborough, Nurse, 3).

At Eastborough, without the organisational structure of a rapid response system, there appeared to be greater freedom for ward staff to apply their own clinical judgement and work-around the TTS. While HCAs and junior nurses reported being guided by the alert

displayed on the IAT, senior ward nurses provided examples of cases where they ignored the commands generated by the IAT.

'If a patient is OK, is stable, the IAT still prompts you [but] in that case there's no need to call a doctor. ... we had a lady who was tachycardic [high heart rate] for about three days, but we know that this has been happening every time, so whenever the nurses come back to me and said, 'It says we should call the doctor,' I said, 'No, she's been like that because that's her condition anyway' (Eastborough, Nurse, 6).

However, customising standards introduces risks. During field work at Eastborough, a woman had a cardiac arrest on the ward and died later in intensive care after scoring highly for a number of days due to a raised temperature. Nursing staff reported escalating her care on a number of occasions. This interviewee discusses the implications of normalisation of high scores, noting how over time, the team collectively became conditioned to the patient's raised score. Inaction became socially sanctioned; medical staff appeared to accept the high score, and although the nursing staff continued to escalate care at various points, they did not question the appropriateness of the response.

'We had a patient who came in with a pyrexia of unknown origin, her temperature was high, had always been high, she'd always been tachycardic, she'd always had low blood pressure, so when you looked at her pattern it was like normal ... well I'd say normal for her, you know. Every time you do the observations you get quite worried because the IAT is asking you [to check the abnormal vital signs]. Although it's been the norm, every time I do [the observations] I'll let somebody know that this is what it says. I remember that particular patient, [...] the doctor actually came and reviewed the patient again, just said to continue with the current plan' (Eastborough, Nurse, 4).

A critical care lead reviewing the case, reflected that this woman had died as a result of a systems level problem. He noted that there was a collective failure amongst the ward team to recognise how sick she was.

In the previous sections, findings have shown how the TTS, IAT and escalation protocol contributed to boundary work and influenced the hierarchical nurse / doctor relationships that existed within medical ward settings. In this next section, the enactment of the standardised communication protocol is explored in practice.

7.2.5 A standardised script

'I spoke to Band 5s and Band 6s, and they said either they get in a tiz when they want to escalate and start telling the whole story, and it's the middle of the night and the person they're escalating to, you know, is, 'Get to the point, what's going ...' and it's really wound them up before they've explained what the problem is. Or they go to the telephone and they say, 'What's the respiratory rate?' and they say, 'Oh ...' and they go away, and then they say, 'What's the temperature?' and then they go away. So again that winds the person up as well' (Westborough, Manager, 10).

In recognition of the problem detailed above, standardised communication tools were introduced to Westborough as part of their rapid response system. However, the SBAR mnemonic was modified to 'SPAR', where 'P' represented the patient at risk early warning score, because some of the safety leads perceived that nurses struggled to provide a concise, useful narrative for the 'background' component.

'SBAR was chosen [...], one of the senior nurses then looked into it and realised that the background [part] was a bit waffly, so then changed it to P for patient at risk score, which has improved it greatly' (Westborough, Manager, 10).

The score (including the vital sign data that made up the score) was perceived as sufficient for the background element of the narrative. As noted in chapter 6, a positive score was imbued with social and moral authority and provided 'objective' evidence that a patient was unwell. As a critical care nurse noted, the premise behind the tool changed; the SPAR tool became more about the validity of the score and whether this warranted a referral to either the medical team or the outreach team. This contradicted the design intent of the background element of the SBAR tool which offered staff the opportunity to incorporate additional markers, for example the 'nurse worried criterion'. An adverse consequence of

this shift to SPAR included the marginalisation of less objective, tacit signs of being unwell, making it more difficult for staff trying to ask for help with a zero score.

‘the old SBAR as a communication tool was there to help more junior staff articulate to medical staff why they needed to come. Whereas I think the SPAR is more about a medical referral, or an outreach referral and [whether] the call is clinically indicated’ (Westborough, Critical Care Nurse, 13).

While the TTS and escalation protocol at Westborough appeared embedded and part of ‘the way things were round here’, this was not the case with the SPAR tool. A safety lead explained the difficulties they had experienced with implementation, partly due to its selective appeal to junior staff, and partly due to its sporadic use.

‘SPAR was something that x tried to roll out and she got quite a bit of negativity with the more senior staff who were saying; ‘We already know about that, [...] who are you teaching how to communicate?’ We were trying to encourage them to use it as an education tool for others that don’t have so much experience’ (Westborough, Manager, 10).

‘We said we wanted people to fill out a form for every escalation that occurred. The problem is that staff don’t escalate that often, where do you put the forms? [We had problems with] staff knowing where the forms are when they wanted one, being able to find one, and actually being able to use one. It’s not something you can put in an admission file because most of the patients aren’t going to need it anyway. So we back-tracked a little bit and said, ‘Use a form if it helps you’. [...] I think those that have used it – hopefully all staff are aware of it – have found it helpful, but because it’s not used that often I think it’s something that we have to keep communicating over and over again that it’s available’ (Westborough, Manager, 10).

The safety lead’s perceptions of its intermittent use were borne out by interview data and observation of ward activity.

[Extract from field notes, Westborough, FN6]

S (a staff nurse) notes to me that she has never seen a paper copy of SPAR. She digs out a laminated sheet of SBAR, very dog-eared and torn at the edges. It has been shoved under a pile of notes. S sheepishly pulls it out and puts it by the phone and says, 'We've been doing lots of tidying up which is why I think it's been put under there'.

'We've got various posters up that say, this is SPAR, but it's not used kind of actively that much. I think again people probably do do it to a certain extent without realising, but very rarely do we sit down and say, 'Right, this is the situation, this is the background,' and kind of go through it' (Westborough, Nurse, 5).

Resistance appeared to centre on the tool's questionable added value and the unnecessary duplication that was involved in filling out the SPAR form.

[Extract from Field notes, Westborough, FN6]

As it was quiet I have a chance to chat to J (a staff nurse). I ask her about SPAR. She says she was told about it six months ago but feels that 'nurses provide this information themselves without the need for a form'. She shrugs her shoulders at this point, and seems fairly disinterested in it. I show her the SPAR paper form that is supposed to be filed in the notes and she says, 'Oh, I've never seen it before.' She also comments, 'I can't see why we would need to use it because the information's already on the observation charts and in the notes, we're just duplicating what's there already.'

Poor utilisation of the forms did not necessarily translate to failure to use the mnemonic to guide the handover process or indeed failure to handover the required information in a form that elicited the required response. Observation of handovers in emergency situations showed that the process was variable; some were largely based on the score with little supporting information while other nurses were observed to provide more comprehensive narratives, with suggestions for action. Similarly, response was variable and utilisation of the SPAR form did not always guarantee a timely escalation response.

[Extract from field notes, Westborough, FN1]

Looking through the patient's records I find that the SPAR form has been filled in by the nursing staff and filed with the rest of the charts. The nurses had also documented in the notes section 'called team to review, SHO returned the call and advised would review patient when feasible but no team came to review the patient during the night shift'.

Newly qualified nursing staff from both sites reported familiarity with the mnemonic's script as utilisation of the tool was taught within the nursing education curriculum. It is possible that junior staff used the process subconsciously without recognising the need for completion of an additional form to guide the handover.

'We did a lot about it as a student, although I don't consciously think in my head SPAR, unless I'm about to give a handover and I'm a bit, ooh, it's a good way to do it, I think I do naturally do it because it was drummed into us so much. But it is quite useful, again during the night, if the doctor you're speaking to doesn't know the patient, I just sometimes do vaguely think through it in my head if I've got a lot to say and want to be a bit more logical than I am naturally' (Westborough, Nurse, 5).

In section 7.2.1, the contested nature of boundaries around diagnosis was noted. One of the key elements of the SBAR tool is the 'recommendation' component which enables nurses to construct a diagnosis and assertively request a specific medical response. As one senior nurse noted, an additional value to the formalised nature of the SBAR or SPAR tool was the potential for formalising inter-professional commitment and responsibilities.

'If you had clearly categorised in SPAR what the problems were, then whoever responded would have to address what they were going to do about these issues and problems, and then plan, if that didn't work what's the next step? Because I think quite often at ward level that's the step that's missing. You'll often get patients identified, maybe still late, but they get identified, you get a response and, you know, it's oxygen, fluids, antibiotics, whatever, but then there's not an ongoing plan, and perhaps the patient just doesn't improve. [...] So if you're making that referral, why not document why you're doing it and then the person responding would have to address those reasons for referral and plan the intervention and

ongoing management, and timescale for re-evaluation' (Westborough, Critical Care Nurse, 13).

It is possible that resistance to the formalisation of this diagnostic work may have contributed to lack of compliance to the SPAR form filling.

7.2.6 Summary: boundary work

A social order to rescue work was observed which drew boundaries around diagnosis and restricted its formal use to medical staff. Other staff were exposed to social sanctions if they crossed this boundary. However, despite these occupational demarcations regarding the legitimacy of diagnosis, junior staff were generally able to work-around jurisdictional boundaries and influence subsequent decision making and action. Trusting relationships were an important precursor for escalation of care, levelling out the power inequity in occupational hierarchies and facilitating prompt intervention. In the absence of these relationships, HCAs, nurses and junior doctors increased levels of surveillance and monitoring of patients accordingly. Continuity of care and familiarity with the patient provided junior staff with the authority to challenge hierarchies. Providing a structured handover facilitated medical response to nurses' calls for help. Seniority also enabled nurses to demand a response from medical colleagues. The TTS and escalation protocol formalised interprofessional responsibilities and actions, and provided legitimacy for nursing staff to escalate care.

An adverse consequence of delegation of observation work to HCAs was the introduction of further divisions of labour and hierarchy to the process of escalation of care. An unintended consequence of the TTS was that it separated staff skilled in detection and formal diagnostic work from those who needed aids to help with recognition. It was difficult for staff to escalate care without the objective authority of the early warning score.

At Westborough, the high degree of central direction and coherence involved in implementation of their RRS appeared to have fostered a collective sense of responsibility for escalation of care. Shared repertoires enabled team situation awareness and a shared logic of a clinical emergency. Escalation of care was seen as a distributed interprofessional process. The TTS had become normalised within everyday care processes such as handover. Lack of collective responsibility for escalation of care was observed more frequently at

Eastborough and could be argued to reflect to some extent the lack of leadership and coherence evident within implementation of Eastborough's RRS. Problems were interpreted at an individual level rather than system level. Greater variance in calling for help and response behaviour, and utilisation of the TTS and IAT was observed at Eastborough compared to Westborough.

In addition at Eastborough, there was evidence of normalisation of high scores with adverse consequences for patients. This substantiates work by Vaughan (1996) and Amalberti (2006) who note that violations to rules can occur as a result of a pathological culture where certain social routines act progressively to mask the problem. Tolerance and absence of reaction of senior management over time enables staff to become gradually more lax in their performance and leads to 'normalisation of deviance'.

7.3. Escalation within and across medical boundaries

Compartmentalisation and bureaucratisation of work, and divisions of labour ensure the need for coordination and integration of care across spatial, temporal and occupational boundaries. This section shows how the social order of medical work and its occupational differentiation intersect with the structural complexity of the health care system, which has consequences for the organisation and delivery of rescue work. The following themes are considered: workforce priorities which shaped certain aspects of service provision; and influences on asking for help, both within and outside the medical team.

7.3.1 Supervision and support for junior staff

The role of the medical registrar emerged from the data as instrumental in terms of providing on site leadership and decision making during out of hours services. With the advent of the European Union Working Time Directive (EUWTD) restricting the numbers of hours worked, registrars were afforded less continuity during their working weeks, and fewer staff were available to cover out of hours shifts. Handover became an important coordinating process to ensure continuity across fragmented teams. Clinical leads raised concerns about the safety implications of this reduction in senior support.

'if you ask the medics they will tell you [delays with recognition and response occur] because they've gone to the short shifts, so they now have a lot more medics rotating through with short shifts, they haven't got the continuity of care. So if you

ask the medics what the handover system is it's not always as thorough as it could be, but realistically when you have one registrar on covering 180 patients you cannot have a handover of every single one of those, and then you're at the point of the juniors picking out which are the ones that need reviewing and making sure the jobs are done . But you know, in support of the doctors, if you actually look at the numbers that are on and the amount of patients that they're supposed to cover, it's quite scary really. It does mean if you get more than one sick patient, you know, or three or four, you have a problem' (Eastborough, Manager, 20).

Consultants were available during the working day, but rarely came in to review acutely ill patients out of hours. While specific patient cases legitimised calling the consultant at home, generally the registrar was expected to hold the fort and to manage the patients.

'The world has changed, I think, with the European Working Time Directive. Consultants used to consult, but there are times now when you think, actually that model's not working because there are times when the registrars aren't there because they're on nights or something, and there's a serious deficiency in the middle to senior grade. Consultants' concepts of their work are going to have to change at some stage because cover is too patchy' (Eastborough, Consultant, 16).

There were tensions balancing responsiveness to the clinical needs of patients with the training and development needs of juniors. These arose on a regular basis, but were particularly apparent during the twice yearly change-over of F1s from one speciality to another. This changeover had implications for supervision and registrars' workload.

'we spend a lot more time [when the FY1s first start] holding their hands, going round and seeing people who wouldn't necessarily need to be seen by us, but until we've been there we can't be sure, and they've not been able to give us enough information beforehand, and actually in the interests of their training we're better off going off and doing that. What it does mean is that it's harder for us to get round to do our jobs, [...] there have been times when I've not been able to get through all my jobs within the allocated time, and then I have to decide whether these jobs do need to be carried out overnight or not, and overnight it's much harder to have a diminished team going around doing all the routine work' (Eastborough, Registrar, 17).

[Extract from field notes, Westborough, FN9]

The specialist registrar (SpR) explains to me that this patient needs a lumbar puncture. The registrar who is working with him needs to do the lumbar puncture because he hadn't done one before, but this will take up two people's time, potentially delaying their response to other sick patients.

7.3.2 Asking for help 'within' the team

While standardised communication tools were introduced to mediate the nursing / medical boundary, fieldwork revealed that difficulties were also experienced escalating care across the junior / senior medical boundary. Attention within local policy discourse largely focused on nurses asking for help, yet beneath the radar, similar informal rules applied within medicine. Junior medical staff also learnt that conformity to particular speaking up standards in turn facilitated appropriate senior medical response behaviour. Medical response was facilitated by evidence of appropriate early diagnosis, decision making and action.

'They like you to have done the groundwork, done some bloods and put fluids up, started oxygen and [taken] gases' (Eastborough, Junior Doctor, 10).

'if there was anything that you knew straightaway needed to be done immediately for them, ... like with this patient he had really severe heart failure, so I knew that I couldn't hydrate him because he was really overloaded, although his blood pressure was dropped. But normally, say if there were no signs of heart failure I would have just given fluids, I would have done the initial things and then called' (Eastborough, Junior Doctor, 8).

Senior staff expected a comprehensive 'chart talk' style handover. This handover process conveyed the junior staff's level of competence.

'I'd make sure I'd got the complete background history behind them, because then it looks like you've done everything you can and you've done your job' (Eastborough, Junior Doctor, 9).

there is something about a structured communication about a patient to a specialist team that improves that communication, because it just calms everything down and makes it more objective' (Westborough, Junior Doctor, 9).

Provision of a sub-standard handover by a junior constituted a moral breach; a junior's request for help risked being discounted by the senior. The field notes below demonstrate how a junior's scanty handover gave the senior house officer legitimacy to discount the call for help.

[Extract from field notes, Westborough, FN9]

E, a senior house officer, is getting handover from a house officer. The house officer asks her to see a patient who has a collection of fluid on her leg; the FY1 has rung the microbiologist who suggests that the team aspirate the fluid collection. The FY1 asks E to do this aspiration overnight. E asks if the patient is showing signs of cellulitis and the house officer is unsure. E asks if the patient has a temperature or has any other clinical signs, and the house officer is unable to give her this information. E is plainly exasperated and discounts the case until the FY1 gets her facts together. When I chat to E about it afterwards she expresses annoyance with the FY1 for not being better prepared.

Junior medical staff learned these rules about escalation informally. At both sites, new staff received a general talk during induction week about making effective referrals. However, juniors across both sites acknowledged that most of the lessons were learnt on the job.

'We don't really learn how to hand over in medical school. You pick it up along the way, I guess. It's a very difficult thing to be taught' (Eastborough, Junior Doctor, 10).

All the juniors interviewed agreed that it was important to involve seniors earlier rather than later on in rescue work. They reported that seniors were generally approachable. However, also distinguishable from the interview data were the 'restitutive sanctions', noted by Bosk (1979 p.169), which occurred when junior doctors made technical errors in misinterpreting or misdiagnosing the significance of clinical signs.

'Once you've made really bad referrals to the registrars ... I guess it is the only way to learn. They turn round and look at you and go, 'What do you need me to do? Nothing. OK, fine' (Eastborough, Junior Doctor, 11).

'In general most people would rather just be told, 'You're being an idiot, you're doing the right thing, I don't need to see this patient,' rather than having missed something' (Eastborough, Junior Doctor, 10).

In chapter six, the handover process was acknowledged as an important mechanism of social control, enabling juniors to learn about clinical priorities within rescue work. This process also performed as a structuring mechanism, enabling the multidisciplinary team to share mind maps about the acutely ill across the directorate. It was also a mechanism for junior doctors to demonstrate their competence in prioritisation and completion of tasks to the rest of the team. The following field notes illustrate how a FY1's commitment to getting through his workload led him to breach social norms regarding handover practice.

[Extract from field notes, Eastborough, FN11]

At twenty-five past eight we finally get to L ward where we meet the other FY1. She asks, 'Are you coming down to handover?' N says, 'No, I'm going to go and see the patient first.' The other FY1 says, 'Well shouldn't you go to handover first? I'm going to go to handover first and then take bloods afterwards.' N replies, 'No, I'm going to quickly clerk the patient and then I'll come down.' The FY1 looks completely askance at this, says, 'Clerk the patient? But the others will want to go home.' N replies, 'It won't take long, I'll be down there.' The FY1 disappears saying, 'Well I'll say you'll be down in a bit.' [..]

Ten minutes later T, the SHO who's on for the night, bleeps N and I hear N saying, 'Yeah, yeah, I'll be there in five minutes.' He carries on writing up his clerking notes.

By this time it's close to nine o'clock so the bleep goes off again and it's T. N responds, 'Yes, yes, I'm coming,' and then goes back to his writing. The bleep goes off again. He quickly finishes his writing, ignores the bleep and says to me, 'Right, we've got to go to handover.' I ask, 'Will you be able to handover the unfinished

jobs to the night staff?' N says, 'We'll talk to them and see. I've clerked the patient, I'm not sure how much more I could do.'

We rush down to A&E reception, get there for five past nine to be met by T the SHO, a site nurse practitioner and the senior nurse. T says to N, 'Are you OK? How come you're so late?'

Seniors explained that for juniors, learning how to manage on their own, as well as when and how to escalate care were important processes to master. As noted in chapter 6, mundane rescue work was linked to the division of labour. Seniors expected only to be called once a patient's condition had deteriorated beyond a certain point.

[Extract from field notes, Eastborough, FN10]

We walk to the next ward. The SpR says that she doesn't get any calls direct from nurses about patients they are worried about, those calls all go to the FY1. She notes this provides good experience for the FY1. On C ward there is a list of patients who need reviewing by the doctors, including two patients the nurses are concerned about, one of which has a very low blood pressure. These patients are not included on the registrar's review list; the SpR notes, 'Oh the house officer will look at them'.

Being 'one of us' eased the process of escalation of care. Junior doctors noted that calling for help within the general medical team was a different process and familiarity with their own team members marked this difference.

'It depends which registrar you get [as to how receptive they are]. Generally they're pretty good, especially because we've worked with a lot of them now, it's much easier phoning up within our own specialty' (Eastborough, Junior Doctor, 10).

'if you're on their team then I guess there's a sense that they have to look after you a bit, [...] you've built up a rapport with them, they know you, they're happy, you know that you wouldn't call them unless you felt it was ... there's a trust there, but otherwise you're calling them and they're just, you're anyone and they just get ... can get quite angry' (Eastborough, Junior Doctor, 19).

Observing junior and senior doctors working on-call highlighted how much of their practice involved working in isolation to complete the workload. A dominant culture of production and efficiency took precedence over competing needs for supervision of junior staff and role modelling.

[Extract from field notes, Westborough, FN9]

It's 9pm. E, an SHO, and I follow the night SPR who has disappeared up to the Doctors Mess. He is on the phone talking to somebody about one of the sick patients. When he comes off the phone he says that he is going to be busy with the HDU step-down patients plus a 'sick one with the low blood pressure who the MET [Medical Emergency Team] registrar is reviewing'. So he suggests to E that she works her way through the others on the list. He says, 'Oh I might see you later, ring me if you need me but otherwise I'll see you in the morning.' As he has nine patients on his list including a lumber puncture he predicts it is going to be a long night.

[Extract from field notes, Eastborough, FN10]

When I arrive the SpR suggests to the house officer that they do their own rounds rather than going round together. Her rationale is that the house officer will have a lot of general tidying up jobs to do on the ward. She says, 'If we go round, go through all of the patients you won't actually have time to get through any of that work.' She notes that as the house officer goes round she will get to hear about patients who are deteriorating and that it is important for her to get this first hand experience in order to learn to deal with these patients herself.

