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FAILURE TO RESCUE: PROBLEMS AND SOLUTIONS

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1 INTRODUCTION

1.1 Background

Patient safety has been defined as ‘the avoidance, prevention and amelioration of adverse outcomes or injuries stemming from the process of health care’ (Vincent, 2006 p.14). It is related to ‘quality of care’, but the two concepts are not synonymous. Safety is an important subset of quality (Vincent, 2006). Quality of care embraces other sub-components such as effectiveness, patient focus, timeliness, efficiency and equity (Institute of Medicine, 2000). ‘Care can be of poor quality, and still be safe, but unsafe care can never be considered of good quality’ (O’Neill, 2008 p. 6).

Attention over the past 15 years in the health service has increasingly focused on improving safety in Westernised countries (notably US, UK and Australia). A number of professional, policy and public drivers have prompted this shift in emphasis. These include recognition of the scale of medical errors (many of which are preventable) and other incidents that harm patients (Leape, 1994, 1999). In England, as many as 1 million patients within the acute sector may be harmed by unsafe care, although the degree of harm in most cases may be slight or temporary (Vincent, 2006). Concerns also abound concerning the cost of medically related litigation. Recent high profile statutory inquiries into misconduct in the health service such as the Bristol and Shipman inquiries (Kennedy, 2001, Smith, 2005) have triggered public anxiety at a time when trust is declining in public services and professionals (O’Neill, 2002). There is an acceptance of the need for more robust and publicly demonstrated forms of professional regulation (Irvine, 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* (Institute of Medicine, 2000) and in the UK by the Department of Health’s *An Organisation with a Memory* (Department of Health, 2000b). Underpinning these

reports is a focus on accountability at a team and systems level shifting the paradigm from the historic 'blame and shame' approach which focuses on individual failures, to a systemic view (Institute of Medicine, 2001, 2004, 2000, Department of Health, 2001, 2000b). Clinical governance strategies have been targeted as a means of improving safety and quality of clinical care (Department of Health, 2000b) which has led to the creation of the National Patient Safety Agency (NPSA). The proliferation of new healthcare regulatory bodies such as the Royal Colleges, the General Medical Council, the Healthcare Commission (HCC), the NPSA and the new Clinical Assessment Service aim to provide improved systems of identifying and responding to professional mistakes and misconduct (Ehrich, 2006).

It is now widely accepted that error cannot be eliminated and therefore the emphasis is on minimising its impact. Identifying and addressing dysfunctional systems are perceived to be priorities. One cornerstone of the systemic approach is root cause analysis of incidents with the reassurance of a no blame reporting system, co-existing with, but detached from, accountability systems. Studying the underlying causes of error and near misses is considered important for promoting both 'single loop' learning (correcting problems within existing structures and processes) and the less common 'double loop' learning (examining assumptions and goals, reconfiguring structures and processes) (Argyris, 1990). Increasing attention has fallen on promoting *cultural change* to promote patient safety (Department of Health, 2000b, 2001). Approaches to safety are now targeting improvements across whole organisations. The US Safer Patients Initiative, devised by the US Institute for Healthcare Improvement has been extended to the UK by the Health Foundation. Funding has been provided initially to four acute hospital trusts and latterly to a further 20 to achieve a 50 percent reduction in adverse events¹.

¹ defined as 'an unintended injury caused by medical management rather than by the disease process' VINCENT, C., NEALE, G. & WOLOSHYNOWYCH, M. (2001) Adverse events in British hospitals: a preliminary retrospective review. *British Medical Journal* 322, 517-9.

Technology is also recognised as a key resource for healthcare. The introduction of new innovations has a significant impact on quality of care and patient safety. Indeed, technology has the potential to create more possibilities for error (Tamuz and Harrison, 2006). Up-take of innovations in the health service has been variable (Nutley et al., 2002). Previous research has shown that diffusion is influenced by ‘an interplay of factors: the credibility of the evidence, the characteristics of the multiple groups of actors, of the organisation itself, and of the characteristics of the outer and inner contexts’ (Fitzgerald et al., 2002 p.1447). Guidance for further spread of innovations in health care has been provided (Ovretveit et al., 2002). Successful implementation appears to depend on factors such as ensuring the culture is supportive and there is senior leadership buy-in (ibid, 2002).