7.3.3 Asking for help 'outside' the team

As Du Toit (1995) notes, the hospital is an example of a classic bureaucracy due to the clustering of knowledge-based specialisation in internal departments and divisions within the organisation. The medical profession celebrates knowledge, creating specialisations which focus on depth rather than breadth. Specialists, with their command of an area, are more highly regarded than generalists, and their work is bounded and easy to defend (Vassy 2001, Dodier & Camus 1998). In his study of the emergency department, Nugus (2007) found that the organisational hierarchy of departments prevailed.

Structural power linked to knowledge and specialisation was evident in this research in the hierarchical relations between general medical physicians and those in fields such as surgery, cardiology and neurology. General medicine appeared to absorb, and provide a safety net for, patients who were not considered suitable for specialty teams. The following excerpt from a shift shadowing a registrar on-call for general medicine illustrates how the subordinate surgical trainee was able to exert his power over the senior medical colleague by virtue of his specialist status.

[Extract from field notes, Eastborough, FN9]

At this point V, the registrar picks up a referral for a 50 year old man who has come in with a fracture, after a fall. The surgical team have applied a back slab to his fractured limb. The orthopaedic senior house officer speaks to the medical registrar and says the patient needs to be seen in the fracture clinic, but can be taken over by the medical on-call team. V is not happy about this, 'I don't really see why we should take the patient, he's not really a medical problem'. The orthopaedic SHO replies, 'He's not an orthopaedic problem either because we've sorted out the back slab.' V says he is going to check with the consultant before he accepts this patient. He has a chat to the Firm 2 registrar who heard the dialogue about the patient. She is disparaging, 'These surgeons are all the same. If they're doctors then they should be prepared to do their work, not behave like this.' V catches the consultant who is attending a ward round and reports the situation. The consultant replies, 'At the end of the day we'll end up taking the patient so we might as well do it now.'

Speciality teams were able to set caseload boundaries. Admissions deemed 'inappropriate' were accepted by medical teams at both Eastborough and Westborough. Senior medical staff appeared reluctant to challenge this practice, despite acknowledging the adverse implications this may have had for some patients.

'I think people are scared of one another, what tends to happen is that there's a neurology problem in A&E, the medical registrar gets to see the patient because the neurologist doesn't want to come, the neurology registrar says, "Well just admit the patient and I'll come and see them in a couple of weeks time." And then what

should happen is that the medical registrar should get on the phone to his consultant and say, "Look, Dr B, I think this is a neurology patient ... they won't take them." But the registrar doesn't want to bother the consultant, the medical consultant doesn't want to have any hassle with the neurology consultant and so what happens is the patient gets admitted under medicine' (Eastborough, 16, Consultant Medicine).

The hierarchy of specialist over generalist played out in general medical staff's perceptions of specialist team response behaviour. Rude behaviour and response delays were tolerated and excused on account of the higher workload associated with clinical specialist practice.

'Most of the specialties have a very ... a really big workload and this keeps them away from being really helpful and really able to sort all the other cases that are referred to them. I can understand why cardiology are always very sharp, because they have so many things to do that they cannot just cope, it's human, I mean I don't blame them, I would be the same' (Eastborough, Junior Doctor, 12).

'for cardiology there's only the one registrar for the whole hospital doing all the tertiary referral work as well, and an SHO and a consultant, but it's still the registrar who's the lynchpin, they've got an awful lot to do and not enough hours to be able to do it all. So whenever you end up with someone who's unhelpful I think 99% of the time it's because they're struggling to meet the requirements of the job' (Eastborough, Consultant, 17).

Medical teams also struggled to access the knowledge of other specialist teams, which exercised their authority to defend their boundaries and control the referral process. Specialist teams were observed to 'pick and choose' who to see. Acceptance of a referral was contingent on evidence of sufficient diagnostic tests and the presence of new interesting clinical signs and symptoms.

[Extract from field notes, Westborough, FN11]

The two ST1s are discussing a neurology referral. H asks who K had spoken to when she'd done the initial referral. H says that she 'got a real grilling' when she'd spoken to one of the neurologists. H and K compare notes concluding that one of the

neurology registrars is 'better' than the other. They then discuss the bargaining power that this new MRI result now gives them. K jokes, "Well I bet when I do ring, I bet they will ask for yet another test."

Later the neurology registrar rings about this referral, so K talks through the new information that was revealed via the MRI scan. K comes off the phone noting that from a neurology perspective the picture is no longer clear and therefore the case had caught their interest.

Nugus' (2007) research illustrates 'the clinical-organisational complexity of aligning patient signs and symptoms with inpatient medical specialties'. He notes that emergency department doctors actively 'packaged' the patient into an organisationally relevant category to suit the particular medical sub-speciality whom they wish to persuade to become involved in the care of that patient. Junior doctors in both Eastborough and Westborough reported learning the social process of referral. This involved taking certain preparatory steps such as collecting sufficient background details to package the case effectively. Packaging ensured conformity to normative standards imposed by the speciality teams.

'You need to give speciality teams clear-cut criteria for them to come and see your patient. To make clear what you've done so far, but they also all want to know, 'What do you want me to do now?' which is sometimes quite hard when you just need someone to review a patient and give you some advice' (Eastborough, Junior Doctor, 10).

Observation across both organisations showed that the medical teams had little jurisdiction to demand access to the explicit knowledge held by the specialist groups. On a few occasions, requests for reviews were made and were ignored. One consultant contrasted the UK hierarchical model with the peer review referral practice in Australia, suggesting the power imbalance in the UK system was instrumental in sanctioning response delays.

'A patient of ours has been referred to a specialist team a week ago, we are still waiting for some advice from this team and are unsure how to progress. In Australia it is seen as an honour to see another patient, it is a respectful process,

and the referral is done by the most senior person, whereas I contrast that with the system we have in this country where it is delegated down to the junior, and if you don't abide by the rules you run the risk of determining the response. Junior doctors soon learn 'the scary specialities'; the ones 'you avoid referrals to' (Westborough, Consultant, 8).

This practice appeared to escape organisational attention; delay in response from specialist teams was largely normalised. This problem was unaddressed by the rapid response system at Westborough, as outreach team attention focused on mediating the nurse /doctor boundary rather than general medical / speciality team interface.

7.3.4 Summary : escalation of care within and across medical boundaries

Across the two sites, the registrar was observed to be central in balancing organisational demands and individual patient trajectories during on-call periods. The EUWTD had introduced further discontinuities in patient trajectories and greater dependency on the handover process. Handover was an important socio-cultural process; junior medical staff had to learn cultural competence in handover practices, and to manage tensions between demonstrating initiative and not taking unnecessary risks. Familiarity and trusting relationships facilitated escalation of care within medical teams.

However, a large number of junior medical staff reported and were observed to experience difficulties escalating care both within and across medical boundaries at both Trusts. Hierarchical relationships between specialist and generalist teams contributed to delays in response. Specialists set and controlled caseload boundaries; senior staff within general medical teams were reluctant to challenge these hegemonic practices. Delays in response from specialists were largely normalised and escaped organisational attention.

Neither RRS at Eastborough and Westborough addressed these issues. In chapter 5, it was noted that data collection for quality improvement purposes at both organisations focused on observation work. In addition, at Westborough it focused on outreach activity, but primarily at the nurse-doctor interface. Interpretation of numerical data can become '*the mode of framing generalisable knowledge about social phenomena*' (May 2006, p.518). Data collected can provide a 'good story', enabling the organisation to focus on those

aspects of behaviour that are more easily auditable such as taking of observations, rather than others such as response behaviour.

7.4. Boundaries between the ward and critical care

At Eastborough, a number of junior and senior members of the medical staff remarked on the absence of a defined escalation pathway and outreach team as it was perceived to have adverse implications for patient safety. When a patient's condition was deteriorating fast, junior medical staff reported finding it difficult to know at what point the cardiac arrest team should be called. Medical staff reported heterogeneity of response across the organisation.

'Where I trained they had an outreach team, so you could get people to come and help you acutely. Here it's only our team or the arrest team once the arrest call's been put out, there's nothing in that middle ground. You felt like you could get that little bit more help immediately, like at the end of the phone, to stabilise someone before they actually end up having a cardiac arrest' (Eastborough, Junior Doctor, 11).

'our [response] pathway is not defined, it's variable, it depends on where the patient is, what care group they're in, who the doctor is, the time of day, also how busy the referring team is and the receiving team, how busy is the ITU. There's no outreach team, there isn't a clear person to phone' (Eastborough, Critical Care Consultant, 14).

Control of access to critical care was reported by both physicians and critical care specialists to be an issue at Eastborough. Demand for beds often outstripped availability. Physicians had to sell the recovery potential of their patient to the lead critical care consultant. Beliefs regarding thresholds for admission varied amongst these critical care staff; standards of support on offer for patients were determined by which teams were on duty rather than at an organisational level.

'[ICU admission] seems to be at their [ICU consultants] discretion. I've never seen a written policy. Every consultant seems to do their own thing, and the registrars there don't seem to be aware of a policy either. You just have to try your luck and

see what happens, you might be on with a consultant who's very keen to take on board anybody and everybody, whereas another day you may not' (Eastborough, Registrar, 17).

'Even the intensive care consultants disagree about the threshold for admission to our area. I have a very low threshold for admission, I'd rather take a patient very early even at level 1 when they're not actually requiring multi-organ support, review them, look at them overnight, if they're fine then I send them back to the ward. Whereas other people, particularly who have been here a long time and who have been more constrained in the past with respect to resources, have a much higher threshold for admission and don't take patients until they're very ill requiring actual intensive care' (Eastborough, Critical Care Consultant, 14).

Variance regarding the threshold to admit to critical care was also reported by physicians at Westborough, particularly with respiratory patients who were perceived by some critical care consultants as high risk. However, their well resourced critical care facility and RRS facilitated access to the service; senior physicians reported being able to negotiate differences of opinion with critical care consultants.

'Some of the non-respiratory consultants I think are slightly less keen to accept the really end stage respiratory patients. [...] If I think there's an inappropriate decision made [regarding admission to critical care] I ask for a critical care consultant' (Westborough, Registrar, 7).

Observation and interview data illustrated how the outreach team at Westborough performed an important interdepartmental and interprofessional bridging function between nurses and medical staff, and between the ward and critical care. The CCOT consisted primarily of critical care nurses. Their professional status helped alignment and identification with the nurses on the ward; yet their critical care specialty skills also conferred authoritative status when the team was required to advise and work alongside medical staff.

In emergency situations, as well as facilitating a prompt response and aiding the rescue process, team members offered practical help in terms of obtaining equipment. The majority of ward nurses and junior doctors reported that the team not only provided

assistance, but validation that their response was appropriate. The team were observed to work alongside the medical staff, providing a valuable additional resource and a sounding board for decision making. Ward nurses reported that the team provided guidance and advice without being patronising or threatening.

'The junior doctor and outreach team member were physically there with each other so they were using each other, at the same time, with the ward nursing staff around as well and helping out, because there was lots of things to do all at once. I think in the end the team put the cannula in because the doctor wasn't very confident in doing that, and the doctor was doing other things at once, and contacting his seniors because he felt like he needed some support as well' (Westborough, Nurse, 5).

Their critical care technological knowledge granted team members the jurisdiction to override intra- and interprofessional hierarchies. The CCOT members were observed to step in to challenge decision making or to facilitate a timely response.

[Extract from field notes, Westborough, FN11]

The outreach nurse appears in the office. She has come to review a patient with a high heart rate. This patient is on digoxin. The junior doctor, H, confirms that the consultant has seen the patient and the patient is to start amiodarone tomorrow because he has had his morning dose of digoxin. The outreach nurse says, 'But you can't leave the patient like this, the patient is still compromised and has a high heart rate, something needs to be done'. She bleeps the cardiology registrar and checks that they can start the amiodarone today while he still has digoxin in his system. She asks H to then write up the dose of amiodarone.

Senior medical staff at Westborough were supportive of the outreach service, detailing how the team mediated boundaries between junior and senior medical staff. The CCOT also helped the senior medical staff prioritise and maintain situation awareness of which patients were at risk across the directorate.

'they help me co-ordinate with the junior doctors that are out by themselves, and they help me support them, which is very important, and they will communicate

directly to me about patients that they think need a higher level of intervention' (Westborough, Registrar, 8).

The CCOT team also mediated boundaries between critical care and the ward.

'Sometimes I fight critical care's corner and say, 'it's not an appropriate referral', or 'it is an appropriate referral but all their beds are full at the moment but they will make one as soon as possible and they are working as hard and fast as they can'. And at other times I feel like I'm fighting the ward's corner saying, 'you're all in critical care with one nurse per patient, doctors all around you, and you've got to realise that from a ward point of view there may be three nurses for 28 patients'. So yes, I feel I fight everyone's corner for them sometimes' (Westborough, Critical Care Nurse 14).

The team's non-medical status was instrumental for a number of junior nurses. This engendered feelings of a common bond based on shared professional and social dimensions (e.g. similar education). This in turn reduced fears regarding competency in relation to making inappropriate referrals. They were observed to provide a valuable role in minding the gaps in ward care. Team members followed up patients post discharge from intensive care and provided an important additional safety net.

[Extract from field notes, Westborough, FN10]

M, the outreach nurse, checks the observations are being done hourly, checks that all the treatment that is appropriate is being given, which it is. She is happy with the patient's progress and says to the nurse her only advice is to try and get a cardiology review for this patient, but that while he has an open wound he probably is going to have issues with tachycardia, which at the moment is uncompensated.

Serendipity appeared to play a large part in these recoveries. During follow-up visits to the ward errors such as miscalculated early warning scores were picked up and gaps in care such as missing observations were remedied.

A small number of nurses and medical staff expressed concerns about potential repercussions from the particular outreach model adopted at Westborough. There were fears that this model, with a rapid response team prompting early transfer to specialist areas, was de-skilling as junior medical staff and ward nurses had little exposure to management of acutely ill patients on the ward. A few junior doctors noted that the response team were often on the ward before them and so had already taken blood, cannulated and taken an arterial blood gas from the patient.

'One of the things I think the Trust has to be very careful about is not deskillling junior doctors and their medical registrars. I think that's fine, get high dependency, get ITU, the patient's really sick, they need them, but you must get the team that are involved with them. You know, pride aside, it's about you know the patient and you might have something to offer to the high dependency and ICU team, but also from a learning perspective you need to be there as a junior doctor seeing patients deteriorating, seeing patients being intervened on, resuscitated, so that when you're the registrar you've got a feel for what to do and who to escalate, how to do it' (Westborough, Registrar 8).

Similarly, medical staff and critical care nurses noted that an element of compartmentalisation regarding care of patients whose condition was deteriorating had occurred at Westborough, together with a diffusion of responsibility. Alerting the response team enabled some ward nurses and medical teams to abdicate responsibility for the patient. Examples were cited of mindless referral without instigation of first line treatment or corrective action on the wards.

'You get this feeling sometimes of dead time, that a patient is sick, it's identified that they need to go to the HDU environment, but the time between identification and actually going to them is viewed as though physiology stays still, and it doesn't clearly. There's a 'pass the problem onto another group' mode because they just don't have those critical care skills ... you certainly see that happening' (Westborough, Registrar 7).

'We're there to help support [the nurses] but not to take that job from [them]. Having said that, in reality you get to the ward and most of the time the nurses are

so grateful to have an extra pair of hands, because they've still got their other seven, eight, nine patients to look after, that they just say, 'Oh thank God!' and hand it over to you. So I do think a lot of the time unintentionally we are deskillling them' (Westborough, Critical Care Nurse, 14).

Implementation of Westborough's RRS brought with it reorganisation and the reordering of care processes within the boundaries of the general ward and critical care. As a result of formalising escalation of care pathways certain practices were now considered unsafe for the ward, and there was a shifting and resetting of normative standards. An example of this was a policy standard detailing that patients with an early warning score of 4 or more should not be admitted to the general ward from the emergency department. This was in recognition of their higher risk of developing critical illness. However, a few senior medical staff noted that a high score was not associated with the same risk for all patients, and at times this led to inappropriate exclusion of these patients from the ward.

'Some of the patients get refused admittance to the ward because the nurses say that they've got criteria that they're not allowed to accept people who've got a high PAR score. But patients may be scoring because they've got a high temperature, they've got a high pulse, if they're a young fit person, we know they've got a severe infection somewhere, but admission to the ward is perfectly reasonable ... like I had the flu about four weeks ago, I had a temperature of 39.9, a respiratory rate of 40, a pulse rate of 130, I knew I wasn't very well but I also knew I wasn't at risk of [critical illness], I had the flu. I think overall it's a very good thing but there is a degree to which common sense can fail, over-worrying people who actually are just a bit unwell but we know will get better' (Westborough, Registrar, 7).

Nurses on the wards were observed to use these criteria to defend their ward boundaries. Patients were then admitted from the emergency department to high dependency, potentially 'blocking' beds for subsequent higher risk admissions.

Following a few cases when patients with tracheostomies *in situ* became unwell while receiving general ward care, a management decision was made to restrict care of these patients to just the respiratory ward. This created competition at times for beds for

patients who did not have tracheostomies, but had other needs for specialist respiratory care. Boundaries between specialisms also de-skilled nurses working outside this one ward.

'X ward is the only ward in the hospital that takes tracheostomy patients. It didn't used to be like that. I think the nurses have been deskilled because of it. There were a few occasions when trache patients deteriorated on the wards and then people thought, 'should they be going to these wards?' So all of a sudden, 'no we won't send them, we'll just send them to a select few wards that we've done lots of teaching on', and it's now come down to one ward' (Westborough, Critical Care Nurse, 13).

Prior to the introduction of the RRS, practices such as non-invasive ventilation used to be offered for patients on the respiratory ward. However, following concerns that patients requiring this level of respiratory support would be better housed within critical care, this service was withdrawn from the general ward. However, this boundary distinction had unintended consequences for patients who required non-invasive ventilation for palliative purposes.

'In most hospitals non-invasive ventilation would be done on a respiratory ward. Here it needs to be on a high dependency unit. If you've got someone who's dying, who would probably benefit from non-invasive ventilation you can't give it to them because you're not allowed to give it on the ward. I can think of five, maybe more cases that I think would have benefited from a trial of non-invasive ventilation, but they were very unwell, probably lots of co-morbidities, not a great prognosis at all, and were turned down for HDU. Which means that we can't do anything for them then, so you just watch them die, I mean it's hard for us but also sometimes people turn around with NIV ... or it reduces symptoms a little bit' (Westborough, Registrar, 7).

This example highlights the trade-offs that the organisation was faced with when introducing organisational structural change associated with implementation of the RRS. This theme is also discussed in the next section.

7.4.1 Summary: boundaries between the ward and critical care

Structural factors, such as outreach and critical care capacity, helped ensure that medical team response and critical care support for patients was largely determined at organisational rather than individual or team level. What was less clear was the impact of this restructuring on patient outcomes given that staff also reported unintended adverse effects of restricting care processes such as non-invasive ventilation to critical care. Outreach performed an important bridging function between the ward and critical care. The outreach team provided guidance for ward teams, and demonstrated the ability to break cycles of inaction and further diagnostic work by prompting timely action. However, the team was also reported to foster dependence and potentially de-skill the ward team. Implementation of outreach also created further compartmentalisation of care.

7.5. Temporal - spatial boundaries

Rescue was associated with boundary work beyond the medical ward / critical care interface. Spatial and temporal boundaries needed to be managed between different wards, and between the ward and diagnostic departments such as x-ray. Patient safety incidents involving diagnostic delay occurred at both organisations and led to policy decisions at Trust level to restrict diagnostic control to specialist groups. However, there were associated opportunity costs such as the diversion of specialist resource away from other activities, increased division of labour and further compartmentalisation of care delivery, as these two physicians explain.

'There is a downside of looking at [avoidable mortality], for instance a lot of abnormal X-rays are missed, and as a result of them not being looked at or reported, patients come to harm. Your response may be, 'we've got to get senior radiologists to look at all of the reports'. People end up doing a lot of work that isn't necessarily very productive to prevent a fairly rare event. At some stage you've got to say, yes, we're prepared to take some risks, because we want to use our time as effectively and efficiently as possible' (Westborough, Consultant Physician, 14).

'A huge amount of process changes happen because of one bad thing, and you've got to be very careful if you're making a process change that you then have the system to support it. Example in mind, chest drains: you cannot insert a chest drain in this Trust without ultrasound. However very few people are trained to use an

ultrasound; I think they are looking at offering training, but it doesn't happen overnight (Westborough, Registrar, 8).

Within the medical directorate, the wards were categorised according to particular medical specialties that aligned with these organs, such as cardiology and respiratory, in addition to specialised service wards such as health and ageing, and rehabilitation wards. Patients were also categorised according to their presenting medical condition and ideally housed on corresponding wards. This compartmentalisation had several implications for rescue work. Firstly, a number of medical patients had complex, multi-organ problems that straddled more than one specialty. Patients housed on outlying wards rather than wards aligned with their problems sometimes 'fell through the gaps' and escaped timely attention. Problems were noted with communication, coordination and cooperation across the boundaries between the specialities.

'Patients get put up on a ward that may not necessarily be the right ward for them because it's the middle of the night, and the cross-over between teams, and who has overall control for that patient, is sometimes a worry' (Eastborough, Physiotherapist, 21).

'It tends to be very difficult especially where you don't have the particular doctor ... based on the ward looking after the patient there are times we have some patients that maybe waiting for a cardiac review. That [introduces] a delay, yes, to treatment, to medicines really. If they had been admitted originally to the cardiac ward they can't be missed out, because when doing the ward round the cardiologists will see them' (Eastborough, Nurse, 6).