The particular focus we have adopted for this paper is the problem of failure to recognise and respond appropriately to early signs of deterioration, i.e. ‘failure to rescue’. The failure to rescue rate is considered an indication of quality of care. ‘This is based on the assumption that, whereas complications may reflect both patient severity and health care factors, the ability to save patients once complications arise is much more closely related to the quality of health care’ (McKee et al., 1999 p. 21). Sub-standard care is seen in ‘failures to optimise essential functions – airway, breathing and circulation, oxygen therapy, fluid balance, monitoring’ (McGloin et al., 1999). The key goal is that staff should recognise basic signs of deterioration (e.g. reduced consciousness, difficulty in breathing, circulatory compromise) and that they appreciate the necessity of obtaining timely and appropriate help (National Outreach Forum, 2003). This paper will examine the concept of failure to rescue and the implications of this for patient safety.

The paper aims to locate those technological innovations (specifically the standardised communication tool) designed to improve the management of escalation (the alerting and mobilisation of a clinical response to the deteriorating

patient) within a sociological framework. In order to do this, the paper will provide a rationale for the choice of focus and define our study settings (maternity and acute medicine). We will examine the nature of the problem of 'failure to rescue' and consider the variety of solutions offered. We are particularly interested in those safety technologies aimed at facilitating communication across professional and occupational boundaries. A brief overview of the evidence base supporting these particular innovations will be presented drawing on the origins and translation of interventions from other industries. Lastly, the discussion will be opened up to consider the wider sociological literature on organisational sources of safety and danger and conflicting cultural and power perspectives in order to contextualise and gain a greater understanding of the safety solutions under consideration.

1.2 The safety problem / rationale for choice of focus

Threats to patient safety can be located in the domains of the 'task' or the 'team', or in terms of 'situational', 'organisational' or 'institutional' factors (Vincent and Reason, 1999, Vincent et al., 1998). Causes of incidents are complex and can be rooted in factors such as inadequate training, poor communication or information gaps, equipment design, management systems and work processes (Vincent, 2006). From their investigative work into a number of trusts, the HCC were able to highlight generic problematic themes which posed threats to patient safety in their *Learning from Investigations*; leadership, management and targets, governance and the use of information, the impact of mergers and organisational change, safeguarding vulnerable adults and poor care of patients on general wards (HCC, 2008).

As health care provision becomes increasingly complex provided by a range of settings and healthcare providers, there is evidence that patient journeys through the health care system (especially for vulnerable users) can be problematic. This is particularly so at the boundaries of organisations and professionals, resulting in failures in referral, handover and transfer affecting patient safety and quality of

care, particularly in areas of care where critical incidents are frequent such as the interface between care settings for intrapartum care (Hodnett et al., 2005). A key issue in distributed care systems is how latent risk and escalation of care for the deteriorating patient are managed at a professional and organisational level (National Patient Safety Agency, 2007b, Lewis, 2007). The World Health Organisation's Collaborating Centre for Patient Safety Solutions has identified this topic as new goal for 2008 and aims to improve recognition and response to changes in a patient's condition by January 2009 (Joint Commission International Centre for Patient Safety, 2008). Bodies such as NICE and the NPSA have also published new guidelines relating to management of this problem area (NICE, 2007a, National Patient Safety Agency, 2007a). On the basis that a proportion of hospital deaths (including maternal and perinatal) from failure to rescue are potentially predictable and preventable (Goldhill et al., 1999b, McGloin et al., 1999, Smith and Wood, 1998, Lewis, 2007) further research into service innovation designed to improve the early identification and management of deteriorating patients is both timely and justified.