Involving other teams introduced associated complications previously noted by West (2006, 2000) regarding diffusion of responsibility and 'the problem of many hands'. Delays in decision making and response were observed and reported due to collective lack of ownership and rudderless care.

'I think the other group of patients [where things are missed] is when the situation is very complex, lots of teams are involved but nobody's really taken ownership. The patient can end up being slightly in limbo, with lots of opinions, but no action.'

Particularly if there is some degree of disagreement between specialties, the end result is that nobody does anything, there's a bit of a waiting game, and the patient continues to deteriorate' (Eastborough, Consultant Physician, 15).

A second implication for rescue work concerned the geography of the service which was observed to shape response rather than clinical need. For example, on-call staff were required to cover a large number of wards; ordering of patient reviews was often directed by location of the ward. In addition, nursing staff at night had come to expect these junior doctor rounds and used them not only as an opportunity for resolving queries and completing outstanding tasks (e.g. writing up drug requests), but as a means of escalating care for patients who were unwell. The location of the ward within the mapped out path adopted by the on-call doctor, potentially drove response time rather than clinical need.

'It's getting to the point where there are so many jobs to be done on patients that aren't necessarily that important that it just raises your stress levels phenomenally, and you just think to yourself, 'God if someone had got really ill today I don't know what I would have done'. The travelling is terrible at weekends. That really does affect how much you can do. If someone says, 'Oh you forgot to write up a warfarin on F ward,' after you've left at 6.30pm and they do the warfarins at 6, you know, that's 15 minutes of your time gone, just getting there and writing it up. That's a pain in the bum. If we had everyone on one ward ... things that just come into your head like that [clicks fingers], you just get to do them there and then, and sometimes they get forgotten if you don't do that there and then' (Eastborough, Junior Doctor, 13).

Issues around structural secrecy were particularly pertinent when on-call staff were expected to care for patients without the benefit of knowing them. Trying to access appropriate clinical information to aid decision making and prioritisation was problematic at times.

[Extract from field notes, Eastborough, FN6]

A, the SHO, says that it is difficult sometimes to follow the trail of doctors' thoughts, the process of decision-making on nights. She gives the example of one patient who has been written up for 4 units of fresh frozen plasma in the notes and

yet she'd found another 2 scripted on the drug chart and isn't quite sure why these had been written up, when they are supposed to be given. There is no one to ask, whereas during the day she could have rung to ask the particular team. She says this is one of the difficulties that face them, they have to go with the information available and make decisions based on that.

[Extract from field notes, Eastborough, FN7]

About 10.30pm the SHO and I move off to A Ward where there is a patient with chest pain. A, the SHO is unable to find anything written in the notes by the cardiology team or the twilight SHO, so the last entry is the nurse's assessment at eight o'clock when she had pain; A is unsure what the plan is for overnight.

Chapter 5 drew attention to the number of cardiac arrests at both Trusts that were deemed avoidable by resuscitation teams and critical care staff. This provided impetus for both AIPH committees to improve decision making regarding patient escalation of care to critical care, and patients' resuscitation status. A weekend handover sheet was introduced at Westborough which asked medical teams to note any decisions regarding the escalation and resuscitation status of the patient before handing over to on-call teams.

However, a reluctance to make decisions about Do Not Attempt Resuscitation (DNAR) status was observed at both Trusts. Despite the handover forms, junior on-call medical staff were often left to make such decisions on behalf of other teams. They were reluctant to do this given the transitory nature of their relationship with the patient.

'Certainly out of hours it's quite hard to get a decision because, I think probably rightly so, the doctors feel they don't know the patient and the full situation, and certainly some of the more junior ones are quite worried about making a decision, which I think is quite sensible really. Sometimes there's ... there was a gentleman over the weekend who became unwell and it was difficult, the doctors were all a bit confused about which bleep they should have, and I think it's difficult to get the person you needed. So we ended up with a medical registrar there for someone who's effectively kind of palliative care needs, and they made the decision to make them not for resuscitation. So it wasn't their team but it was someone more senior, and more experienced' (Westborough, Nurse, 5).

Formalisation of patients' escalation and resuscitation status at Westborough brought with it concerns from some medical staff regarding the relative permanence of decision making given some patients' change in acuity. DNAR forms once signed were reported to be infrequently revisited, despite requests for a date for formal review by the patient's medical team. Patients assessed as having a poor chance of recovery and classed as DNAR could be viewed very differently days later, in terms of prognosis in the light of new clinical information and response to treatment.

'We had a lady up on the ward that had signed a DNAR form, she had made it clear she didn't want anything happening to her, and the ICU consultant previously had made it clear that she was never to go to ICU. However, I sent her to ICU, with the ICU team's approval and she survived and now wants to go back to ICU in the future. She said, 'Help me,' and so I kind of viewed that as tacit approval to send her to ICU ... she was too unwell to have big discussions about it. I think even with a DNR case you have to be somewhat fluid' (Westborough, Registrar, 7).

Patient categorisation occurred on on-call shifts in order to prioritise those that needed attention urgently. Three categories of patients tended to be handed over to the senior members of the on-call team; those sick patients that urgently needed review, those that had improved, but were still at risk (requiring close surveillance and monitoring), and those patients that were new referrals. This last group took up a disproportionately large amount of senior staff time relative to patient need, as registrars had to familiarise themselves with their cases. Inappropriate new referrals displaced medical registrars' attention away from the at risk group causing them to 'miss those patients that perhaps should have been kept a closer eye on' (Westborough, Registrar, 15).

In chapter 5, it was noted that at Eastborough, junior doctors spent limited time in any one location as their patients were distributed across the medical directorate. This was in contrast to the ward selected for study at Westborough, where the ward was covered at any one time by only two consultant led teams. During their two week stint of ward work, the particular medical team's patients were therefore largely located on this one ward, enabling juniors to use the ward as a base for their daily work. Junior doctors and nurses from both sites who had experienced both types of system highlighted the benefits of the

latter. One of the major benefits was the continued presence of the junior doctors on the ward, enabling prompt response to early signs of acute illness.

'I think the medical cover seems more thorough [with ward based teams]. The doctors are based on the ward whereas before they would be scattered all around [the directorate], you'd see them for a short period in the morning, whereas now they're around all day. So you can see them in the morning and if a patient has changed you can say, 'Hm, [I'm] not happy here'. The patients would always have been seen once a day, but it could have been at any time, and [it seems like such] a small window when they come on the ward and then go on to another ward' (Westborough, Nurse, 6).

Field notes from observations from the two wards illustrate how the ward based team facilitated early response following signs that a patient had become acutely unwell. This contrasts with observation of the model adopted at Eastborough where nursing staff experienced difficulties with contacting medical staff following an episode where a patient collapsed. The difficulties were exacerbated by lack of familiarity with the particular team members and the spatial distribution of the team across the hospital.

[Extract from field notes, Eastborough, FN4]

At 1pm following a period of collapse the resuscitation team leave with the message that W, the staff nurse, needs to get the patient's team to assess the patient and particularly the ECG that has just been done. W starts bleeping the team at 1.15pm. At 1.45 she is still waiting for the team to respond; She has bleeped them three times, both the SHO and the registrar and has had no response. I ask her, 'How do you know who to call?' and W says, 'Well sometimes you don't, you just try them all.' W then spends time trying to locate who else to call. The doctor listed on the white board is different to the consultant that she believes is the patient's. She is also aware that the house officers are busy in teaching sessions between one and two but has tried both the SHO and the SPR with no response. At 2.10pm W bleeps the SPR again: no response. She says to me, 'No one has reviewed the ECG yet' She then bleeps the medical administrator to see if she can find out the correct person to contact. W checks on the patient. S the sister appears. W says she's having problems getting hold of someone, so S tells

her to write an incident form and to document the delay in the electronic patient records. Finally a Foundation Year doctor arrives on the ward at 2.20pm to see the patient. W says she's had problems trying to get hold of someone. He says one of the team is off, one of them is not due on until two o'clock and he's unsure why the other one didn't respond to their bleep. He goes off to review the patient.

Nurses and junior doctors from both sites noted that ward based teams facilitated the development of trusting relationships which helped overcome some of the problems identified earlier due to occupational and hierarchical boundaries.

'Firm 1 medicine is ward-based but we're not; if you're ward-based you've got that better relationship and trust between the nurses and doctors. It sounds bad, but if those nurses call you and give you information, you're more likely to trust, I guess, what they're saying' (Eastborough, Junior Doctor, 9).

[NM: Would medical staff listen to intuitive concerns about a patient?] 'I think it depends if it's your regular doctor; if they know you they might take you a lot more seriously rather than someone who has no idea who you are, like an on-call doctor' (Westborough, Nurse, 3).

In contrast, temporary and transitory contact between multidisciplinary team members made escalation of care more problematic. Similarly, the on-call system meant that contact between on-call medical and ward nursing staff was superficial, making it harder for each group to trust in the other's knowledge and skills.

'Where I came from we used to have a registrar there, I think he's been there for many years; if I walk into the hospital on a weekend and he's on-call I'm confident. [...] But here, because you have so many doctors to deal with, it's really very difficult to ... to assess their competence' (Eastborough, Nurse, 6).

7.5.1 Summary: temporal-spatial boundaries

The geographical distribution of patients across the organisations led to delays with response, primarily because of problems with coordination of temporal-spatial boundaries. Instances of delayed intervention were reported for patients housed on outlying wards.

On-call staff were often directed by location of wards rather than patient need when coordinating their on-call visits. Temporary and transient relationships exacerbated difficulties with escalating care and DNAR decision making. Involving other teams brought with it the problem of diffusion of responsibility.

7.6 Conclusion

An important component of rescue work is the process of escalating care across boundaries. Figure 7.1 provides an overview of boundary influences on the rescue trajectory. At both Trusts, findings show the complexity and inter-related nature of boundary work; HCAs, nurses and doctors negotiated hierarchical, occupational, temporal, spatial and bureaucratic boundaries. Informal diagnostic work crossed occupational boundaries, while control over diagnosis was retained by medicine. Assertiveness skills and experience helped nurses counter cultural norms regarding professional deference to medical staff. Trusting relationships mediated hierarchical and occupational boundaries; nurse to junior doctor escalation of care was facilitated by ward based medical teams. There were widespread difficulties for junior doctors escalating care within and across medical boundaries. Some cultural norms were aligned with a safety system approach to managing deterioration (e.g. prioritising acutely ill patients, taking the necessary clinical first steps in an emergency, asking for help), but others were at odds with it (e.g. being seen to cope, escalating up the chain of command rather than bypassing hierarchies, not calling consultants at home). Specialist teams exercised their authority to control the boundaries of their organ based specialism which at times led to delays in intervention for patients whose condition was deteriorating.

Without an organisation level RRS, heterogeneity of calling for help and response was normalised at Eastborough. The RRS at Westborough fostered a collective sense of responsibility for rescue work, so that HCAs, nurses, doctors and managers knew 'what should be done round here', enabling team members to speak up when standards were not adhered to, and nurses to mind the gap when HCAs were unable to complete observation work. The TTS structured discussions and provided a mandate for escalating care when implemented within a comprehensive RRS such as at Westborough, which incorporated educational support, mandatory regulation and audit. However, the tool drew a distinction between those who had the authority to 'work with' the tool and those who did not, reinforcing hierarchies and professional divisions, and making it hard for staff to ask for

help without the objective authority of the score. Importantly the RRS focused on the nurse-doctor interface, leaving problems with escalating doctor-doctor largely unaddressed.

The CCOT performed an important bridging function between critical care and the ward, providing support for junior staff and mediated boundaries between nurses and doctors. However it also introduced further divisions of labour, and the shifting of responsibilities which at times was associated with adverse consequences for acutely ill patients while they were still based on the ward.

The three findings chapters have presented the themes that emerged inductively and deductively from the data. The structure of these chapters links with the study's aim and objectives. The themes have been organised around the structural organisation and policy enactment of rescue at meso-level, micro-level enactment of rescue work at ward level, and the significance of boundary work. The role of the RRS provides a central theme within each of the empirical chapters. The final discussion chapter is presented next. This chapter integrates the findings with the policy and social science literature in order to answer the research aim and objectives. It also provides a reflection of the methods and limitations of the study and some suggestions for further research.

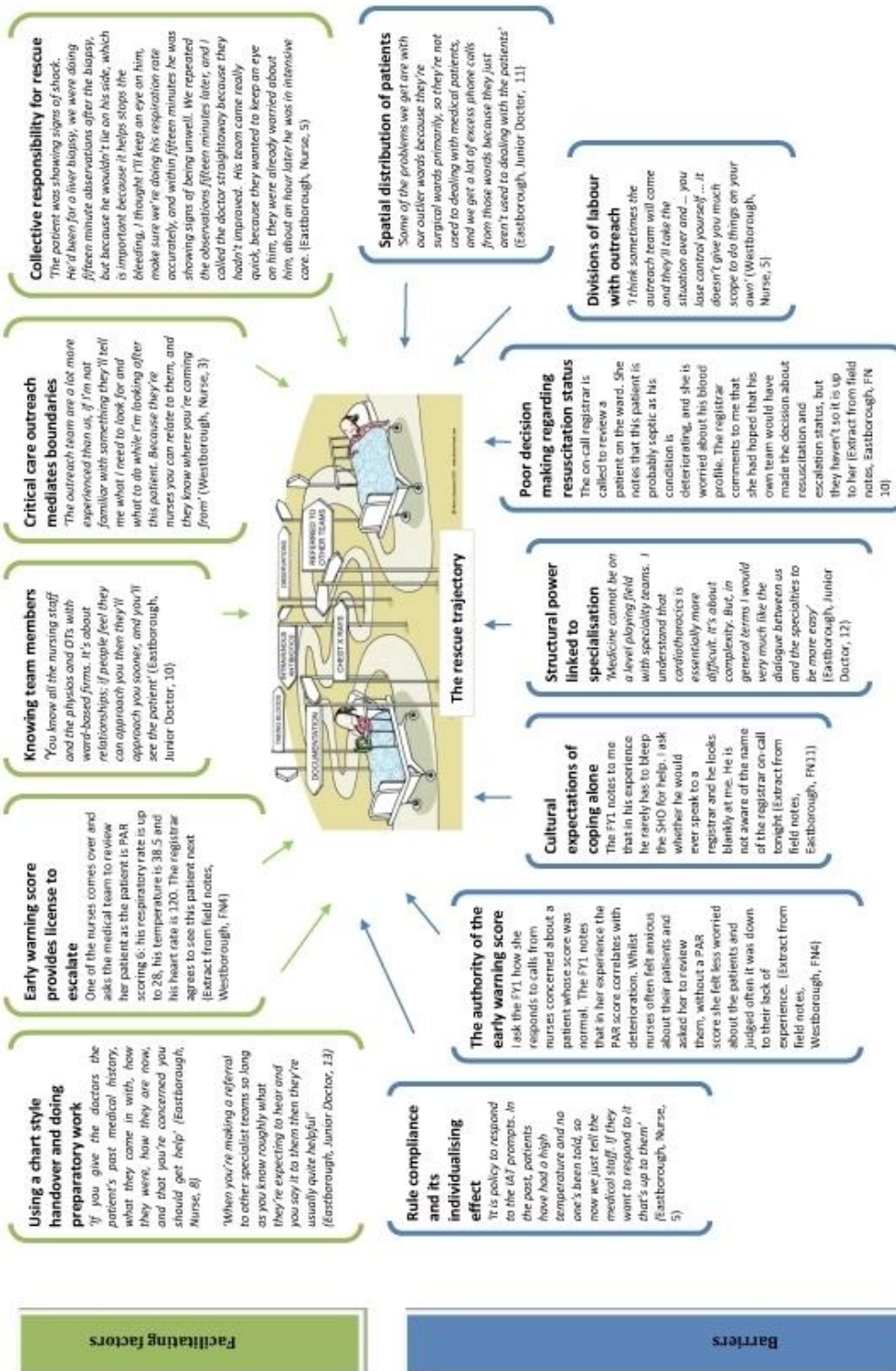


Figure 7.1 Boundary influences on the rescue trajectory

Chapter Eight: Discussion

'In our eagerness to embrace the new science of improving quality in healthcare and implementing changes, we may have jumped that fundamental step: making the diagnosis' (Amaral & Wunsch 2011 p.2).

8.1 Introduction

A significant proportion of in-hospital cardiac arrests are perceived to be preventable, amenable to earlier detection and intervention. In the last ten years, the social construct 'failure to rescue' of the acutely ill patient whose condition is deteriorating on the ward has emerged as a legitimate arena for policy and professional scrutiny. UK policy has focused on finding technological and systems solutions to help overcome this problem. Current risk management and safety strategies focus around regulation of routine assessments and the governance and control of the trajectory of the acutely ill patient. The rapid response system (RRS) has been offered as a safety net for patients on the ward who are at risk of becoming acutely unwell (DeVita *et al.* 2006, Smith 2010). This includes tools such as the track and trigger system (TTS) and intelligent assessment technology (IAT), introduced to aid event detection, plus specific teams set up to facilitate a predetermined response, such as the Medical Emergency Team (MET) or Critical Care Outreach Team (CCOT).

However, there is continuing controversy regarding the 'effectiveness' of these technological and systems solutions. Differences in service models, response and treatment make it hard to interpret results (Subbe *et al.* 2003). While some leaders in the field call for further randomised controlled trials of RRSs (Winters *et al.* 2007), others claim that empirical methods may not be best suited for safety system evaluation and that the benefits of RRSs are self evident (DeVita & Bellomo 2007). To date, there has been no economic evaluation of RRSs or evaluation of potential unintended consequences such as additional costs, diversion of resources that could be used to care for critically ill patients, desensitisation to emergencies and ward teams' decreased ownership and responsibility for patients (Jones *et al.* 2011a). Evidence of suboptimal care continues to emerge (NCEPOD 2012) despite implementation of RRSs, generating calls for better understanding of the cultural processes associated with rescue (Shearer 2012, Buist 2008).

A social science approach offers a resource or a perspective for helping understand the considerable challenges encountered in implementing changes which are thought to be necessary to improve safety and quality (Øvretveit 2009a). Ethnographies of health care work and medical ward work have illuminated important contextual influences such as social norms, temporality, competing demands for staff time, and limited resources (Benning *et al.* 2011a, Benning *et al.* 2011b, Dixon-Woods *et al.* 2009, Bosk 1979, Chapple 2010). In their presentation of an ex post theory of the Michigan Intensive Care Unit project, Dixon-Woods and colleagues highlight the importance of establishing how and why quality improvement programmes work. They note the difficulties associated with establishing whether continuation of healthcare problems following introduction of quality improvement initiatives result from flawed theory regarding underpinning social processes and mechanisms, or their patchy implementation or a combination of both these factors (Dixon-Woods *et al.* 2011).

The aim of this sociologically informed research was to articulate more and different features of rescue work than have been discussed to date by existing policy and clinically orientated research on organisation of services for acutely ill ward patients. The study was located within the messy, relatively unbounded field of general medicine, characterised by uncertainty regarding the nature of the disease itself, the medical decision, and implementation of the selected therapy (Amalberti *et al.* 2005). It aimed to explore how staff, tools and technologies accomplish rescue, utilising an ethnographic approach to enable a move from accounts of what should happen to what does occur in practice. While recent sociologically informed ethnographies have increased understanding about relationships between social contexts and TTSs (Dixon-Woods *et al.* 2009, Suokas 2010), there is a need to provide a situated account of how organisations, staff, and the RRS inter-relate in the management of acutely ill patients. This research explored the interactional linkages in rescue work between meso- and micro-levels of health care (Griffiths 2003, Allen & Pilnick 2005) and the role of the RRSs themselves, including the influence of implementation processes, and the social processes responsible for their intended, unintended and at times contradictory consequences.

8.2 Research aim and objectives

This research aimed to explore rescue practices in order to draw out the associated interplay of socio-cultural and organisational processes and the context of clinical work within two medical wards. The following objectives were identified to enable the research to meet its aim.

1. To explore how organisational and structural factors influence rescue work
2. To explore how rescue work is enacted within general medical settings
3. To examine how boundaries are negotiated and mediated in rescue work
4. To offer theoretical insight into the underpinning social processes and mechanisms of the RRS

8.3 Summary of research findings

Findings presented in chapters' five to seven highlighted the complexity of inter-relationships between socio-cultural and organisational processes, and micro- and meso-level rescue practices. In the light of these findings, one of the key achievements of this research has been to reconfigure understandings of the 'management of acutely ill patients' and 'safety strategies as solutions' by locating these within the wider categorisation and classification structures that order medical practice. Categorising patients and medical work is intrinsic to the bureaucracy of health care organisations; classification of medical work knits together 'to form the texture of a social space' (Bowker & Star 1999, p.286). This research extends understandings beyond current policy perspectives on care of acutely ill ward patients and re-frames both understandings of the nature of the problem and potential solutions (see Table 8.1). In this discussion chapter, section 8.4 presents rescue conceptually as a topology, assimilating findings relating to the intertwining of patient and organisational trajectories, actors and technologies in the handling of clinical uncertainty, with theoretical perspectives on the social system of health care work presented in chapter three (section 3.3).

Findings related to the influence of organisational and structural factors on rescue work (objective one) were discussed in chapter five but also formed a central thread in the other two findings chapters. This research has shown how structural features and policy

enactment at meso-level interact with and shape micro-level clinical work. Appreciation of these inter-relationships illuminates the textured layers that form the context of (sub) optimal care. This is addressed in section 8.5 of this chapter which discusses the social system of rescue work and draws together these findings with literature reviewed in chapter two, and theoretical perspectives on the social system of health care work (section 3.3) and socio-technical systems presented in chapter three (section 3.6.3).

Chapter six presented data regarding the everyday doing of patient safety at ward level (objective two). While policy and practice constructions occupy part of this space, reframing management of the acutely ill within the rubric of rescue work enables the inclusion of articulation work, diagnostic work and work-arounds that have previously escaped attention. What also becomes apparent is that rather than representing a deficiency model of the problem of failure to rescue, rescue work reflects the mastery and skill of handling uncertainty within everyday health care practice. Section 8.6 considers these findings in the light of sociological theory on the cultural context of acute care (section 3.5) and the social system of health care work (section 3.3).

Boundary work was a central theme within this research (objective three). Section 8.7 extends the literature in this field by assimilating literature in chapter two, sociological understandings of managing boundaries (section 3.4) and the social system of health care work (section 3.3), with findings from chapter seven. Integration of these concepts with empirical exploration of rescue work at meso- and micro-level extends the literature in two ways. Firstly, it draws attention to the adverse impact of boundaries between critical care and general wards, and organ based specialists and generalists for rescue work, and secondly, it illustrates the significance of inter-relationships between organisational and patient trajectories.

Section 8.8 helps to shed light on why only some RRSs have an impact on patient outcomes and why improving detection of and response to acutely ill patients is such a complex process (objective four). It integrates the clinical literature (section 2.4) and sociological literature (section 3.6) with the findings related to the role of the RRS that formed a central thread through chapters' five to seven. This section locates the RRS within conceptual understandings of culture as complex historical social systems of shared beliefs and values, where culture is both the product and context of rescue practice. The RRS is

reconceptualised not as an instrumental quick fix means to change behaviour, but as part of the complex social processes that shape inter-relationships between safety systems and practice, with both positive and negative consequences for care of acutely ill patients. Similarly, rather than identifying a set of factors which facilitate or hinder implementation of the RRS (which arguably presents a reified notion of the culture of rescue), this research locates the RRS within the wider picture of social processes that are influential in shaping rescue.

The re-framing of perspectives outlined in Table 8.1 represents the main contribution this research makes to this field. The chapter concludes with a consideration of the limitations of the research and its implications for policy, practice and education.

Table 8.1: Extending research findings regarding care of acutely ill ward patients

	Existing Perspectives	Re-framing the landscape
The rationale	The management of acutely ill patients is a legitimate arena for policy and professional scrutiny to address the quantifiable problem of suboptimal care provision on medical wards.	Concepts such as ‘deterioration’, ‘acute illness’ ‘suboptimal care’ and ‘failure to rescue’ are socially constructed; management of the acutely ill reflects the messy nature of handling clinical uncertainty
The nature of the problem	Suboptimal care is understood to consist of discrete episodes that are exceptions to normative medical caring / curative work.	Rescue work reflects the complexity of everyday medical work and is characterised by relations between patients, staff and tools; patient trajectories are intertwined with organisational and structural features
Focus	The focus is on the ‘heroic act’ of saving the patient at the point of collapse and the ‘window of opportunity’ that immediately precedes this.	Understandings are extended to encompass the unbounded, collective nature of rescue, and the value of upstream work performed by lower level staff within the wider trajectory of care
Solutions	The problem of failure to rescue can be ‘fixed’ and designed out with the RRS, i.e. staff training, monitoring tools, protocols empowering nurses and junior doctors to call for help, and response teams.	There is a need to focus beyond a deficit model to appreciate the hidden accomplishment of rescue work. Quality improvement initiatives address some of the issues, but unintended and adverse consequences also arise as a result of changes to the social order of health care work. Important socio-political issues remain under the radar

8.4 Managing rescue trajectories

Rescue work embodies diagnostic, 'mind the gap' and boundary work which is shaped by technology in action, cultural, socio-political and structural influences. It constitutes a rich fabric, yet current conceptualisation of management of the acutely ill patient reduces this complex temporal and socially situated practice to simple, reified linear representations. This research highlights the limitations of current classification systems such as the NPSA contributory factors taxonomy (NPSA 2007a), which identifies a long list of failure to rescue causal factors (including communication, task, education and training, patient, team and social, organisational, and individual factors), suggesting a relatively stable, discrete set of practices which can be effectively tackled by quality improvement programmes. By reframing this health care work as rescue work, this research shifts conceptualisations beyond bounded individual and team features, and instrumental notions of safety solutions, to additionally acknowledge relationships between factors, the importance of historical context, structural factors, temporality and space.

This research reconfigures this conceptual representation as a rescue topology, recognising the importance of intertwined patient and organisational trajectories, and the intersection of actors and technologies in the handling of uncertainty. A rescue topology draws on the notion of trajectory frameworks (see section 3.3.1) previously used by Strauss and Corbin (1998, 1991), Timmermans (1998) and Bowker and Star (1999) to highlight how patients, staff and technologies are shaped and experienced through interactions, with each trajectory continuously intersecting with the trajectories of others.

Policy and clinical representations of the pathway of managing acutely ill patients currently construct rescue as the point of collapse together with a critical window of opportunity 6-24 hours prior to this event. This doctoral study extends rescue to include distributed activities from the point of admission to the point of collapse and beyond, and draws attention to previously hidden articulation work and distributed diagnostic work which makes the activities of those in charge of rescue possible. While care pathways within surgery focus attention on preoperative and postoperative management in order to reduce surgical morbidity, the stable and predictable nature of elective surgery stands in sharp contrast to the messy, unpredictable nature of acute medicine where few pathways and planned trajectories of care exist (Every *et al.* 2000).

In addition, while care pathways detail clinical, managerial and patient interests, this research highlights how patient trajectories within acute care are nested within a complex backdrop of interlinked socio-cultural, political and technological structures and processes. This representation adds to current classifications of rescue work which largely focus on (a) monitoring of vital signs, detection of deterioration and escalation of care, and (b) the importance of standardised care processes. It links the individual with larger organisational processes and structures, which generate both enabling and constraining patterns over a set of systems (Bowker & Star 1999). Individual, team and organisational processes are pushed and pulled by trajectories of classifications (diagnostic and technological) and by structural features. It brings to the foreground the contingency, temporality and fluidity that characterises the textual substance of rescue work.

8.5 The social system of rescue work

8.5.1 Historical and structural influences

The findings from this research illustrate the dynamics and consequences of the economic, institutional and political environment which shapes local cultures and the enactment of patient safety on the frontline. As such the findings are congruent with key reports such as 'Organisation with a Memory' (DoH 2000c) and 'To Err is human: Building a Safer Health System' (Kohn *et al.* 2000) which acknowledge the importance of safety at system rather than individual level. Both the case study sites utilised for this research were comparable in terms of population served, size, bed occupancy and admission rates (DoH 2011). Previous empirical studies have noted the importance of hospital level factors for rescue (e.g. level of technology, number of beds, number of doctors, specialties, nurse-to-patient ratio, staffing, skill mix, organisational support for nursing care) (Clarke & Aiken 2006, Endacott *et al.* 2007, Rafferty *et al.* 2007, Silber *et al.* 1992, Hravnak *et al.* 2011). Others have linked the complexity of caring for critically ill patients on the ward to leadership, communication and power (Coad *et al.* 2002, Odell *et al.* 2002, Rowan & Harrison 2007, Buist *et al.* 2007) and cultural and anthropological change (DeVita & Bellomo 2007, DeVita *et al.* 2006, Rowan & Harrison 2007).

Yet, what these analyses lack are theoretical accounts of how these structures and processes influence rescue work. Cultural analyses can provide theoretical and practical

lessons, extrapolating the significance for social life from small but densely textured facts (Geertz 1973). This ethnographic account of rescue work within two study sites illuminates the significance of power and cultural issues for patient safety, and how both are intertwined and nested within health care work. This research foregrounds the importance of the formal organisation, yet avoids reification of its rationality, by examining the agency of staff operating within these authority structures. The situated exploration of the particularities of rescue work within two organisational case studies offers an alternative logic to 'hegemonic organising frames' (Monahan 2011, p.503) which can be criticised for overestimating the stability and influence of organisational bureaucratic structures and boundaries (Davies 2003a). Structuralist assumptions regarding system universality were problematised by exploration of local performative processes. This research articulates how staff groups were able to exercise agency within the relatively stable bureaucratic structures of each Trust, for example, by controlling care of 'at risk' patients to certain wards, mediating the interface between wards and critical care, and working-round normative rules (see section 8.6 and 8.8.4).

This research joins other social science studies (Jensen 2008, Vaughan 1996, Silbey 2009) which consider the intertwined effects of national policy and governance structures for shaping safety practices at organisational level. Regulatory bodies such as the Care Quality Commission imposed political pressure for both organisations to demonstrate their mortality rates were within 'safe levels' and agencies such as the NPSA, NICE and NCEPOD legitimised the role of the RRS within the management of clinical deterioration. However, these external bodies imposed little regulatory influence at system level; there were no financial incentives for Trusts to reduce either their cardiac arrest rates or unexpected admissions to their intensive care units (ICUs). At the time of the study, while all acute hospitals within the UK were encouraged to audit their practice related to in-hospital cardiac arrest and 'Do Not Attempt Resuscitation' (DNAR) decisions (DoH 2000b), this was only evident at Westborough. Across both organisations, measures of effectiveness of rescue were framed locally in terms of adherence to observation standards, and use of the TTS, rather than measuring system level effects on patient outcomes. This reflects a generic failure of health care organisations to link process measures to meaningful patient outcomes (Pronovost *et al.* 2006), and raises questions about the usefulness of quality accounts given the constructed nature of what are considered 'valid' indicators of patient safety.

The findings of this research draw attention to the politically charged nature of rescue structures and processes. Processes such as 'quality improvement' and 'safety systems' bring with them associated normative labels and suppositions. 'Organisations are rarely characterized by organisation-wide consensus and harmony' (Antonsen 2009); differentiation, conflicts over limited resources and the exercise of power are more common (Zaleznik 1970). While policy tends to locate responsibility for rescue at the frontline, implicating HCAs, junior nurses and doctors in their ability to detect and raise the alarm appropriately, this research demonstrates that responsibility is distributed *across* the organisation; individual responsibility spans various hierarchical levels. Powerful elites may be removed from hands on risk-assessment and response processes, but this research illuminates how their decisions and actions also enable and compromise rescue work. This is evident from data regarding the introduction of a universal TTS at Westborough (section 5.6.3), the pilot trial of the IAT at Eastborough (section 5.5.3), and governance processes across both Trusts).

This doctoral study shows that safety committee priorities, guidelines, policies and tools were imbued with positive connotations because of their self-evident rationality. Implementation of a RRS at each Trust was associated with expectations of benefit over existing service provision, despite lack of robust evidence to validate these perceptions. However, committee work regarding management of the acutely ill and adoption of policy recommended practices such as the TTS, IAT and outreach service demonstrated organisational commitment to patient safety and risk management. Organisational compliance with policy guidelines and evidence of effective strategies provided Westborough with symbolic capital and the chance for safety leads within the organisation to lay claim to expertise within the burgeoning field of patient safety. This finding supports Green's insight that the utilisation of technologies has a moral as well as technical dimension. In her analysis of the role of risk technologies in controlling the accidental, Green (2003) noted that technology utilisation 'demonstrates not only proper prudence in the face of a hazardous world, but also a commitment to the whole risk management enterprise' (p.35).

The historical-political context and cultural identities of both Trusts was influential in shaping rescue practice. This research joins other social science studies in demonstrating

the significance of a 'cultural frame', a representation of 'collective problems and solutions that help other actors link their own interest and identities to a collective purpose' (Stone Sweet *et al.* 2001, p.8-9). Mannion's study (2005) links strong directional leadership, a 'can do' attitude and robust performance management architecture with hospital performance. Westborough's active and engaged clinical leadership, prioritisation of quality improvement work for the past ten years, and perceived status as a strong, political player within the patient safety field provided a powerful legitimating force reinforcing the normalcy of decisions (Vaughan 1996). Within the organisation, not only was there evidence of strong medical and nursing leadership and positional power (Lukes 2005), but the chair of the Committee had secured legitimacy for leading the programme of work due to his alliances within the patient safety field and his well established track record of safety work (section 5.6.1).

Westborough responded to policy and professional calls for organisations to implement quality improvement programmes to tackle failure to rescue by exhibiting institutional isomorphism, adopting similar processes, practices and structures to those advocated by specialists within the field (DiMaggio & Powell 1983). Strategic leads perceived implementation of a rapid response system as the 'right' way forward (normative isomorphism) (DiMaggio & Powell 1983). Critical care capacity was relatively well resourced compared to that of neighbouring Trusts. Westborough also had considerable supporting resources for quality improvement implementation efforts which other research has shown to be important (Ferlie *et al.* 2009, McCormack *et al.* 2002). At ward level, consistency in utilisation of an escalation protocol and the critical care outreach team was observed across the medical directorate, and TTSs appeared part of the verbal and written vernacular at an organisational level, routinely integrated into handovers and documentation.

Lack of resources, powerful medical elites and lack of business planning and management of new initiatives can have a deleterious effect on hospital performance (Mannion *et al.* 2005). Eastborough's strategic leadership and quality improvement work regarding management of acutely ill patients was compromised by the lack of clarity regarding the Committee's aims, the frequent change of chair and infrequency of meetings. Adoption of the IAT was facilitated by Eastborough's established information technology dominant position within the health care field. However, the lack of project management regarding

its implementation undermined its potential for change. While attention was focused on the IAT as a potential technological fix, resource was diverted away from coordinating Trust wide quality improvement efforts to improve care of the acutely ill. Eastborough's critical care capacity was less well resourced comparative to that of neighbouring Trusts of similar size. Localised processes of escalating care and responding to calls for help contributed to delayed escalation of care across hierarchical and professional boundaries (nurse to doctor, junior to senior doctor, see section 7.2.2). The multiplicity of TTSs and auditing practices limited their impact. The different systems in operation competed with one another, reducing the potential for compatibility and coordination across different social, spatial and temporal domains.

Despite different structures and processes at the two Trusts, within the context of general medical wards, this ethnography confirms existing observational accounts of competing demands and scarce resources (Suokas 2010, Dixon-Woods *et al.* 2009) and reports of heavy workloads, staff shortages, frequent use of temporary staff and varying skillmix (NPSA 2007a, Cutler 2002, Endacott *et al.* 2007). These ward based structural factors are likely to limit the effectiveness of system level interventions to improve rescue on general wards such as communication, education and training for staff.

8.5.2 Organisational cultures; consensus and contestation

This research responds to calls to 'move beyond singular views of culture to embrace analyses of multiple subcultures and their interactions' (Scott *et al.* 2003, p.115). By linking meso- and micro-level structures and processes, the findings bring to the foreground contestations within the territory of managing acutely ill patients. Relations between critical care, medicine and management influenced the organisation and provision of services within the two study sites (section 7.4). At Westborough, critical care provided a dominant subgroup culture and the provision of an outreach service offered the opportunity to shape care provided within the general wards. Historically, critical care had not assumed a strong leadership role within Eastborough. A number of medical specialism subcultures (e.g. neurology, cardiology) dominated, creating turf wars and professional tribalism. Professional difference and conflict was normalised, leading to a certain amount of inertia in tackling organisational problems. Eastborough joined the Patient Safety Campaign, but lack of consensus at Trust board regarding the benefits of sign-up to the campaign led to poor compliance with data monitoring and feedback centrally. However,

across both Trusts, medical elites reinforced their monopoly, blocking managerial initiatives to standardise clinical processes (such as the TTS at Eastborough, see section 5.5.5) and monitor care trajectories (such as admission to intensive care at Westborough, see section 5.6.4).

This research illustrates that organisational collective identities are plurivocal and reflexive constructions that unfold over time and are embedded in broader discursive (cultural) practices (Brown 2006). It joins other research to demonstrate how medical elites in opposition to managers and safety policy makers have the power to challenge attempts to regulate them and defend against unwanted professional scrutiny (Currie *et al.* 2009b, Waring 2007). This research links with the work by Allen (2009), Zuiderent-Jerak *et al.* (2009) and Benford and Hunt (2003), in illustrating how 'counterframing' strategies, contestation, conflict and shifting objectives can make it hard for safety collaboratives to agree on and achieve outcomes.

8.5.3 Data as social control

Measuring social phenomena and events and translating them into data facilitates evaluation, comparison and intervention (Latour 1987). It is therefore important for quality improvement efforts (Pronovost *et al.* 2006). Measurement has its consequences; every system of measurement acts on the system being measured (Dixon-Woods *et al.* 2011).

Studies have shown how dominant medical elites, if part of a safety collaborative and supported by organisational leads, have the capacity to shift normative practice, to open up for scrutiny and regulation specific medical practices over time (Waring 2007, Dixon-Woods *et al.* 2011). This research illustrates how collection of rescue work data made visible what had previously lain hidden, and provided a means of coercive power (Lukes 2005) to shape organisational behaviour. Data collected at Westborough revealed poor monitoring of fluid balance across the wards, and lack of early warning signs prior to collapse in particular patient groups (such as those with acute coronary events). This then enabled targeting of improvement plans (section 5.6.4). Interview and observational data from Westborough demonstrate the power of effective safety management when operated *by doctors* (functioning with dual legitimacy as safety lead and clinician), *for doctors* (Waring 2007 p.174, Dixon-Woods *et al.* 2011). The construct of failure to rescue at Westborough was perceived as largely avoidable and therefore an important social

problem, amenable to behaviour changes (Øvretveit *et al.* 2002, Dixon-Woods *et al.* 2011). Data monitoring of process and outcome data at both organisations shaped interpretations of the problem and required solution.

However, drawing on social studies of science, and the role of categories in ordering action, this study additionally draws attention to the performative action of national and local systems of classifying rescue work. This categorisation presents a simplistic picture of medical work and creates an illusion of transparency (Tsoukas 1997). This research joins the work of Bowker and Star (1999) in emphasising the role of invisibility in the process by which categories are made and perpetuated, and how this then creates a hidden social and moral order. Due to the multiplicity of those involved in rescue work, as well as the continuous introduction of new practices, directives, technologies and tools, transparency is unstable and unachievable. Presentation of audit data regarding selected aspects of rescue self-sustains and shapes the organisation's generalisable knowledge about this work, at times becoming an organisational ritual in itself. This is exemplified by Westborough's collection of rates of referral to critical care; a rise in referral was interpreted uncritically as a 'good' thing, despite lack of data regarding impact on patient pathways and outcomes. This supports others' findings regarding the specific language-game and set of practices that participants in improvement collaboratives enrol in to enact notions of 'effectiveness' (Power 1997, Tanenbaum 1994, Zuiderent-Jerak *et al.* 2009). Reports of instances of gaming and measurement problems at Westborough add to the literature highlighting adverse consequences to command and control regimes (Bevan & Hood 2006).

Professional groups claim autonomy on the basis that their work is grounded in expert and exclusive knowledge (Abbott 1988, Freidson 1970, Jamous & Peloille 1970), which limits others within the division of labour from legitimately evaluating their work (Waring & Currie 2009). While generic pathways of care at Westborough were audited (e.g. pathways for high risk patients such as those with head and neck cancer), this excluded evaluation of the processes of diagnosis, decision making and treatment of medical work carried out during the patients' care trajectory. The hierarchy of specialism over generalism also manifested itself within the wards in hegemonic organising frames and constructions of risk. Specialist teams were observed to pick and choose who to see. Monitoring of

processes such as admission rates to critical care was resisted by leaders within the speciality.

Interestingly, the one domain of medical decision making that was included within the regular audits of rescue work at Westborough was decision making regarding resuscitation. Additional disciplinary force was provided by the inclusion of cardiac arrest rates as a measure of organisational success. Cardiac arrests at Westborough were considered 'deviant deaths' by safety leads. This reflects increasing national and international policy and practice recognition of the importance of preventing unnecessary cardiac arrests (Chen *et al.* 2009, Buist & Shearer 2010). Efforts to reduce cardiac arrest rates and mortality rates therefore resulted in increased scrutiny of those perceived 'at greater risk' of sudden collapse with no warning, such as patients with head and neck cancer with sudden haemorrhage.

The social and cognitive boundaries between inter- and intra-professional communities of practice help account for sticky knowledge flow (Ferlie *et al.* 2005). Previous studies have shown that credibility of evidence and competing priorities influence practitioners' decision making (Ferlie *et al.* 1999). This research illuminates how lack of an established evidence base appears to provide a space for difference, contestation and conflict. Adoption of a rapid response system at Eastborough was perceived as a political process and what empirical evidence there was for the benefits of outreach was contested by certain critical care consultants and physicians. Retrospective data review by critical care staff of the clinical trajectories of acutely ill patients who ended up on critical care generated contestation between general medical physicians and critical care specialists across both sites, but particularly at Eastborough, regarding care decisions. What was construed as an 'avoidable death' and 'avoidable admission to intensive care' appeared socially constructed with lack of consensus regarding definitions of cases of avoidable failure to rescue. Findings from this research also resonate with studies highlighting concerns regarding the use of cardiac arrest rates and mortality rates as measures of 'success' (Litvak & Pronovost 2010), and the exacerbation of scientific legitimacy debates by the validity and rigour of quality improvement data (Benning *et al.* 2011b).