1.3 Rationale for choice of selected clinical environments

There is justification in looking at the above issues through the 'lenses' of both maternity and acute care. Maternity is a 'high-stake' clinical setting, identified as a priority in a number of policy initiatives, such as: the National Service Framework (NSF) for Maternity Services (Department of Health, 2004b) and Maternity Matters (Department of Health, 2007b), and by a range of organisations e.g. NICE, the NPSA with its oversight of confidential enquiries into maternal and perinatal health (National Patient Safety Agency, 2005), the King's Fund Review of safety in maternity (O'Neill, 2008) and the HCC Review on maternity services (HCC, 2007b). The environment is undergoing substantial and rapid reconfiguration and innovation in service delivery, particularly involving change in workforce roles and responsibilities; and a changing primary-secondary care interface. In addition, improving safety in the care of pregnant

women and newborns has been identified nationally as a research priority by the Chief Medical Officer in his Annual Report 2006 (Department of Health, 2007a) and by the World Alliance for Patient Safety at the ISQA Conference in Boston 2007.

A similarly high stake picture emerges in the acute sector. Emergency medical admissions have risen steadily; approximately 90% of patients in acute hospital medical wards present as emergencies (NHS Trust Federation, 1995, Houghton and Hopkins, 1996). There are many more critically ill patients in hospital (NCEPOD, 2005). As medicine has become more specialised, patients have developed multiple problems 'defying our attempts to categorise them into single organ diagnosis'(Hillman, 2004 p. 9). Surgical patients are often elderly with multiple co-morbidities; likewise medical admissions often present with morbidities other than their primary admission problem. Shifting boundaries of acute care (i.e. increases in day surgery; shorter length of in-patient stays; surgical procedures in 'high risk' patients following advances in anaesthetics and critical care techniques) has resulted in an increase in the acuity and dependency of patients being cared for on acute general wards (Haines and Coad, 2001).

Like other NHS Trusts, the management of escalation for deteriorating patients has been defined as a priority for our partner organisation, King's College Hospital. Concern has been expressed about delays in response in both maternity and the acute sector.

2 SCALE OF THE 'FAILURE TO RESCUE' PROBLEM IN MATERNITY AND ACUTE CARE

2.1 Introduction

'Failure to rescue' encompasses problems not only with the recognition of warning signs, but with interpretation and timely institution of appropriate clinical

management once deterioration is identified. Frontline staff must possess an extensive range of technical and non-technical skills and knowledge, applying these correctly and flexibly in a manner that supports patient choice. Effective interprofessional teamwork is essential. Sound inter-organisational collaboration is also important for clients experiencing problems that might be better addressed by another agency (housing, drug rehabilitation, etc) (Lewis, 2007).

2.2 Scale of the problem

2.2.1 Maternity

The nature of obstetric emergencies places a premium on continual vigilance and may necessitate very rapid responses. In the seventh Report of the Confidential Enquiries into Maternal Deaths (CEMACH), 'the assessors were struck by the number of health care professionals who appeared to fail to be able to identify and manage common medical conditions or potential emergencies outside their immediate area of expertise' (Lewis, 2007 p.3). Assessors involved in analysis of inquiries for previous CEMACH reports coded a significant number of direct deaths as having some form of sub-standard care including: failure to appreciate severity of illness and sub-optimal treatment; wrong diagnoses; and failure of junior staff to diagnose or refer a case to a more senior colleague (Lewis, 2001, 2004).

Worryingly the incidence of intrapartum deaths² has not changed significantly since 2000 (Acolet et al., 2008). Nearly 500 babies die every year due to events occurring during labour (Department of Health, 2007a). Evidence from the NPSA's National Reporting and Learning System and other sources suggest that problems associated with foetal monitoring contribute to intrapartum related deaths and other poor outcomes (including cerebral palsy) (Acolet et al., 2008).

² 'Intrapartum-related deaths are defined as deaths that are directly related to events occurring from the onset of labour until birth' DEPARTMENT OF HEALTH (2007a) 2006 Annual Report of The Chief Medical Officer On the State of Public Health.

The intrapartum period is a critical time requiring prompt and appropriate decision making based on the available evidence, balancing the needs of two patients, the mother and baby. Multidisciplinary working and communication are vital for successful outcomes (Department of Health, 2007a). Intrapartum deaths are planned to be the subject of the next CEMACH perinatal inquiry (Acolet et al., 2008).