8.5.4 Normative codes of practice

There is still uncertainty as to the 'normal values of many of the classic vital signs, and certainly considerable doubt as to what change in vital signs identifies the patient-at-risk and the deteriorating patient' (Kellett *et al.* 2011, p.119). Interpretation of the significance of vital signs was shaped by factors such as age and the condition of the patient. This research illuminates how constructions of 'acute illness', 'deterioration' and 'suboptimal care' were professionally framed. Hierarchical and professional differences in perceptions between critical care and general medical doctors appeared significant, particularly regarding the efficacy of early interventions by critical care and the points at which admission to critical care is advisable. The TTS and the intelligent assessment technology also shaped constructions particularly for HCAs, and junior nurses and doctors.

Cultural interpretations were professionally and organisationally bound. A moral order was discernable within both organisations which detailed aspects of staff's behaviour as normative. Some of these normative rules aligned with the organisations' safety system approach to facilitating detection of and response to acutely ill patients (e.g. prioritising acutely ill patients, taking the necessary clinical first steps in an emergency, asking for help), but others were at odds with the formally espoused safety culture (e.g. being seen to cope, escalating up the chain of command rather than bypassing hierarchies, not calling consultants at home). Calling for help is a complex judgement that balances the desire for clinical autonomy with an understanding of consequences to self, senior colleagues and patients (Stewart 2008). Being seen to be clinically and technically competent was important. This code appeared at times to contradict the normative code of seeking appropriate help (Bosk 1979).

Social orders juxtapose with one another. Comparative to emergency work, mundane medical work was ascribed low worth and delegated to juniors. Yet junior medical staff were expected to get through this work and were exposed to sanctions when normative breaches occurred. Tensions were evident in managing the distinction between mundane routine work and the heroics of rescue work. This research also illustrates the artificiality of this distinction. Less prevalent, but also distinguishable were managerial codes of practice regarding getting patients through the system. Junior staff struggled to negotiate and manage competing structural and temporal orders, individual patient clinical demands versus organisational norms regarding efficiency and throughput (for example balancing

the importance of writing medication orders for discharge versus responding to a request to review a patient with a change in clinical signs). This research supports Chapple's (2010) earlier finding of a dominant ideology of rescue within acute health care, with its notions of propulsion and momentum. This research additionally builds on this work by highlighting the difficulties involved managing individual and collective trajectories.

Both organisations promoted cultural standards prioritising patient safety and teamwork. Yet there were competing cultural scripts; nurses drew on what might be characterised as 'defensive' discursive resources, influenced by norms such as 'covering your back' and 'complying with protocol', in their enactment of rescue work. This normative standard appeared occupationally bound, facilitating silo behaviour and compromising shared situation awareness and responsibility across the nursing-medical boundary regarding management of the acutely unwell patient. This is discussed further in relation to the TTS and intelligent assessment technology in section 8.7.3. This research additionally extends attention beyond nurse-doctor and junior-senior doctor relations to micro-cultures within medicine, highlighting the difficulties associated with cultural differences between general medicine and specialities such as cardiology and neurology.

8.6 Rescue work as an accomplishment

8.6.1 Articulation work

This research privileges the production of emic over etic forms of knowledge, and illuminates how staff engage productively with policy, practice and tools on the frontline. Articulation work provides the glue for effective rescue work; yet this phenomenon defies measurement and categorisation as a formalised indicator, so it largely remains below the radar. Mundane low status scut work (Becker *et al.* 1961) keeps patients' temporal trajectories on track. Nurses and HCAs perform important articulation work, balancing individual patients' needs and departmental objectives, such as progressing transfers and discharges (Allen 1996, Nugus 2007, Suokas 2010).

This study of rescue work additionally extends this literature to illuminate the valuable, but to date poorly conceptualised role of the junior doctor in this articulation work. Examination of associations between clinically qualified staff (doctors plus nurses) and failure to rescue suggest that medical staffing levels may be more significant than nurse-

patient ratios (Jones *et al.* 2011b). The junior doctor acts as an intra- and inter-professional bridge, mopping up displaced tasks both from senior medical staff and from nursing staff and absorbing workload strains from above and below the hierarchy (see section 6.3). As preparatory and serving work, associated with a cultural code of femininity, 'this work is rarely acknowledged or well conceptualised (...) from a gendered professional ideal it is regarded as trivial' (Davies 1995, p.61). Medical articulation work performs an important preparatory step in enabling seniors to make appropriate decisions and engage in effective remedial activities further downstream in patient trajectories. It also helps to maintain departmental efficiency and forward momentum within the organisation (Nugus 2007). Conceptualising the role of articulation work in this way challenges normative perceptions of the short term, heroic, compensatory model of rescue work and resituates it as a dispersed, interlinked map of complementary and competing trajectories within the domain of medical practice.

8.6.2 Diagnostic Work

Caring for acutely ill patients is underpinned by much hidden diagnostic work, i.e. the 'intertwined practices of sense-making, assessment and action' (Büscher *et al.* 2010, p.3). These diagnostic processes embody the nature and status of different types of rescue work and determine perceived notions of both the accuracy of interpretations and appropriateness of actions. Diagnostic work is not restricted to the professional work of medical staff; it is all pervasive and includes the mundane. HCAs and nurses were skilled in interpreting tacit signs of deterioration and knowing when to work-around triggers when they were felt to be not significant. Diagnostic work also includes minding the gap activities upstream as opposed to solely the remedial activities that occur at the point of patient collapse. Rescue work can be seen as an interactional achievement, characterised by its distributive, collaborative nature.

This research highlights the important temporal consequence to medical coordination work. Time spent waiting, working out the pieces of the puzzle, and making sense of contradictory markers, for some patients was critical in terms of deferred decision making and treatment. This finding adds weight to the concept of 'clinical futile cycles' when, despite well intentioned high volume activity, little is done remedially to relieve the circumstances of the patient (Buist 2008). It highlights the poor visibility of a series of medical events over time, such as a failure of referral or the coordination of an

investigation, processes which lie outside the parameters of a clear diagnostic error (Scarpello 2011).

8.6.3 Rules and work-arounds

The present research joins ethnographies of emergency, neonatal and intensive care (Nugus 2007, Mesman 2008, Goodwin 2009), in demonstrating multidisciplinary team members' competence at 'working' imposed safety systems as part of the daily practice of rescue work. It adds to previous research which associates professional differences in utilisation of protocols with epistemological variance between nurses and doctors (Manias & Street 2000, Rycroft-Malone *et al.* 2008, McDonald *et al.* 2005c, Parker & Lawton 2000). The present research shows how organisational safety system enculturation levels out some of these professional differences as protocols and tools for rescue work become more widely accepted across the multidisciplinary team.

Buist (2010) noted that a number of patients' conditions improve after triggering, with little or no critical care intervention, which undermined staff's faith in the validity of the RRS and resulted in poor compliance. Rather than interpreting this as a limitation of the predictive ability of the TTS, and illustrative of rule breaking, this research notes that this is an associated consequence of imposing universal standardisation schemes on complex work practices; work-arounds evolve. 'Because imposed standards cannot account for every local contingency, users will tailor standardised forms, information systems, schedules, and so forth to fit their needs' (Bowker & Star 1999, p.159). This research provides detail of both conformity to and violation of these imposed standards which created hazards; illustrating the complexity of negotiating the textured, multilayered landscape of rescue. While current safety policy discourse utilises a deficit model to highlight where staff fail to abide by rules and regulations, this research augments this by demonstrating how junior and lower level staff manage complex work practices within the uncertain and messy world of medical practice. HCAs, junior nurses and junior doctors co-ordinate contradictory frames of reference for rescue work and draw on multiple scripts, vocabularies and repertoires (Mesman 2008). They routinely assimilate codified data provided by the TTS, verbal and written instructions, patient reports and visual cues, which are in turn shaped by both embodied and quantifiable knowledge.

Organisational learning from cases of failure to rescue and audits of staff compliance with standards hold individual performance fragments against the backdrop of a world we now know to be true, and fails to encapsulate the mastery of everyday rescue work. In practice, health care workers come up with creative ways to work-around the various standards (Gasser 1986) and resist what in their mind is unnecessary work (Noble 1984). Adherence to and working-around imposed standards illustrates the intelligence and flexibility of frontline workers (Amalberti *et al.* 2006).

8.7 Managing boundaries in rescue work

8.7.1 Professional jurisdictions

What was consistent across the two sites was that certain rescue practices were included within each organisation's rapid response system and therefore regulated, while other practices were excluded from the systematised process (section 5.6.4). This doctoral study contributes evidence of how health care work classifications reproduce and legitimise the privileged position of those at the apex of medical hierarchies. Work processes such as taking and recording observations and calling for help were considered within the jurisdictional boundary of the rapid response system and therefore were standardised and subject to management control and audit. Response behaviour of senior nurses (the critical care outreach team at Westborough) was also monitored. However, decision making within medical firms and medical response behaviour was not routinely included within this process. The exception to this rule was decision making regarding DNAR orders, which is considered further in section 8.7.3. Those rescue processes selected for scrutiny fell mostly within the jurisdiction of HCA and nurse control, perpetuating inequalities in monitoring and consequentially potentially 'blame' for errant behaviour between professions and occupations.

This research adds to other work illustrating how opportunities and constraints for discursive action within health care work are dependent on position (Finn *et al.* 2010). Silbey (2009) proposes that 'safety culture is frequently operationalised in terms of the attitudes and behaviours of individual actors, often the lowest-level actors, with the least authority, in the organizational hierarchy' (p.341). Findings from this study showed that while medical staff were observed to question the appropriateness or timeliness of certain response behaviours or treatment decisions made by colleagues outside their team, seniors

appeared reluctant to speak up and challenge their medical colleagues (section 7.3.3). Certain aspects of medical practice therefore lay outside formal scrutiny, and knowledge was trapped between medical specialisms.

Ehrich (2006) notes that the culture of not challenging medical colleagues has a specific historical, professional and regulatory underpinning in the UK. While a more systematised form of peer monitoring and surveillance is in operation than described previously (Freidson & Rhea 1972, Light 1972), it appears that the division of labour within health care still keeps mistakes from visibility (Hughes 1951, Atkinson 1984). In contrast, findings from this research additionally highlight the relevance of Bosk's (1979) insights for current rescue practice in that junior doctors' failure to demonstrate competence in prioritisation, take early corrective action and show communicative competence in asking for help were perceived by senior medical staff as normative errors and therefore merited social sanctions.

Power is distributed via the structural organisation of medical work. This research extends Nugus' (2007) finding that the organisational hierarchy of departments prevails over the hierarchy of positional roles beyond the boundary of the emergency department and inpatient services, to boundaries within medical services and between medical wards and critical care. Organ specialism assumes a hierarchical superiority over generalism; this is reflected not only in the negotiated clinical work that takes place at micro level, but also at the meso level, where both organisations were struggling to redefine the landscape of medical services within the wider context of acute care, and shape boundaries between acute medicine and general medicine, and medicine and critical care. Bureaucratic structures and boundary contestations influenced patients' trajectories, such as capacity and staffing models utilised within critical care, and organisation of medical wards and firms.

Sociological research has shown how organisational hierarchies protect the status of profession, organisation, and individuals (Millman 1977, Bosk 1979, Rosenthal *et al.* 1999). Findings from this study add to a substantial evidence base that formal divisions of labour and professional boundaries cause gaps or discontinuities in, and interfere with escalation of care (Leach *et al.* 2010, NPSA 2007a, Endacott *et al.* 2007). This research illuminates the importance of 'structural secrecy' which illustrates how the division of labour, hierarchy,

and specialisation segregate knowledge about tasks and goals (Vaughan 1999). While the critical care outreach team, and tools and technologies such as the TTS and IAT help mediate these boundaries (see section 8.8 for further discussion), having a critical care outreach team alongside increasing specialisation of medicine and nursing (with delegation of tasks such as taking observations to HCAs) could be argued to potentiate the problem (see section 8.8.4).

Critical care is an emerging speciality, having changed as a result of modernisation, expansion of critical care training, and enhanced political and clinical authority (Green *et al.* 2011). This doctoral study builds on work by Carmel (2011) in highlighting the boundary work (Abbott 1988) and jurisdictional struggles that take place between physicians and critical care doctors. It extends this work by focusing on rescue processes within medical wards rather than critical care outreach services, and by exploring tensions between micro and meso level discourse and what was observed in practice. This research highlights that critical care staff legitimate extension of their jurisdiction to medical services with reference to their specific knowledge and skills, particular to superior understandings and management of acute deterioration. Other studies have shown that ward teams resist calling in specialist help, feeling that they have the necessary skills (Shearer *et al.* 2012, Benin *et al.* 2012). This behaviour was not seen or reported at Westborough with its relatively mature outreach service; however some resistance was expressed and observed on the part of a few medical leads at Eastborough to what they saw as attempts by critical care to appropriate care within medical services. This supports Carmel's (2011) findings of resistance amongst some non-critical care staff to critical care 'empire building'. However, what this doctoral study also adds is an understanding of the consequences of professional closure (Witz 1990) utilised by critical care to control access to their units. This is addressed further in section 8.8.4.

8.7.2 Temporal and spatial influences

This research highlights the importance of diagnosis and intervention (and their associated uncertainties) for the study of rescue work, particularly the consequence of the temporal and distributed nature of diagnosis, investigation and treatment for acutely ill patients. 'Substantial time and effort is devoted to the intellectual game of diagnosis instead of the challenge of management' (Atkinson 1984, p.952). Complexity and uncertainty lie at the very heart of acute illness and medical care (Fox 1980, Fox 1957); diagnosis and treatment

necessarily entail judgments about the implications of acting or not acting in particular ways. Sociological studies have illuminated how medical training for certainty attempts closure of uncertainty, reducing complexity to simplicity by the alignment of symptoms and pathology (Light 1979, Atkinson 1984).

What this study illuminates is the intertwining of patient focused processes, such as the detection of disease and deterioration, and design of therapy and response, with organisational trajectories and structural processes such as the organisation of ward based or directorate based firms, housing of outliers and transfer of responsibility between medical firms (Sinclair 1997). It confirms the tensions associated with the temporary and transitory contact between nursing and medicine (Allen 1996, Svensson 1996), but extends this to relationships within medicine (section 7.3.4). It illustrates the adverse consequences of junior doctors' unsupervised working practices and boundary tensions between medical teams for patient care. Findings from this research also add to those from other studies exploring the adverse consequences of admission to clinically inappropriate wards. This can lead to suboptimal care due to delayed medical review, nurses unfamiliar with who best to contact, and nurses' lack of familiarity with condition specific signs and symptoms of deterioration (Goulding *et al.* 2012, NPSA 2007a, Schmid-Mazzoccoli *et al.* 2008).

Many hospitals in the UK have introduced Acute Medical Units (AMUs) for medical inpatients presenting with acute medical illness from emergency departments and/or the community for 'expedited multidisciplinary and medical specialist assessment, care and treatment for up to a designated period (typically between 24 and 72 hours) prior to discharge or transfer to medical wards' (Scott *et al.* 2009). Neither Eastborough nor Westborough had an AMU, so emergency admissions were distributed across the organisation and followed up by individual medical firms. Physicians from both sites reported concerns about the impact of this on patient journeys and patient safety; studies have shown the positive effects of AMUs with regard to access to appropriately trained acute care physicians, and rapid turnover of pathology and clinical investigative services (Scott *et al.* 2009).

Findings from this study emphasise the temporal and organisational elements of rescue work. It builds on and links important sociological studies of medical error (Bosk 1979, Freidson & Rhea 1972, Hughes 1951) with studies of medical work (Mol 2002, Mesman

2008, Goodwin 2009, Atkinson 1995). For Hughes (1951), all work can be divided into routines and emergencies. During routines, workers recognise common problems, know what to do and are able to do what they need to do. A sense of mastery is thus created. Similarly, emergencies, when handled well, create routines and re-establish a sense of achievement. However, emergencies that spiral out of control may result from a mishandling of a routine (Hughes 1951). Mol (2002) notes the difficulties separating 'decision making moments from the series of long layered and intertwined histories that produce them, as if somehow normative issues could be isolated and contained within [certain] pivotal moments' (p.169). This research illustrates how rescue work embodies both the routine and the emergency, and the complex patient trajectory. It demonstrates the consequences of the interconnection of routine and emergency, as upstream mundane work such as ordering tests and chasing results, impacts on the evolution of patient trajectories (including subsequent decision making, referrals to other teams and early intervention).

8.7.3 Diagnostic categorisation regarding escalation of care

Diagnosis categorises patient trajectories, determining who has access to what resources and under whose jurisdiction the management of the condition will fall (Jutel & Nettleton 2011, p.794). A normative focus within general medicine on acuity and emergencies has the potential to marginalise those patients with mundane, chronic conditions, or those not for escalation or resuscitation. The heightened attention associated with 'interesting cases' may make life in hospital riskier for those with prosaic problems' (Bosk 2005, p.8, Vassy 2001).

This research shows how rescue work includes the 'future' orientation of diagnosis (traditionally focused toward treatment and prognosis) which expands to include categorisation of patients into those who are assessed as stable or unstable, and those who qualify for escalation of care or those who do not. It adds to other studies noting that rapid response systems may enable better decision making about end of life care (Hillman *et al.* 2005, Jones *et al.* 2007a, Chen *et al.* 2009, Jones *et al.* 2012). Chen *et al.*'s study (2009), however, found that access to the MET did not affect the incidence of unplanned ICU admissions, suggesting transfer to ICU is a complex process and likely to vary between hospitals. This research adds to a body of work reporting individual variance regarding decision making of patients' prognosis and suitability for ICU (Jones *et al.* 2012). Shifting

care provision and specific services within jurisdictional boundaries, for example, restricting provision of non-invasive ventilation to critical care, however, has implications for the provision of palliative care on general medical wards (see section 7.5).

This research illustrates instances of poor continuity of medical care, with reviews of DNAR status delegated to on-call teams and confusion regarding plans for escalation of care. This adds to other empirical research demonstrating highly variable patterns of DNAR prescribing (Flabouris & Chen 2011). The findings draw attention to the new insights generated as a result of collection of retrospective data at Westborough regarding cardiac arrests and the appropriateness of decision making regarding resuscitation. As discussed previously in section 8.5.3, practices previously hidden were opened up for review and situated within wider organisational perspectives regarding the 'efficacy' of resuscitation and escalation.

Hospital based resuscitation norms moved full circle from an efficacy model in the 1960's with emergency medicine in its infancy, to the dominance of universality with the advent of emergency infrastructure in 1970s (Timmermans 1999). This doctoral study illustrates the normative shift in focus from 'universality' of resuscitation back to what appears now to resemble more of the 'efficacy' model, with emphasis now shifting to the 'appropriateness' of resuscitation and escalation of care orders. Policy, professional and lay pressure to improve end of life care, together with the performative measuring of organisational 'success' regarding rescue work, have also helped to formalise boundaries around resuscitation and DNAR prescribing.

What this study also highlights is the framing of rescue work as a means of organisational success. Falling cardiac arrest rates as a result of normative shifts in categorisation of patients as 'not for escalation of care' or 'not for resuscitation', or for the 'Liverpool care pathway', were perceived as a measure of organisational success. This reduction in rates reflects a 're-classification' (Chen *et al.* 2009) and masks underlying questions such as the efficacy of individual DNAR prescribing practices or perhaps the adverse effects of this categorisation on patient pathways and care processes.

8.8 The role of the rapid response system

8.8.1 The search for the technological fix

Within policy and managerial discourse, the work of the RRS tends to be imbued with positive connotations. Implementation of the TTS and intelligent assessment technology, for example, were perceived by safety leads to assure improvements in care. Leads perceived that at worst, poor adoption of the tools would bring about little change to existing practices. However, empirical studies from other high risk industries such as the airline industry, show that accidents are highest when new technologies are introduced (Bosk 2005). Over the research period, the pace of change within each Trust was noticeable. A fairly constant stream of new systems, policies, procedures and technologies was introduced during this time with little consideration of the dynamic implications of these changes to clinical practice routines. Heightened risks were associated with the disruption of established routines (e.g. removing paper charts from the end of beds) and co-existing practices (e.g. paper records existing alongside the electronic charts). The findings from this research illustrate how safety tools and technology neither 'save' nor 'endanger' the patient; instead, the embedding of the safety systems, technological tools and policies shifted the landscape of acute care. This brought with it not only opportunities for improvements (e.g. facilitating detection of clinical deterioration, coordinating understandings), but also unintended consequences. These are considered further in section 8.8.2 and 8.8.3. Protocols and tools do not expunge clinical messiness, but shift it (Berg 1997a).

Greater conceptual clarity is afforded by the RRS within sociological discourse on the risk-free ordering of life and death (Bayatrizi 2008). Cardiac arrests however still occur even when mature rapid response systems are in place (Galhotra *et al.* 2007). Clinical instability is not a static phenomenon (Hravnak *et al.* 2011). Sudden deterioration is likely to occur in between monitoring intervals. Given this landscape, safety tools and technologies are establishing themselves as an important part of the socio-political context, offering new solutions, expanding spheres of clinical practice and re-shaping organisational and professional norms within rescue work (Brown & Webster 2004). At both Eastborough and Westborough, technocratic rationality rather than craft work underpinned much of strategic leads' discourse regarding rescue work.

8.8.2 The track and trigger system: benefits

This research joins other work in demonstrating that formality and standardisation associated with the introduction of the RRS have a useful social purpose in promoting safety in some instances (Bosk *et al.* 2009, Yeung & Dixon-Woods 2010). The TTS, protocols and intelligent assessment technology are useful material and epistemic resources for rescue, not only for boundary work, but for distinction work (Burri 2008), raising the status of mundane work (taking observations), and enabling lower level staff (junior nurses and HCAs) to demonstrate professional skills and power. The tools helped these staff with informal diagnostic work i.e. sense-making, assessment and action. The mandate provided by protocols and the 'packaging' of objective data by the TTS and intelligent assessment technology provide a means of overcoming hierarchies. In contrast to studies that conceptualise boundaries as markers of difference, Star and colleagues perceive boundaries as interfaces facilitating knowledge production (Star & Griesemer 1989). This research adds to important existing social science which expands understanding beyond boundaries as conditions for separation and exclusion, to include the concept of the 'boundary object' which structures and coordinates relations across communities of practice (Allen 2009, Pinder *et al.* 2005, Lamont & Molnár 2002).

Allen (2009) and Pinder (2005) found that clinical pathways act as mobilising metaphors, providing a means of prescribing as well as describing care. Like the care pathway, rapid response systems have the generative power to shape understandings of deterioration, facilitate communication; bridge and coordinate care across spatial, temporal and professional boundaries; and provide the license and mandate for action. This research illuminates the active ingredients of this rescue system, notably the multiplicity of actors (tool designers, strategic leads, managers, patients and clinical staff), practices and tools (TTSs, protocol, IAT, outreach). In addition, audit and accounting processes provide an important space for reflexivity in the management of acutely ill patients. Disruption of established routines and practice changes result from the interaction of the actors, tools and practices within the context of acute care.

This study highlights that the TTS and IAT depict functional zones of normality and abnormality and shape perceptions of diagnosis and interventions, through constructions of 'deterioration'. It joins other studies (Cussins 1996, Goodwin 2009) in suggesting that it is not the objectification of the patient *per se* that make these technologies threatening,

but rather the various outcomes of those objectifications. In her study of the connections between the patient and the anaesthetic machine, Goodwin noted that this alliance enhanced the ability of the unconscious patient to convey his/her status. Similarly, the TTS and IAT technologically augmented certain expressions of deterioration, for example, a dropping pulse and blood pressure which at times the patient was unaware of, or unable to communicate because of his/her condition.

The IAT enables real-time remote viewing of vital signs which facilitates temporal and spatial coordination across interprofessional boundaries. Data generated via the intelligent assessment technology produces large electronic databases of vital signs and related clinical data, offering potential for generating greater insight into physiology of acute illness (Kellett *et al.* 2011). It is packaged as an adjunct to nursing care, reducing the need for multidisciplinary teams to solely rely on nursing observation which is limited by need to care for multiple patients (Tarassenko *et al.* 2006, Smith *et al.* 2006).

Packaging deterioration effectively is dependent on knowledge, confidence and experience (Andrews & Waterman 2005, Wood *et al.* 2004, Cox *et al.* 2006). This research joins others in noting that some doctors discount nurses' intuitive or soft signs (Leach *et al.* 2010). It also illuminates how language is an important means of imposing order and conveying certainty (Mesman 2008, Nugus 2007). This research illustrates the importance of 'chart talk' (Chellel *et al.* 2006), privileging biomedical knowledge. Shared repertoires enable team situation awareness and a shared logic of a clinical emergency. Communicative competence in escalating care enables staff to be taken seriously and facilitates timely response.

8.8.3 The track and trigger system: unintended consequences

This research responds to Timmermans and Epstein's (2010) call for scholarship into standardisation that is 'specific, empirical and located in concrete, social settings' and enables investigation of the 'full spectrum of positive and negative consequences of standardisation' (p.84). What this research brings to this body of work is an understanding that while the TTS, protocol and IAT perform a valuable bridging function across the interface between occupations and professions, their discriminatory power undermines understandings of tools' associated neutrality and equality. These tools and technologies

not only offer scope for redefinition, but also reproduce and reinforce cultural practices such as existing hierarchies and occupational divides. The symbolic capital provided by the IAT and TTS not only enabled nursing staff to challenge jurisdictions, but restricted their ability to negotiate occupational hierarchies. Implementation of the TTS, IAT and escalation protocol reinforced existing power relations between junior nurses and doctors and acted as disciplinary mechanisms. While standardisation of practice clearly has its benefits, it also comes at a cost that these tools attenuate lower level staff's authority and ability to persuade staff higher up in the organisation of the credibility of their knowledge. Educational efforts to develop junior staff's assessment, clinical reasoning and communication skills are likely to be hampered by these underlying power dynamics. Technical-instrumental approaches to teamwork and rescue become reified in strategies focusing on some professions and privileging other elite groups who largely escape attention (Finn *et al.* 2010).

There are additional tensions between the different logics of practice within rescue work. This study draws attention to the jurisdictional authority associated with safety tools and technologies. There is an epistemological disjuncture between the rationality associated with those values portrayed by both the IAT and TTS as 'valid' and the embodied tacit knowledge of patients' deterioration possessed by staff, patients and relatives, found to be useful in early detection of deterioration (Leach *et al.* 2010, Odell *et al.* 2009, Ball *et al.* 2003). Santiano and colleagues' research (2009) showed that patients at risk of a cardiac arrest and perhaps with a more severe degree of illness were identified earlier by nursing assessment as opposed to vital sign abnormalities. Neither Trust incorporated a 'nurse worried criterion' into their TTS for escalation of care, and Westborough's focus on the Patient At Risk score and re-categorisation of the SBAR communication tool to a SPAR mnemonic, undermined its potential for enabling nurses to use subjective calling criteria.

Additionally, the IAT functioned as an 'e-panopticon' (Foucault 1976), rendering the patient as a 'universalised datum', disconnected from any 'tangible, corporeal body' (Samson 1999), removing understandings of deterioration from the need for visualising or touching the body. While this facilitated distributed team understandings across temporal and spatial boundaries, the IAT was less effective than the paper chart as an embodied structuring device (Greenhalgh 2008). This was observed to be problematic particularly in an emergency, when timeliness of response was influenced by the location and availability

of chart. The technology also provided a new order to escalation of care, by designing out the need for HCAs to report abnormal values to nurses; instead the IAT offered a script for action.

This research supports Vaughan's caution that 'bureaucratic systems can create extreme rule-mindedness that deflects individuals from actions that are most beneficial to the organization' (Vaughan 1999, p.281). Routine following and reliance on safety tools and systems led at times to 'missing the zebra' (the exceptions to the rule) (Bate *et al.* 2008, p.28), and normalisation of high scores over time, with adverse consequences for patients (see section 7.2.4). The tools were associated with the individualising effects of hierarchical accountability (a pre-occupation with individual performance and attentiveness to formal rules and scrutiny), and a fear of liability and defensive behaviour (Suokas 2010).

These findings further conceptual understanding of the contested space regarding those safety tools and systems designed to facilitate detection of and response to acutely ill patients. Within policy and clinical fields there have been calls for uniformity, such as a national TTS (Subbe 2010). Yet, the effectiveness of these rescue systems is dependent on the very looseness and imprecision that accompanies local adaptation. Re-articulation of the system to meet the goals of the actors involved is a *sine qua non* for its functioning (Timmermans & Berg 1997). Yet, we also see that too much flexibility is associated with reduced usefulness. While uniformity of the TTS at Westborough ensured a shared nomenclature and cultural meaning across domains, multiplicity of the TTS (including the IAT) at Eastborough worked against the provision of a common identity across social worlds and stability over time. The number of written rules and procedures and their perceived relevance, complexity, and acceptability is associated with the systematic production of organisational deviance (Vaughan 1999). Organising systems such as the TTS need sufficient stability and uniformity to create sufficient momentum for its transformative purpose. Directives contained within standards such as the TTS or IAT risk remaining 'paper tigers' unless they are widely adopted (Timmermans & Epstein 2010, p.79).

8.8.4 The role of critical care outreach

Critical care outreach services provide an example of changes in patterns of medical working and the implementation of neo-liberal managerial principles, namely flexible working among health care workers (Green *et al.* 2011). It has been suggested that the

potential benefit of a rapid response system may be as much a function of staff education about recognising deterioration along with effective communication and nurse empowerment rather than being about a special critical care outreach team (Øvretveit & Suffoletto 2007, Moldenhauer *et al.* 2009).

Existing evidence shows that not all medical emergency teams or outreach services show an impact on patient outcomes (Hillman *et al.* 2005, Chan *et al.* 2010). There is still uncertainty about the significance of differences between doctor and nurse led services. This research adds to other studies identifying causal mechanisms associated with quality improvement in care of acutely ill patients. This research confirms the critical care outreach team's bridging function between critical care and the ward (Rowan 2007, Leach *et al.* 2010, Chellel *et al.* 2006); its coordinating and mediating role regarding gaps in the system, addressing organisational diffusion of responsibility (Chellel *et al.* 2006) and its coaching, education and advice giving function (Carmel & Baker-McClearn 2011). These findings help explain why improved outcomes such as cardiac arrest rates have been associated with implementation of outreach in some studies (Buist *et al.* 2002, DeVita *et al.* 2004, Bellomo *et al.* 2003).

Patient outcomes may be influenced as much by access to critical care resources as the nature of the service itself. Access to a critical care outreach team is only available for patients whose conditions have deteriorated to a critical point defined by the organisation's TTS. This research confirms that availability of critical care beds varies (Wunsch *et al.* 2008, Adhikari *et al.* 2010) and that thresholds for critical care vary (Wunsch *et al.* 2011). As Amaral and colleagues (2011) note, with a lower threshold, a rapid response system may be relevant in providing a timely initial assessment and subsequent communication with critical care for transfer. In a more restrictive system, where decisions regarding critical care triage become more relevant, a rapid response system may be a fundamental resource in providing initial critical care on the ward, such as observing a patient with severe sepsis who might be able to remain on the ward after the first 4-6 hours of treatment.

This research illustrates how rescue imposes a socially constructed hierarchy shaped by tools such as the TTS. The TTSs were based on grading *certain* physiological parameters while others e.g. blood results or assessments of pain were left out. Staff at both Trusts

appeared to accept the authority of the banding structure and the setting of the trigger points. Comparison of the TTS at Westborough and the intelligent assessment system at Eastborough illustrated how categorisation of the normal and abnormal was socially constructed. 'Trigger points' were set differently on the two Trusts' charts (e.g. a heart rate of 40 was attributed a score of 2 at Westborough and a further assessment in 4 hours whereas at Eastborough it generated a score of 3 and follow-up observations in 2 hours).

This doctoral study also demonstrates that outreach is associated with unintended consequences. This resource further compartmentalises acute service provision, and creates new divisions of labour. While previous research has noted the deskilling effect the CCOT may have on ward nursing and medical staff (Rowan 2007, Carmel & Baker-McClearn 2011, Benin *et al.* 2012), this research illuminates the formal interfaces that arise with the introduction of the CCOT, between critical care and general wards. A tension arises with implementation of the CCOT which extends critical care skills across general medical settings, while simultaneously introducing the problem of 'many hands' (Bovens 1998) with the potential for fragmented accountability, multiple handovers and reduced continuity. Shifting jurisdictions appear to impact on junior doctors' skills development, particularly when the critical care outreach team operate a 24/7 service. This research suggests that given organisations' limited critical care capacity and the increasing acuity and complexity of conditions of many of those patients nursed on general medical wards, the CCOT provides an important resource for rescue work. The question that remains is how organisations can mediate these adverse consequences and address the long term impact on the development of junior nursing and medical skills.

8.8 Conclusion

This research aimed to explore rescue practices in order to draw out the associated interplay of socio-cultural and organisational processes and the context of clinical work within two medical wards. It contributes to theory development in this field by articulating how current quality improvement programmes, surveillance and monitoring of rescue work involve the sifting and categorisation of medical work, which provide only a partial view of the landscape. It presents a textured topography of rescue, extending understandings beyond reified, linear classifications to include multiple overlapping structural, technological and diagnostic trajectories. This research shifts theoretical conceptualisations

beyond bounded individual and team features, and instrumental notions of safety solutions, to additionally acknowledge relationships between factors, the importance of historical context, structural factors, temporality and space.

The research explored how organisational and structural factors influenced rescue work. It draws attention to the importance of external regulation, reporting mechanisms and national guidelines (e.g. NICE, CQC, NPSA) in shaping meso-level decision making, but additionally, articulates how organisational response to policy direction is heterogeneous at meso-level, given the influence of Trusts' particular historical and cultural features. It adds to the clinical literature by demonstrating how responsibility for rescue is distributed *across* the organisation. It contributes to existing evidence regarding the importance of centralised governance, leadership, senior level support, infrastructure and resource for patient safety improvement. However, in line with Vaughan's work (1999) on the dark and light side of organisations, it identifies factors that both facilitate and hinder rescue work, suggesting the relatively unstable distinction between context and practice. Factors such as external regulation and internal data reporting mechanisms have both intended and adverse effects. This research adds to anthropological and sociological studies which theorise culture as both the product and context of social action, and draws attention to cultural contestation within professions and organisations. It adds to the body of sociological work which outlines the role of epistemic contestation and powerful medical elites in decision making and control of resources, particularly when a robust evidence base for particular safety systems is lacking. In addition, it provides findings to suggest that processes such as data review, can unsettle norms and act as a leverage point for facilitating rescue work.

This study explored how rescue work was enacted within general medical settings. The current clinical and policy evidence regarding the ward based management of acutely ill patients is underpinned by a deficit approach to patient safety. In contrast, this research draws attention to the constantly shifting nature of the landscape of handling acutely ill patient trajectories which illustrates the adaptability and intelligence displayed by frontline staff to handle clinical uncertainty. It extends the focus of rescue from the point of a patient's collapse and the period immediately before, to include distributed activities within the patient's trajectory of care. The research articulates how hidden articulation work, which is performed by lower level staff, makes the activities of those in charge of

rescue possible. It adds to sociological literature which has found that diagnostic work is distributed across the health care team rather than being medically bound. In foregrounding the competence and skills employed by HCAs, nurses and doctors in managing these treatment trajectories, this thesis contributes to STS work focusing on the doing of patient safety. It additionally extends this body of work by acknowledging the interface between these local practices and the structural setting and context of rescue work.

The role of boundaries in hindering escalation of care is recognised as a central theme within the clinical evidence to date. This research draws additional attention to the adverse impact of boundaries between critical care and general wards, and organ based specialists and generalists for rescue work. It extends the evidence base regarding tensions associated with the temporary and transitory contact between nursing and medicine to include relationships within medicine, and illustrates the adverse consequences of junior doctors' unsupervised working practices and boundary tensions between medical teams for patient care. This research adds to the clinical literature reporting variance regarding DNAR decision making and thresholds for admission to critical care, and provides evidence of the impact of this on care provision. It additionally draws attention to the unintended consequences of categorisation and organisational structuring of resources associated with escalation of care for individual patient care trajectories.

The fourth objective of this research was to offer theoretical insight into the underpinning social processes and mechanisms of the RRS. This research helps to explain why the evidence base for RRS is inconclusive and why organisations still struggle to effectively manage acutely ill patients on the ward. Rather than perceiving the RRS as an agential mechanism for changing the culture of acute care, the findings from this research suggest that rescue work and the RRS interlink and share more of a dyadic relationship. This research concurs with previous studies that highlight the importance of multiple elements of the RRS, notably calling criteria (including nurse worried criterion), a rapid response team, evaluation strategies, education and ownership (DeVita *et al.* 2006, Smith 2010, Rao & DeVita 2011). The RRS opens up aspects of rescue work for scrutiny, and enables the development of a shared management logic for management of the acutely ill patient. The RRS performs a valuable bridging function between occupations and professions. However, tools such as the TTS and IAT reinforce cultural practices such as existing professional

hierarchies and occupational divides. They also shape patient trajectories and mediate boundaries, with both positive and negative consequences for patients in terms of access to specialist and critical care.

This research identifies a number of factors which interconnect and help shape the effectiveness of the RRS. Staffing, skill mix, and availability of senior staff to role model effective practice influenced lower level staff's engagement and utilisation of the RRS. The findings support the results of previous studies which note the importance of external scrutiny, central direction, project team consistency and commitment, resources, (in this case, particularly critical care and project management resource) and data monitoring for QI implementation. This research also broadens the focus to include the importance of an organisation's reputation, underpinning values regarding safety and rescue, and competing organisational priorities. It adds to the literature confirming the need for a sound evidence base to justify implementation of QI programmes; lack of consensus regarding impact contributes to conflict and jurisdictional battles between hierarchical and occupational groups, and hampers implementation efforts.

Lastly, this research contributes methodologically to the body of sociologically and anthropologically informed ethnographic work. It demonstrates how the privileging of fieldwork enables the questioning of constructs used in policy and practice, the disentanglement of relationships between meso-level and micro-level health care work, and a greater understanding of the effects of power, hierarchy and cultural norms on ward practices. Rescue embodies the nature of clinical work. This ethnographic study provides a nuanced picture of many of the defining features and complexities of health care practice, thus offering potential for learning beyond the field of rescue and to contribute to patient safety theory more generally.

8.9 Reflection on methods and limitations of the study

This research illuminates associations within the landscape of the acutely ill, drawing attention to the interleaved actions of actors and technology. However, as Gardner (2011) notes, it is not practically possible to undertake empirical work of medical practice without making some sort of *a priori* judgments. This research limited its point of focus to the

bounds of the medical directorate, and to two wards in particular. I chose to study two organisations rather than one, thus limiting the period of immersion in each. However, the opportunity to compare and contrast the two case studies provided valuable insight into the consequences of these associations which would not have been possible with the exploration of a single case study.

Observing ward practice during fieldwork gave me a sense of the routine and the special, and highlighted the interrelated nature of patients, staff, tools and technologies within rescue work. My observations on two wards gave me access to a number of staff, some of whom I then arranged to shadow. Shadowing offered an intimacy and connection with these clinicians, generating understandings beyond those gained by observations of medical practice within the two wards. As Nugus (2007) notes, data generation is a function of our common humanity; the quality of relationships not surprisingly influences the data collected. My clinical and critical care background enabled connections, facilitated understandings of the clinical significance of interactions and shaped the 'emic-etic' distinction between the researcher and the researched (Tedlock 2000). However, these connections were influenced by a number of factors including attitudes of the ward managers to my presence, 'the work' I was able to help out with, and the layout of the two wards. Data collection at two sites helped mitigate the difficulties encountered at each site.

Ethical approval for the ethnographic study included accompanying staff on ward rounds, and attending ward and directorate meetings. It was not possible to seek individual consent from all staff and patients I came into contact with during the observations of ward activity, so posters explaining the purpose of the observations were displayed prominently in the clinical areas. When accompanying ward rounds, verbal consent was obtained from the staff involved, and where this included a bedside handover or clinical examination, permission to attend was sought from the patient. If patients were unable to give verbal consent, I waited outside the room until the ward round moved to review the next patient. However, as Suokas (2010) notes, it is difficult 'to draw a line between observations that are necessary for studying patient safety, and observations that may compromise the privacy of patients who lack the capacity to consent' (p.293). On a few occasions I was either asked to wait outside a room or elected to do so in an effort to protect a patient's privacy or dignity, or because of concerns regarding consent. I was selective in what I included within my field notes in order to assure patient anonymity.

Interviews with junior and senior clinical staff following observations enabled testing out of initial assumptions and clarification of assumptions regarding the nature of rescue work and associated influences. The research would have additionally benefited from additional interviews with senior managers and board members, to supplement the observation data collected at both organisations' Acutely Ill Patients in Hospital Committees. This is likely to have generated greater insight into the nuanced relationship between external drivers, organisational goals and rescue practice on the frontline.

Working both as a researcher on an aligned project and a PhD student on this study brought with it additional tensions because of the changing relationship between fieldwork and writing, given the different timescales and evaluative component of the former. Fieldwork relations shape writing, and writing alters relationships of the field (Mosse 2006). Notes of accounts are always partial and provisional, but ethnographic writing still has significant social effects of its own. Reporting ethnographic findings back to clinical staff interrupts a managerial view that 'accelerates history so that the aspirations of the present constantly erase the experiences of the past, where it is always 'too early' to judge the success of a new technology, whose disappointments are contingent, whose latest results are always the most promising, and whose full advantage lies in the future' (Mosse 2006, p.943). In recognition of the temporality of the findings, constantly evolving field of practice and social consequence of the research process on both organisations, I ensured data collection was completed for my PhD prior to feedback of findings from the wider research project. However, my continued attendance on both committees and involvement in subsequent practice development during the intervening period has continued to shape my understanding of the data and illuminates how artificial boundaries can be regarding entry and exit to the field.

A consequence of this ethnography is that the differences observed in practice, the variance in relations and structural conditions at either site matter, which could be argued to limit the critical potential of the research. However, this research also shows 'politics in action, locally and on a larger scale' (Timmermans & Berg 2003, p.107). Operational differences at Eastborough and Westborough highlight the focus and organising principles of the research. New insights are generated into the important relations within rescue

work which can be abstracted such that general principles can be applied to other organisations.

This research stands apart from those ethnographies of relatively bounded areas of medical practice such as A&E (Nugus 2007, Dodier & Camus 1998, Vassy 2001), intensive care (Seymour 2001), neonatal care (Mesman 2008) and anaesthetics (Goodwin 2009). This research shows the boundaries of general medicine to be more fluid, and illustrates the tensions between this field and others it intersects with such as critical care and specialisms such as cardiology. The fluidity of this locus of practice makes study of it harder and raises concerns whether this ethnography captures the complexity and breadth of this clinical domain. While the mundane and everyday nature of work within this domain was studied in order to understand how acute illness was categorised, rescue work as an organising frame provided a necessary focus to the data collection. Fieldwork involved studying the management of a number of patients with different acute illnesses. While the specificities of patients' individual diseases and illness trajectories were not the focus of this research, it is also important to acknowledge the importance of these (Timmermans & Haas 2008) within the sociological organising frame of 'acute illness' chosen for this research. Patient perspectives were not included within this research, but were part of the wider programme of work.