Electronic foetal monitoring (EFM) is used as a means to identify those babies who may be compromised, or potentially compromised, by a shortage of oxygen (foetal hypoxia). Foetal heart rate variability is the most sensitive predictor of the absence of foetal compromise and presence of foetal vigour (Fox et al., 2000). However, wide variations in EFM interpretation (both inter- and intra-observer) have led to a history of inappropriate interventions, false reassurance and lack of appropriate intervention (Alfirevic et al., 2008). Failure of staff to recognise and act upon signs of distress on the traces can lead to serious complications and, ultimately, could lead to the death of a baby' (HCC, 2008 p. 11). The HCC's investigation into deaths at three maternity units found that at one of the sites in three of the four incidents investigated, there was either a failure to recognize foetal compromise or a delay in taking action (HCC, 2004). In another site clinical staff failed to recognize (4/10 cases) and respond (2/10 cases) to the severity of the condition of the women. Inaccurate recordings were also documented (2/10 cases) (HCC, 2006). Similarly, failure to recognize the onset of labour, follow up complications that arose during labour and monitor foetal heartbeat at sufficiently regular intervals were common themes in an inquiry into 6 unexpected perinatal deaths at a birth centre (Department of Health, 2004a). As a result of these findings, the HCC Services Review are currently working on developing clinical quality indicators regarding foetal monitoring and cardiotocograph (CTG) interpretation (HCC, 2008). Given current concerns regarding intrapartum related perinatal and maternal morbidity, we have chosen to make intrapartum care the focus for our study.

2.2.2 *Acute care*

In acute care, 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 place the patient at higher risk (NICE, 2007a). Clinical deterioration of patients on general wards is often preceded by changes in physiological observations in the period six to 24 hours before an adverse effect (Franklin and Mathew, 1994, Hillman et al., 2001, Kause et al., 2004, Schein et al., 1990, Smith and Wood, 1998). Most commonly, physiological abnormalities in respiration, pulse, oxygenation, and mental function indicate escalation (Goldhill et al., 1999b, Schein et al., 1990). However, these changes in clinical signs are often missed, misinterpreted or mismanaged (Franklin and Mathew, 1994, Goldhill, 2000, McQuillan et al., 1998, Smith and Wood, 1998). Delays in treatment or deficient care of these patients often results in unanticipated admissions to the intensive care unit (ICU), increased length of hospital stay, cardiac arrest or death (McGaughey et al., 2007). Up to 50% of ward based patients have been found to receive suboptimal care (defined as avoidable components in the management of airway, breathing and circulation, and oxygen therapy) (McQuillan et al., 1998).

Despite reorganisations and recent changes in the structure of acute care (e.g. introduction of hospital at night teams), there have been a number of reports continuing to find evidence of suboptimal care (NCEPOD, 2001, 2002, 2005, National Patient Safety Agency, 2007b, HCC, 2007a). For example, patient notes have been found seldom to contain written requests regarding the type and frequency of physiological observations and instructions giving parameters that should trigger a patient review were rarely documented (NCEPOD, 2005). This is of particular concern given that a large number of observations are now carried out by health care assistants who may not appreciate the clinical relevance of abnormal signs (NCEPOD, 2005, National Outreach Forum, 2003). Respiratory rate was infrequently recorded and 27% of hospitals did not use an early warning

system. Suboptimal care was considered to contribute to about a third of the deaths that occurred (NCEPOD, 2005).

2.3 Causes of 'failure to rescue'

Research into the causes of failure to rescue reveals the complexity of the problem, with some parallels reflected in both maternity and acute care. Findings from two studies based in the acute sector illuminate causative factors. Both studies need to be used with caution for methodological reasons: McQuillan's study for relying on the subjective opinions of two assessors about what constituted suboptimal care and for outcome bias (Gorard et al., 1999), and the NPSA's mixed method work for its small sample and social desirability bias (National Patient Safety Agency, 2007a). However, both studies provide useful insight into contextual aspects such as organisational failure, lack of knowledge and skills, lack of supervision and inadequate staffing levels which together with high workloads created time pressures for staff making it difficult for them to prioritise tasks (McQuillan et al., 1998, National Patient Safety Agency, 2007a). Inadequate obstetric consultant cover, administrative overload and inappropriate deployment of clinical skills have been reported in maternity settings (O'Neill, 2008).

In both maternity and acute care, there is evidence that the introduction of support workers has led to wide variation and overlap between the type of support worker and scope of practice (Sandall et al., 2007, Knibb et al., 2006). This has the potential to lead to confusion around role boundaries and competencies. In their review of skillmix in secondary care, Carr-Hill et al (2003) noted that although substitution provides organisational benefit by increasing the proportion of less qualified and non professionals in the workplace available to provide routine care, it could compromise quality of care. Levels of surveillance, sensitivity to warning signs and capacity to respond to an emergency are likely to be diluted to a level that impact negatively (Carr-Hill et al., 2003).

There are doubts whether changes in demand in acute care settings have been met by an equivalent match in knowledge and skills by ward staff (McQuillan et al., 1998). Difficulties in recruiting qualified nurses has led to a dilution of skill mix and reliance on temporary staff in many areas (McArthur-Rouse, 2001). For a rapidly deteriorating patient timely access to specialist skills is of utmost importance. However, this is often not feasible (Hillman, 2004). The creation of the Medical Admissions Unit with dedicated staff, together with specialisation into other areas of medicine has distanced many consultant physicians from acute work (NCEPOD, 2005). As a result doctors in training are both providing and leading the provision of acute care which is a cause for concern (Seward et al., 2003).

Within maternity, a range of service specific, as well as general NHS directed, initiatives are driving changes in the organisation and delivery of maternity care. In the 1990's Changing Childbirth (Department of Health, 1993) recommended that the planning and delivery of maternity care should be responsive to individual needs, and enable women to make informed choices about their care. Subsequent NHS policies and priorities, such as the Maternity Standard of the NSF for Children's, Young People and Maternity Services (Department of Health, 2004b) specified that 'every woman [should be] able to choose the most appropriate place and professional to attend her during childbirth based on her wishes and cultural preferences and any medical and obstetric needs she and her baby may have'. This consolidated a policy direction for maternity care which emphasises patient choice, local service provision and access.

Changes in workforce deployment such as the Changing Workforce Programme, revisions to medical training, the European Working Time Directive (NHS Confederation, 2004), maternity staffing standards (Royal College of Obstetricians and Gynaecologists & Royal College of Midwives, 2007) and neonatal service reconfigurations are all altering professional practice

boundaries. This has resulted in the introduction of support workers, of senior medical staff taking on direct care, extending the roles of nurses and midwives to include activities usually undertaken by junior doctors, and the promotion of midwifery led care. The implementation of these initiatives is taking place within a complex service, provided by a range of caregivers in different settings across the acute and primary care sectors, to meet diverse needs which range from promoting health and well-being to high dependency care of sick women and babies. Concerns have been raised about safe staffing levels (Smith and Dixon, 2007, O'Neill, 2008), whether midwifery education adequately prepares midwives for serious unrelated problems in pregnancy (Lewis, 2007) and consequences of the European Working Time Directive with specialist registrars qualifying with less experience (O'Neill, 2008).

Maternity care is delivered in a particularly wide range of organisational settings and involves a particularly wide range of caregivers. High quality maternity care that crosses professional, institutional, geographical and temporal boundaries is predicated on developing effective pathways of care for a range of women. Evidence of communication difficulties with handovers / transfers and poor documentation have been reported in both maternity and acute care (National Patient Safety Agency, 2007a, O'Neill, 2008). There is an empirical evidence base that patient handovers in all healthcare settings are highly variable in content and process (Borowitz et al., 2008, Behara et al., 2005, Solet et al., 2005). Borowitz et al's study of adequacy of information transferred at handover between resident physicians on a paediatric acute ward found that 31% of residents indicated that something happened while they were on call that they were not prepared for (2008). Despite the study limitations (hindsight bias, single setting limiting generalisability), the findings add to others that handover is a point of vulnerability (Behara et al., 2005, Patterson et al., 2004, Sabir et al., 2006). Imposition of limits on junior doctors' hours has also increased the frequency of hand-offs which have already been identified as an important and vulnerable point in the care process (Philibert and Leach, 2005).