8.10 Implications for policy, practice and future research

This section suggests implications for policy, practice and education, and recommends suggestions for future research.

Policy

1. Acute medicine is characterised by increases in the acuity and dependency of patients being cared for on acute general wards, a rise in emergency medical admissions, together with the increasing number of medical admissions presenting with morbidities other than their primary admission problem. These factors present a challenge for policy makers to address in order to provide safe and high quality care for patients alongside achieving organisational efficiency. Policy makers need to widen their 'reference points' to appreciate the structural and social organisation of rescue work. Consideration of structural elements needs to encompass associated structures such as

emergency admission units, critical care provision, organisation of medical teams / wards, and critical care outreach.

2. Policy makers need to shift their perceptions of tools and technologies representing the *end* of the quality journey to understand their role in shaping the beginning and ongoing relations within the field. Greater recognition is required of the role of policy makers, regulators, technology designers and managers in shaping the socio-political process of rescue.

Practice

1. Greater criticality needs to accompany local consideration and introduction of new tools and technologies to practice. This includes associated constructions of the tools' and technologies' aims and what constitutes success. Project management should encompass consideration of what essential work is likely to be displaced by their introduction. Training to 'deal with the implementation problem' of tools and technologies needs to change to encompass the interlinked nature of staff and technology, and the significance of the ever changing contextual landscape of health care. Structural professional and hierarchical inequalities, shaped through the situated embedding of the tools in practice, need to be addressed; shifting alignments offering greater agency and opportunities for change should be explored to assess the implications for patients and staff.
2. The findings from this study suggest that some central control of rescue work is required; however, pursuit of managerial consensus can have unintended consequences for organisational safety, as other cultural interpretations are silenced and individual adaptation and intelligence is designed out. Greater recognition of the adaptability and intelligence displayed by frontline staff to handle clinical uncertainty and patient trajectories is needed.
3. The hidden competence of lower level staff in accomplishing the mundane routine of rescue work needs recognition. Safety leads, clinical leads and educators need to recognise the importance of 'scut work' for the management of acute illness. However, there is an associated danger with the 'tidying up' and reification of this hidden work into explicit categories. 'The more tempted we are to see the world as transparent and tinker with it, the less likely we are to succeed' (Tsoukas 1997, p.832). There may be unintended secondary consequences if those 'hidden' types of rescue work are opened up to scrutiny and objectification. The answer probably lies in the delicate balance

between attributing greater weight to this activity, and defying formalisation and objectification.

4. Data monitoring systems are important for reflexivity. They privilege the production of emic over etic forms of knowledge, and enable staff locally to engage productively with policy, practice and tools on the frontline. What is important is the expansion of focus of quality improvement strategies for seriously ill patients beyond measuring compliance with standards set by safety strategies to care processes 'downstream'. There needs to be greater criticality of the performance data collected and its relation to the complex landscape of rescue, as well as appreciation of those practice domains that are missing. Narratives, particularly from patients and relatives, need to be added and valued alongside quantitative data. Managers and safety leads would benefit from collecting prospective data in order to capture a sense of rescue work in action. The intelligent assessment technology may offer an opportunity to capture some of this work as access to real-time data facilitates prospective review of patients with high early warning scores.
5. Diagnosis provides a framework for medicine to work within. Medical education needs to reinforce the significance of diagnosis and action for patients whose trajectories are temporally bound, even when diagnosis is uncertain. This research has highlighted the significance of turf wars, diagnostic category contestation and hierarchies between medical specialities in terms of delayed response and intervention, for care of acutely ill patients. Formalised systems and processes such as morbidity and mortality reviews, audits and intelligent assessment technology real-time data review may provide an opportunity for intra-professional dialogue and sharing of perspectives. This also needs to be supported by medical education and local training programmes, teaching junior medical staff how to liaise with other specialities, and exploring with seniors the significance of local medical and safety cultures.
6. There needs to be greater recognition of the significance of communicative competence in handover and escalation of care. This needs to move beyond traditional perceptions that locate the problem at the boundary from nurse to doctor, to additionally address responses from medical staff, and interfaces (both up and down the hierarchies) between doctor / doctor, and HCA / nurse.
7. Greater recognition is needed regarding the consequences of categorising patients within an acutely ill pathway. Further emphasis on decision making regarding the appropriateness of resuscitation and escalation of care early in patients' trajectories is

required. Safety and quality monitoring needs to include evaluation of care provided for those patients who are categorised as not for resuscitation or escalation to protect their position on the margins of legitimised rescue work. This evaluative work ought also to address some of the unintended consequences of shifting boundaries between medical wards and critical care. It would be useful to gather data regarding patients' trajectories from admission to discharge, transfer or death, to explore the implications of temporality and structural boundaries on this process.

Research

1. Further study examining how acutely ill patients (and their relatives) enact safety within the remit of rescue work will enrich knowledge of this textured landscape. This could include their constructions of deterioration, alongside their contribution to detection and response work. This data could then help refine the rescue topology. An added strength would be to explore how patients and relatives routinely interact with the tools and technologies alongside staff, and how acute illness shapes the nature of these relations.
2. Ethnographic observation of the care of patients who are categorised as not for escalation and deterioration is needed to explore how this categorisation is enacted in practice and how patients, relatives, staff, tools and technologies mediate this process.
3. Additional research mapping the alignment and relations between departments such as the emergency department, general medical wards and critical care, will generate important insights into boundary management within the bureaucratic structure of the health care organisation. Study of the impact of this on individual patient trajectories would enrich knowledge held to date in this field.
4. As intelligent assessment technologies and continuous monitoring systems are introduced to general medicine to facilitate rescue, ethnographic methods are required to follow the associated shifts in practice. As this research illustrates there is much to be gained from the addition of a sociological perspective to health service research evaluating effectiveness, notably an understanding of the contested politics of expertise, jurisdictional control, and power and dominance.
5. If a national TTS is introduced across acute care, further research is required to explore the significance of universality within the social order of rescue work.

8.11 Conclusion

This research explored the nature of rescue work within acute hospital care. Adoption of an ethnographic approach enabled the articulation of relationships between organisational structures, processes and cultures in the socially complex field of health care practice. This thesis reframes reified linear representations of the management of acutely ill patients as a rescue topology, comprised of interlinked patient and organisational trajectories. Understandings of rescue are extended to encompass staff's hidden accomplishments in managing these trajectories. The research highlights how features such as organisations' historical and cultural features, the politics of technology, the structural organisation of medical care, and spatial and temporal boundaries within acute care can both contribute to and lead to problems with rescue work. This thesis contributes to programme theory regarding the role of the RRS by conceptualising it as part of the complex social processes that shape inter-relationships between safety systems and practice, with both positive and negative consequences for care of acutely ill patients.

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Appendix 1: published papers

Mackintosh N., Rainey H. & Sandall J. (2011) Understanding how rapid response systems may improve safety for the acutely ill patient: Learning from the frontline *BMJ Quality & Safety* **21**(2), 135-144.

Mackintosh N., Rainey H. & Sandall J. (2011) Understanding how rapid response systems may improve safety for the acutely ill patient: Learning from the frontline, Republished. *Postgraduate Medical Journal* **88**, 261-270.

Mackintosh N. & Sandall J. (2010) Overcoming gendered and professional hierarchies in order to facilitate escalation of care in emergency situations: The role of standardised communication protocols. *Social Science and Medicine* **71**(9), 1683-1686.

Appendix 2: sample information sheet

King's Patient Safety and Service Quality Research Centre

NHS National Institute for Health Research

Managing complications in acute medicine

Interviews: Staff Information Sheet

KING'S College LONDON

King's Patient Safety and Service Quality Research Centre is a partnership between King's College Hospital NHS Foundation Trust and King's College London and is part of the National Institute for Health Research

9. How and where will the results be published?

We plan to publish papers in professional and academic journals and user publications. We will also disseminate findings within this Trust, on the internet and at conferences. We will keep you informed about dissemination at the end of the study and will send you a summary of the research findings.

10. Where can I find out more about the study?

Further information can be found on the web at: www.kingspsdq.org.uk

THANK YOU VERY MUCH FOR READING THIS LEAFLET AND FOR CONSIDERING HELPING WITH THE STUDY

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The normal NHS complaints mechanism is available to you if you wish to complain about any aspect of the way you are approached or treated during the course of this study. Formal complaints may be addressed to Professor Naomi Fulop, Director, King's Patient Safety and Service Quality Research Centre, Department of Management, School of Social Science and Public Policy, King's College London, Franklin-Wilkins Building, 150 Stamford Street, London SE1 9NH; Tel. 020-7848-4142.

Version 2, 10th Nov 2008

We would like to invite you to take part in a study exploring the management of the complications/emergencies that can occur during a patient's stay in hospital. This study is taking place at **King's College London** and **St Thomas' Hospital**.

Between December 2008 and November 2010, Researchers from King's College London are carrying out the study, funded by the National Institute for Health Research.

The study has several purposes:

- To discover more about staff, patients and their relatives' experiences of the management of complications/emergencies during their hospital stay.
- To observe nurses and doctors making decisions about patients who are experiencing complications during their hospital stay to further understanding about communication during these episodes.
- To review patients' records to collect additional information about these episodes.
- To explore the role of specific tools designed to help detect early signs of complications and the management of these situations.
- By examining all these different sources of information we hope to improve the management of escalation.

We would therefore particularly like to hear your views on subjects such as:

- Your experiences of the complications that occur during a patient's stay and difficulties experienced in detection, diagnosis and treatment.
- The patient and close relative's role in these situations.
- The role of the interprofessional team in managing these complications.
- The role of standardised tools in the management of emergencies.

Here are some questions people often ask about research, and our answers. If you have any other questions, please don't hesitate to contact one of the researchers, listed at the back of this leaflet.

- Who has given ethics approval for the study?**
King's College Hospital Research Ethics Committee has reviewed the study and given it ethical approval [ref 08/H0808/178].
- Why may I be invited to take part?**
We are inviting all members of staff working on this medical ward and managers of this service to participate in this study to share their experiences of managing complications. Your participation is entirely voluntary, but we do hope you can help us by taking part.
- What would be involved in taking part?**
We would like to invite you to take part in a **confidential face-to-face interview**. The interview will address the issues listed above. The interview will take about 45 minutes and will be at a time and place convenient to you. We are happy to arrange a telephone interview if you feel this is more appropriate.
- What if I change my mind?**
You can withdraw from the study at any time without having to give an explanation. This includes ending the interview at any point if you should so wish.

5. Will taking part be of any benefit to me?

There may be no individual benefit. We will give you written feedback about the findings of the study. We will also report the findings back to staff at this Trust to help them improve their services.

6. Are there any disadvantages to taking part?

We appreciate that participating will take up some of your time but we will do our best to minimise any inconvenience to you.

7. Will what I say be confidential?

Yes. Nothing you say will be revealed to anyone outside the research team in a way that could identify you. Audio recordings of interviews will be stored securely and made accessible only to research team members. It will not be possible to identify you from the published results.

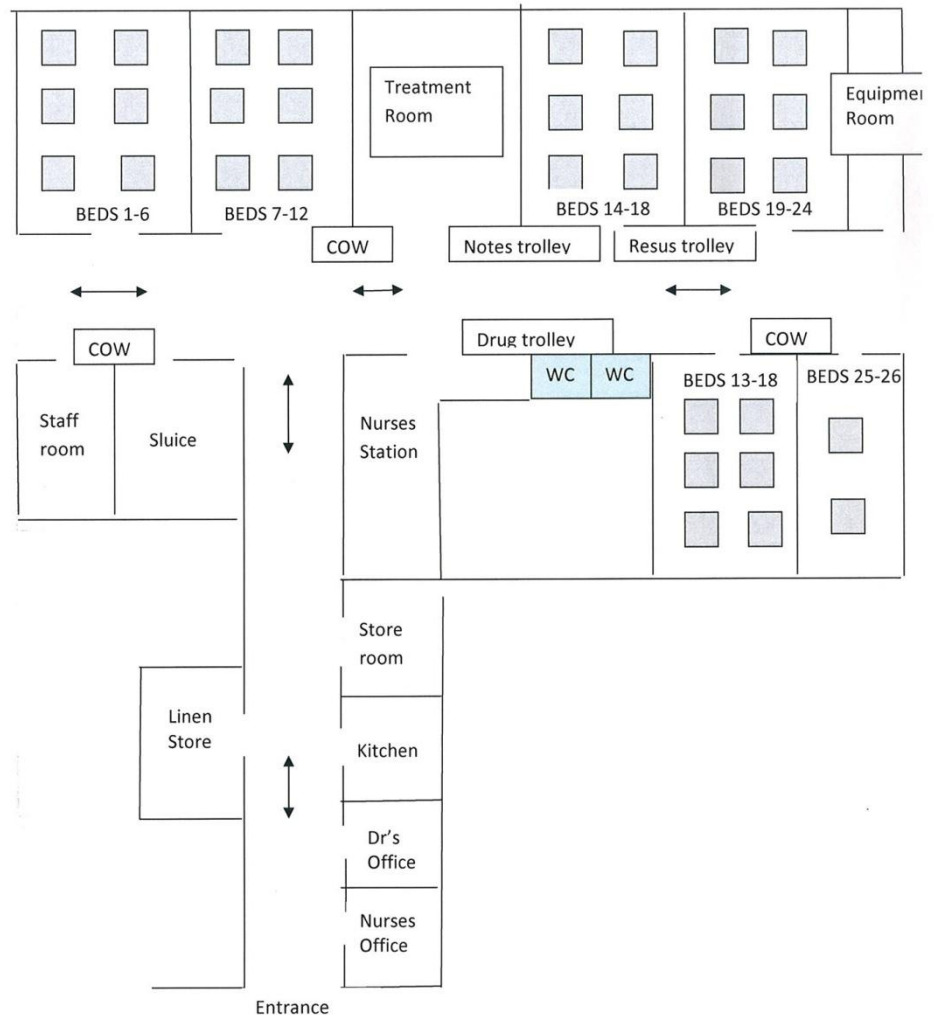
We will guarantee you confidentiality and anonymity unless there are clear and overriding reasons to do otherwise, for example in relation to the abuse of children. Any concerns raised by the researcher will be dealt with by the governance processes within the PSSO Centre where there will be consideration of the need for further action. Information will be grouped together with other findings and anonymised in such a way that you cannot be identified.

8. What if I have any concerns?

You can contact the research team at any time, using the contact details on the back of this leaflet. We will be very happy to discuss your concerns and/or put you in touch with someone who will be able to help.



Appendix 3: sample ward layout



COW – Computer on wheels

Appendix 4: extracts from field notes

Eastborough FN 4

I arrive on the ward at about twenty past twelve, there are lots of people at the nurses' station and a group of doctors positioned just outside the nurses' station looking at the computer on wheels (COWS). I can't see the ward manager, so I drop my bag and go to the whiteboard where I can see that the staff nurse, Wendy, is scheduled for a late shift today, so at least somebody else will need a report at the same time as me. It feels difficult coming on the shift halfway through knowing that the majority of people are working a 12 hour shift. It feels to me as if there isn't a natural break in the shift for me to assimilate and get a sense of what is going on, so I am going to have to get started in the midst of this and try and get my bearings as I go along. I also think it's good to see what it's like for people coming on to the ward who are trying to gain information, and to see what is visually on display, and what information is gained from ad hoc handovers rather than via a formalised process. I wait to see what information I receive.

Wendy arrives and is allocated to look after the patients in beds 10-18. Wendy and I have handover on these patients from Amelia (staff nurse) who has worked the early shift. Wendy prints the handover sheets which are stored on Lynn's (receptionist) computer, in the nursing station. I notice some of the information in the plan is not current as it details that one of the patients is on an infusion, which is no longer the case. We have handover round the bedside which is different to the morning handover which occurs in the office. Amelia displays a lack of knowledge of the care management of a couple of the patients. Wendy asks if one of the patients has a catheter in situ and Amelia checks whether this is the case. Wendy also queries whether another patient is on sliding scale insulin which prompts Amelia to check the drug chart.

We don't receive handover on any other patients. I find this uncomfortable – I instinctively want to have an update on the rest of the patients in order to gain a contextual overview of the ward, and to get a sense of how work needs to be managed over the shift. I consequently feel quite disengaged from a large proportion of ward activity for this shift.

Once we'd had handover Wendy checks the IAT 'to see which observations are due'. We find that they all need doing, they are all overdue, so Wendy has to prioritise and see which ones need doing first. I ask her how she does this and she reports that she looks at the

early warning scores (EWS). All of her patients have EWS of 0 apart from one patient who has an EWS of 1. Wendy chooses to prioritise two patients with EWS of 0 but with other conditions. One patient is on a blood transfusion and therefore is on frequent regular observations to check for a reaction to the transfusion. The other is due for an oesophagogastroduodenoscopy (OGD) and has an unstable blood sugar. Both these patients' observations lie outside the parameters of the IAT as vital signs recorded during transfusions are not entered into the system. The vital signs are recorded on a separate paper sheet that is left at the bottom of the bed. Similarly, the blood sugar readings are recorded separately on a paper chart. I wonder how these artefacts connect with one another.

I chat to Amelia as she has had no break this morning and ask her about her morning. She tells me that she has been busy giving intravenous infusions, administering transfusions and moving patients. I look on the IAT screen and see that the observations for two of the bays are overdue and none of the patients have had their vital signs checked since 6am. Other actions such as giving intravenous drugs, washes, bed-making, have been prioritised above taking observations.

At 1.05pm there is a cardiac arrest call for Maureen in bed 16. Maureen presented a few days ago with temporary left sided weakness and was admitted with a suspected trans-ischemic attack. She has been assessed by her team as fit for discharge and she is due to go home this afternoon, with an appointment for a magnetic resonance imaging (MRI) scan as an outpatient. She had been talking to another lady when she suddenly collapsed on the bed and became unresponsive. Her last set of observations which were done at 6.24am generated an EWS of 0.

When the nurses rush to answer the call they don't take a COWS with them, so when the arrest team arrive to see the patient there is no visual record of Maureen's vital signs. One of the staff nurses, Michael has to rush to one of the COWS to print out the last set of vital signs. I observe that if the COWS had been taken to the bedside it would have added to the general clutter and cramped conditions as already there is a Dynamap, an ECG machine, the resus trolley and a suction machine in the small bed space.

I talk to the nurses afterwards and find that Maureen collapsed mid-conversation. I ask Wendy and Amelia about the IAT in an emergency situation such as this. Wendy reports that she would normally take the COWS and a PDA to the bedside. I also notice that although Maureen's observations have been done post-collapse, none of the information is entered onto the system until 3 hours later. Although the nurses record several sets of observations after the event only one set makes it onto the IAT and is 'formally' recorded. I remember that when I saw the patient Alan collapse I noted that the student nurse immediately reached for the Dynamap and wrote down the observations on a piece of paper, rather than fetching a PDA to enter the observations onto the IAT. There also appears to be no mechanism for recording on the IAT that this set of vital signs was recorded after Maureen's collapse; on paper charts, there is the ability to write a note in the margin which enables other staff to contextualise the vital signs with changes in the patient's condition.

Maureen is now awake and responsive. The resuscitation team leave with instructions for Wendy to get hold of Maureen's medical team to assess her and review her ECG. Wendy, however, has problems trying to get hold of the medical team. At 1.45pm she is still waiting for the team to review Maureen; she started bleeping them at 1.15pm. She bleeps them three times, both the SHO and the registrar but there is no response. I ask her, 'How do you know who to call?' and Wendy replies, 'Well sometimes you don't, you just try them all.' We discuss use of the fast bleep: Wendy notes they only use the fast bleep when patients are considered to be 'peri-arrest'. She says she once fast bleeped a registrar when her patient had an EWS of 5, but found, 'He wasn't very happy and queried on what grounds I had called him'. Wendy reported that she was instructed to by the IAT. She noted that the registrar wasn't happy but did come up.

Wendy spends a considerable amount of time trying to locate Maureen's medical team. The doctor listed on the white board is different to the consultant that she believes to be the patient's. She is aware that the house officers are busy in teaching sessions between 1 – 2pm but has tried both the SHO and the SPR with no response.

Wendy takes a call from a neurology SPR. Maureen was referred to this specialist team a few days ago. The neurology team are concerned that the medical team are about to discharge Maureen before she has had an MRI scan. The registrar rang to say that in their

opinion Maureen is not to go home until she has had an MRI as an inpatient. Wendy tells the registrar that Maureen has just collapsed and she is having problems getting hold of the medical team to review her. The registrar suggests that Maureen is having syncope attacks, but is reluctant to get involved before the medical team have re-assessed her.

At 2.10pm the staff nurse bleeps the medical team registrar again: no response. She says to me, 'No one has reviewed the ECG yet'. Finally, a FY1 doctor arrives on the ward to see the patient. Wendy says she's had problems trying to get hold of a doctor, it is 2.20pm, so an hour after Wendy first bleeped. He says that one of their team is off today, one of them is not due on until two o'clock and he's unsure why the other one didn't respond to their bleep. He goes off to review the patient.

Westborough FN 14

These are the field notes from the morning I spent on 6th May 2009 with the outreach team at Westborough. I'd negotiated to spend the morning with them well in advance, about a month ago. I'd been told to turn up at about half past eight in the morning. I knew they started earlier, about eight o'clock in the morning. They have a handover from the ICU and HDU staff regarding patients who are potentially for transfer to the wards, and also patients who have been transferred to the general wards in the last few days so that they can keep an eye on them.

I turn up at half past eight at the end of this handover while they assess which patients need reviewing on the wards and allocate jobs between them. There are three nurses on duty for the outreach team this morning, that's their normal complement, but with annual leave they sometimes run with only two nurses. Mandy is the senior sister; she carries the bleep. They allocate jobs between them; they explain to me that if Mandy gets a lot of calls she will re-allocate some of these to other members of the team. I ask if they have had handover from the site nurse practitioners (SNPs) who covered the wards last night; they inform me that the SNPs went home before the outreach team come on duty so they handed over to the day site managers, and then these day staff passed on a handover sheet to the outreach team. They show me the handover sheet and are quite dismissive of it in terms of the level of information that is provided. In a box is the patient's name, presenting problem, ward and a few details of care, but the information appears quite scanty. The outreach team also cover a hospital on another site, so one of the staff is due to visit this site later this morning. They decide it is not necessary to visit before midday as the patients are likely to be reviewed by their own team, but inform me that if a patient does deteriorate in the meantime this can always be revised.

There is some discrepancy with a few of the patients that should have been on the chart for review, and those that actually are. For instance there is one patient who was transferred from ICU to L Ward yesterday; the nurses rang this morning because they were concerned about the patient. Mandy notes surprise that this patient is not on the handover sheet from the SNPs, because the SNPs should have reviewed the patient last night, but this patient seems to have escaped through the net. Their policy is to review a patient for 72 hours post-step down ICU, but to review this and keep it more if required. And similarly if a patient is escalated on a ward and needs an outreach referral then they will be seen for

three days routinely. They point out that at weekends and out of hours this is different, so if a patient is transferred from ICU to the ward on a Friday afternoon the outreach team won't be able to review them until the Monday morning, so that's where the system falls down. And unless the patient is scoring above 2 then they wouldn't necessarily be reviewed by the SNPs during the weekend. I listen to them chat amongst themselves, they discuss a woman whose haemoglobin is low, but because she isn't scoring this hasn't triggered concern. The team note they need to flag this up, that this patient needs urgent review by the medical team. Here is an instance where the score doesn't actually reflect worrying blood results or some other underlying changes in condition.

The first ward Mandy and I visit is L Ward, to see the patient transferred from ICU yesterday. We see the patient Mandy had received a call about this morning; he has been prioritised by the team for an urgent review. L ward is a vascular surgery ward with a four-bedded HDU. The patient is in one of these HDU beds. The nurses are using a large A3 sized 24 hour ICU chart and fluid chart. Mandy, the staff nurse from L Ward and I look at the charts that were transferred over with the patient from ICU; I find it confusing to synthesise the information recorded on them. Mandy explains that this is because the ICU use electronic charting; she says it makes perfect sense when the information is displayed on the electronic screen. However when it comes as a print it out the data doesn't seem to make sense, because the information should be seen concurrently whereas it's printed on separate sheets which you don't see all together. This patient has a very comprehensive set of notes including a detailed print-out of every time the patient was reviewed on ICU. Mandy explains this is unusual; patients normally come to the ward with just a transfer form, a summary form rather than the in-depth notes that this patient came with. One of the other things of interest is that the patient had been well enough to be discharged to the ward for over a week now. ICU had intended to discharge this man on 23rd April, so the nurses had written a discharge summary, and then the patient ended up staying on ICU because there were no beds available on the wards. The transfer sheet was printed off yesterday and came with the patient to the ward; however some of the information that is recorded on there that was appropriate a week before is not appropriate now. For instance there is information about nasogastric (NG feeding); the patient is no longer being NG fed. Mandy explains to me that once information has been recorded you can't then delete it off the electronic record system on ICU, so it stays there. She notes what should have happened is the nurse should have then added on a section afterwards to say how that

information has now been superseded by different information. So the patient was transferred with information that is out of date.

Because the nurses on L Ward are using the ICU chart they don't have easy access to the early warning scoring system, which is embedded within the observation charts that are used on the ward. As a consequence they have a laminated sheet of the scoring system, next to the ICU charts. Mandy points out to the nurses that this scoring system is out of date; it was phased out over eight months ago. She says jokingly she has mentioned this a couple of times to the ward staff. So the scores and triggers are different, although only marginally, so for example the respiratory rate on the old system is set to trigger at 26 breaths per minute rather than the current system which is set to trigger at 25. On the new chart the heart rate trigger has also been lowered. The patient has been given a score of 8, partly because staff are using this old scoring chart, but also because the patient had a low urine output overnight. The nurse had taken the cumulative urine output since midnight and divided by the number of hours, which meant that the patient only had a urine output of 12 ml an hour; the nurse had added this to the warning score. Mandy points out that this patient is self-regulating and hadn't drunk much overnight, so she wasn't concerned at this stage. It's the first time I've seen the fluid balance taken into consideration with the scoring system. There is an issue also with continuity with fluid balance charts in that the ICU charts are measured from six to six, the ward charts are measured from midnight to midnight, and Mandy noted to me that on some of the other wards they total fluid up between eight am to eight pm, so different systems are in use on different wards. I'd noticed that fluid charts on the ward I'm based on are often not completed with input and output totals. The fluid balance sheets don't seem to be utilised in a comprehensive manner. But even in this case where the urine output is taken as an indicator of acuity, Mandy is debating how useful that information is.

Mandy looks at the ward notes for this patient, discovers that the patient has a new drug chart since transfer from ICU indicating that the medical team have reviewed him since he arrived back on the ward. However, nothing had been written in the notes; there was no formal record of the team's acceptance of him back under their care. The first entry was at four o'clock in the morning when the nurses called the on-call FY2 doctor to see the patient because they were worried about his heart rate which had gone up to 150bpm. The nurse reported that the FY2 had spoken to the SNPs but the SNPs hadn't written anything in the

notes either, so it was unclear whether they had seen the patient as there was no handover of this patient from the SNPs to the outreach team. Mandy reviews the patient and checks the observations are being done hourly. She checks his treatment and notes that since he received his cardiac drugs in the morning his heart rate has settled; she is quite happy with his current condition. Her only advice to the ward nurse is to try and get a cardiology review for this patient, but she observes that while he has an open wound he probably is going to have issues with tachycardia (high heart rate), which at the moment is uncompensated.

We then go to G Ward. As we walk across we chat about SPAR. Mandy reports that the wards don't really use SPAR; she is able to cite two wards that do routinely use it but even there only some of the staff do; however the majority of the wards don't use it at all. She notes that the referral that she took from the nurse based on L Ward, while she got some of the information that she needed she also had to ask for other pertinent facts. She believes that this problem is addressed by SPAR as it structures the handover process. Mandy herself feels that SPAR is an appropriate tool for junior staff and student nurses. She reports to me that the senior management team had wanted to make SPAR mandatory but this was overruled because the senior nurses argued that not everybody needed to use it. Mandy notes that a mandatory rule like this is quite patronising and insulting for ward sisters and senior staff, who don't need a tool such as SPAR to effectively handover their patients.

Mandy discusses access to medical staff: she reports that nurses often have difficulty getting hold of the junior medics to try and attend a patient if they're on a ward round. The ward round appears sacrosanct; junior nurses are discouraged from interrupting a ward round to review a patient who's deteriorating on another ward. Some teams always start on one ward irrespective of patient need. She notes that particularly in surgery nurses have difficulties getting hold of the doctors when they're busy in theatres. I ask about scoring, whether the outreach team mind being called for scores over 4 for patients who routinely triggered with low saturations or high heart rates yet were clinically stable. Mandy replies that she would far rather be called to all scores over 4 and then make the decision herself that this is normal for the patient. She can then recommend that the Medical Emergency Team is only called when the score goes up to 6. She says 'if we allow nurses to make individual judgements that's when it gets quite messy'.

On G ward we see a patient who had been alerted to the outreach team two days ago, it is day three. Mandy chats to the patient, has a look at his observations, checks his blood results, changes the score on the observation chart as the nurses haven't added in that the patient is on oxygen. They have recorded his score as zero, she changes it to 1. She looks through the notes to make sure he is on appropriate treatment, and appropriate action is being taken. As she does this she says to me, 'I tend to skip through the nursing notes,' and focuses on what the doctors have written in the notes. Mandy then moves onto another new referral from yesterday who has been scoring because of a high heart rate. This patient's observations hasn't been done since 6am and as Mandy goes over to see him she notices that he is breathless, his heart rate is also quite high. He seems quite comfortable in himself and says to us that he feels OK, but she decides to record another set of observations and to check his oxygen saturation level. She records that his saturations have dropped to 92-93%, so there's been a slow drift down from 98-100%. This patient was transferred from HDU yesterday and when he'd come out of the unit he'd been quite stable, but Mandy is concerned his respiratory condition is slowly deteriorating. Mandy starts him on some oxygen and then tells the nurses what she's done. The FY1 arrives while she is there and seems visibly relieved that Mandy is there, together they discuss the patient's condition and his plan of care, I can see the benefits of the outreach team in terms of support for the junior doctors, even if it's just to bounce ideas and to check that they're doing the right thing.

While we are there one of the staff nurses asks Mandy to review a patient who Mandy knows of old. The patient is not for resuscitation or escalation of care to ICU; he is for ward-based care and this has been written in the notes. Mandy goes to see him: the first thing she notices is that the blood pressure cuff that is round his arm is too big, the systolic blood pressure on the Dynamap machine is registering 70 but she explains that it is likely to be inaccurate given it's the wrong size cuff. She takes off the cuff. The nurse can't find another cuff so Mandy checks his blood pressure manually, and makes the systolic value 105. The physio has just seen the patient and reportedly the patient has improved markedly since the physio did some breathing and coughing exercises with him. Mandy says to the nurses, 'I think actually what the patient needs is physio, there's not a lot more we can do, he's on antibiotics, he's for regular physio and IV fluids. That's all we can do really.' The staff nurse appears disappointed in M's response replying 'Well that isn't really very helpful for us.'

Mandy changes the score on the chart and records it as 6 because he is drowsy, with a low blood pressure, and his saturations are low.

Mandy talks to me about electronic monitoring. She notes that if she had her way all nurses and HCAs would do manual blood pressures, especially if patients had low blood pressure; she said there is one sister on V ward who insists all her staff take manual readings. She said one of her other bugbears is that nurses record patients' heart rates off the saturation monitor, which is notoriously inaccurate. She argues that ward nurses should record radial pulses and also utilise the time to feel patients' skin temperature and warmth and colour.

Appendix 5: staff interview schedule

Version 1: 02 Sept 08
Interview topic guide for staff

MANAGING COMPLICATIONS IN MATERNITY AND ACUTE MEDICINE

TOPIC GUIDE FOR INTERVIEWS WITH MEDICAL STAFF

Introduction: Outline purposes of study and this particular strand of data collection. Reiterate voluntary nature and safeguarding of confidentiality. Offer opportunity to raise further questions / concerns. Take consent.

1. Please could you identify your current role within the trust? How long have you worked at this trust and what were you doing before?
2. Could you start off by recalling a recent situation on the ward where you were involved in managing a patient whose condition was deteriorating – could you describe this episode in detail, stage by stage?
 - What indicators were used as markers of deterioration?
 - How did you make sense of the information? (Was any information missing or contradictory?)
 - Who, if anyone, was called to help and why?
 - What was the response?
 - What was the outcome?
 - Were there any factors that helped this process or contributed to delays / problems with managing care?
 - What feelings did you have about this case and what influenced these feelings?
 - If you felt positive about the management of this case can you recall and describe an episode where you felt less good? OR If you felt negative about the management of this case can you recall and describe an episode where you felt more positive about the management of a case?
3. How do you learn how to make decisions and manage patients deteriorating on the wards?
4. How do you decide which patients you need to rush to review and which patients you may not need to see?
5. Are there any factors that enable or make this process of prioritisation more difficult for you?
6. When a patient's condition deteriorates on the ward the nurse usually calls you for help; you may also end up calling a senior colleague / or speciality. How does this process work in practice?
 - Probe re nurses utilisation of SBAR and assertion in demanding a review
 - Probe re nurses utilisation of PAR score and perception of this
 - Probe re hierarchies
7. What in your opinion are the key factors that facilitate early detection and rescue on the wards?
8. What, if any, are the key factors that contribute to problems with the management of escalation on the wards?

Appendix 6: coding extract

[NVivo Node: Identification of a problem](#)

[Internals\observations\S2m-FN-1>](#) - § 9 references coded [16.96% Coverage]

Reference 1 - 2.30% Coverage

The patient in bed 14 on the chart had a PAR score of 2, which wasn't mentioned at handover, but the patient in bed 15, Michael, when J handed over he said that he's been PAR scoring 2 today because he's tachycardic, and because of this he withheld his salbutamol. J also said he needed to check his resus status, that he was for not for resus but they needed to make sure that the do not resuscitate notice was up to date, and he told L to keep an eye on the heart rate, check what the pulse rate was. She asked what it was running at and he said it was about 110 at the moment

Reference 2 - 1.54% Coverage

In his handover about Manuel he said, 'Today an hour and a half ago he had a period of unresponsiveness,' and they had had to bring the crash trolley to him. The sister walked past and J said, 'What actually happened?' The sister said Manuel had had a period of collapse in a chair and was found slumped, didn't seem to be breathing. He was put on the bed, he vomited a bit which 'isn't like him'.

Reference 3 - 0.55% Coverage

There was a patient in bed 29, the handover detailed that PAR scoring now was 1, 'the blood pressure was a bit low and he was a bit feverish'.

Reference 4 - 2.05% Coverage

We discussed whether patients ever don't PAR score but still cause concern and she said, definitely, there'd been a case earlier that week of a patient who she'd been worried about, she'd had a feeling that the patient wasn't very well, she said just visually looking at him he was very sweaty and agitated, didn't look right. So she told the sister, although he wasn't PAR scoring. She wasn't sure what the sister did although she knew that obviously the nurse had been asked to keep an eye out, but the patient later arrested.

[NVivo Node: Structural influences](#)

[<Internals\interviews\S2m-IV-6-MA>](#) - § 6 references coded [23.87% Coverage]

Reference 1 - 3.65% Coverage

It used to be, all the medical wards used to be acute, we used to have on-take days so you didn't have admission wards as such. So you would have your on-take days you'd be the admitting ward for that day. Plus all the other patients. Then you would ... we started to change that, we went to an admission ward system, and then we went into specialties and we're a respiratory and HIV. Then we moved again, we moved physically because they were demolishing the building, and we moved physically again and then we moved across here when the A&E closed because all the medical wards were transferred here. And since we've been here we've been respiratory and general medicine with some neuro.

- OK, and what does that mean in terms of medical cover, because you're respiratory and general medicine?

- Well all the medical wards have an allocated team of doctors and mine are predominantly chest physicians but there are also general medicine as well.

- Right. And they rotate? My understanding is they rotate.

- On here they rotate every fortnight.

- Every fortnight, OK, but you have an overlap isn't it of one week?

- Yes. There's two teams and they don't both go on the same week.

[NVivo Node: Routine work](#)

[<Internals\observations\S5m-FN-6>](#) - § 5 references coded [16.64% Coverage]

Reference 1 - 4.55% Coverage

The first ward we visit needs a drug chart rewriting. G, the Site Nurse Practitioner, is quick to point out that this was an inappropriate job for the SHOs to do but also recognised that this seemed to be a large part of what they ended up doing at night. I saw this as a recurring theme as we went round the wards, during the daytime the F1s are too busy or

it's de-prioritised so rewriting drug charts is left and then has to be picked up by the F2s who know nothing about the patient and then have to spend time looking back through the notes to familiarise themselves to make sure the rewriting of drug chart is appropriate. G stressed to the staff every time they asked A, the SHO to do this that this was inappropriate, but their response was that they had spent all day bleeping doctors to try and do this to no avail so they had no other choice. There were also two incidences where G picked up a drug chart where the staff had actually signed that the drug chart was full, there were no more boxes left for signatures to verify administration of a drug so the staff had just ticked or signed in the margin. G pointed out that this was actually illegal, wouldn't stand up in a court of law, and the staff again pointed out that this was because they couldn't get anyone to rewrite the drug chart, so G said he was going to take this up and handover to the day staff because this needed to be resolved.

Reference 2 - 0.70% Coverage

Talked to A and G about the EPR because I noticed every time we went to the ward and there was a query about a drug A went onto the EPR to pull up the notes, to trawl through and find out the appropriate information.

Appendix 7: research ethics approval

King's College Hospital Research Ethics Committee

Camberwell Building
King's College Hospital
94 Denmark Hill
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SE5 9RS

Telephone: 0203 299 3923
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15 December 2008

Professor Jane Sandall
Professor of Midwifery and Women's Health
King's College London
Health and Social Care Research Division
Waterloo Bridge Wing, Stamford Street,
London
SE1 9NH

Dear Professor Sandall

Full title of study: Exploring the management of complications in maternity and acute medicine at [] Trust and [] Trust
REC reference number: 08/H0808/178

Thank you for your letter of 10th November 2008, responding to the Committee's request for further information on the above research and submitting revised documentation.

The further information has been considered on behalf of the Committee by the Chair.

Confirmation of ethical opinion

On behalf of the Committee, I am pleased to confirm a favourable ethical opinion for the above research on the basis described in the application form, protocol and supporting documentation as revised, subject to the conditions specified below.

Ethical review of research sites

The Committee has designated this study as exempt from site-specific assessment (SSA). The favourable opinion for the study applies to all sites involved in the research. There is no requirement for other Local Research Ethics Committees to be informed or SSA to be carried out at each site.

Conditions of the favourable opinion

The favourable opinion is subject to the following conditions being met prior to the start of the study.

Management permission or approval must be obtained from each host organisation prior to the start of the study at the site concerned.

Management permission at NHS sites ("R&D approval") should be obtained from the relevant care organisation(s) in accordance with NHS research governance arrangements. Guidance on applying for NHS permission is available in the Integrated Research Application System or at <http://www.rdforum.nhs.uk>.

Approved documents

The final list of documents reviewed and approved by the Committee is as follows:

<i>Document</i>	<i>Version</i>
Advanced Notice of Observation (medicine)	Version 1: 02 Sept 08
Advanced Notice of Observation (maternity)	Version 1: 02 Sept 08
Participant Consent Form	Version 1: 02 Sept 08
Participant Information Sheet: Ethnographic observations (maternity)	Version 1: 02 Sept 08
Participant Information Sheet: Ethnographic observations (maternity staff)	Version 1: 02 Sept 08
Interview Schedules/Topic Guides	Version 1: 02 Sept 08
Compensation Arrangements	KCL
Protocol	Version 1 September 2008
Investigator CV	Jane Sandall
Application	Dated 24/09/2008
Response to Request for Further Information	Dated 10/11/08
Participant Information Sheet: Staff Interviews (medicine)	Version 2:10 Nov 08
Participant Information Sheet: Interviews with patients/relatives	Version 2:10 Nov 08
Participant Information Sheet: Staff interviews (Maternity)	Version 2:10 Nov 08
Participant Information Sheet: Interviews with women/ birth partners	Version 2: 10 Nov 08

Statement of compliance

The Committee is constituted in accordance with the Governance Arrangements for Research Ethics Committees (July 2001) and complies fully with the Standard Operating Procedures for Research Ethics Committees in the UK.

After ethical review

Now that you have completed the application process please visit the National Research Ethics Website > After Review

You are invited to give your view of the service that you have received from the National Research Ethics Service and the application procedure. If you wish to make your views known please use the feedback form available on the website.

The attached document "After ethical review – guidance for researchers" gives detailed guidance on reporting requirements for studies with a favourable opinion, including:

- Notifying substantial amendments
- Progress and safety reports
- Notifying the end of the study

The NRES website also provides guidance on these topics, which is updated in the light of changes in reporting requirements or procedures.

We would also like to inform you that we consult regularly with stakeholders to improve our service. If you would like to join our Reference Group please email referencegroup@nres.npsa.nhs.uk.

08/H0808/178

Please quote this number on all correspondence

With the Committee's best wishes for the success of this project

Yours sincerely

Dr David Jewitt
Chair

Email: william.bowen@kch.nhs.uk

Appendix 7: example poster

Version 1: 02 Sept 08
Advance Notice of Observation (medicine)

MANAGING COMPLICATIONS IN ACUTE MEDICINE Advance notice of observation on [x] Ward

Periods of observational research have been arranged to take place in [x] Hospital on [x] ward in the period January - December 2009.

This is part of a research study being undertaken by [x] research centre to explore the management of the complications / emergencies that can sometimes occur during a patient's hospital stay.

During the observation sessions, the researcher will observe the nature of work on the ward and how the team interact and make decisions. Observations will mainly take place at the hub or central station of the ward, but will also include accompanying staff on ward rounds, attending ward and directorate meetings and observing intra- and interprofessional interactions in a variety of settings e.g. the staff room. The researcher will be clearly identifiable, and the commencement of observation sessions will be announced.

Please be assured that names or other identifiers **will not** be used. All data collected will be treated with the utmost confidentiality.

Anyone wishing to opt out or request the withdrawal of the researcher may do so without penalty.

If you have any questions or would like further information about the project, please contact the research team. Thank you

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