Junior doctor uncertainty can result in delays of indicated care and in some cases, patient harm (Farnan et al., 2008). Farnan and colleagues documented uncertainty in decision making at times of transition of care, specifically where patients required escalation of care. The most commonly reported type of uncertainty, conceptual uncertainty, demonstrates a resident's inability to apply abstract criteria to a clinical scenario, in particular in the setting of the need for escalation of care. To address their uncertainty, residents describe an informal hierarchy of individuals to approach for advice. The hidden curriculum - the set of informal, institutional or cultural expectations placed upon trainees - helps to maintain this hierarchy (Farnan et al., 2008).

The phenomenology of medical uncertainty provides us with some additional insight into the nature of this problem. Medical students are faced with three different categories of uncertainty: 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). Controlling these kinds of uncertainty involves mastering what they can, limiting the domain of knowledge they try to know and settling the remaining uncertainties through collective solutions (Light, 1979). Training for control involves specialising, adopting particular schools of thought, collecting success stories to demonstrate effectiveness and shifting the emphasis on technique as an end as opposed to as a means (Light, 1979). However, the resultant focus on individual medical autonomy can lead to too much control over the uncertainties of work and insensitivity to the complexities of care (Light, 1979). This has the potential to add to interprofessional differences and conflict (Ehrich, 2006).

Difficulties relaying and interpreting information across interprofessional boundaries have been extensively reported (National Patient Safety Agency, 2007a, O'Neill, 2008). Occupational and hierarchical boundaries have contributed

to care management problems with deteriorating patients; problems associated with professional hierarchies have been recognised (National Patient Safety Agency, 2007a p. 21, HCC, 2008). Patient safety incidents have been linked with a culture of secrecy, hierarchy of fear and autocratic leadership (HCC, 2007a). Within maternity, inter- and intra-professional rivalries (e.g. between obstetric consultants, obstetric consultants and midwives, obstetricians and gynaecologists) have been widely reported (HCC, 2004, CHI, 2003, HCC, 2006). Two recent reviews have highlighted communication barriers and a lack of collaborative working between health professionals as contributory factors to patient safety risks (Rowe et al., 2001, 2002). Conclusions drawn from *Confidential Enquiries into Maternal Deaths* show that 50% of direct maternal deaths had some form of sub-standard care (vigilance and/or responding to problems) affecting outcome, with the main factors being poor communication and teamwork, normally deficiencies in *interprofessional* or *interagency* communication or teamwork (Lewis 2001, 2004). In acute care there is evidence of interprofessional hierarchies preventing nurses from directly intervening, despite being able to recognise signs of deterioration (National Outreach Forum, 2003). Prevention of prompt and necessary action in other cases is attributable to failure to articulate concerns concisely and clearly (Simpson and Knox, 2003 p. 243). Rigid professional boundaries, lack of mutual respect for each profession's contribution, working as isolated practitioners and lack of clarity about roles have been highlighted (Clinical Governance Support Team).

2.4 The client experience

Interestingly, little empirical research has been conducted into the client experience of escalation and failure to rescue. Nurses report that most patients tend to know when their condition is deteriorating (Grossman and Wheeler, 1997). Research into patients' experiences with safety-related events in hospital show that many do not communicate with staff about their safety concerns (Schwappach, 2008). The theme 'surveillance' has emerged from studies

examining the experiences of those who are critically ill or resuscitation survivors (O'Brien and Fothergill-Bourbonnais, 2004, Russell, 1999). Schmidt examined patients' perceptions of nursing care on medical / surgical wards using a grounded theory method (Schmidt, 2003). The 'watching over' category represented patients' knowledge that nursing staff were in close proximity and providing a degree of surveillance; several noted this engendered a feeling of safety. One patient described unsatisfactory watching over which led to an emergency admission to intensive care.

There is a paucity of research that has explored women's experiences of intrapartum transfer (Creasy, 1997, Lindsay, 1998, Shaw, 1985, Walker, 2000, Wieggers et al., 1998) let alone their birth partner's. This is the focus of some work in the Birthplace in England Study (National Perinatal Epidemiology Unit, ongoing). Further study to illuminate women and clients' experiences of their deteriorating conditions and the role of the interprofessional team in managing this is warranted. It will also be valuable to examine the birth partner and carer's perspective and participation in this process.

2.5 Defining a focus for the project

A taxonomy of causative factors contributing to failure to rescue is presented in figure 1. For the purpose of this study, we have chosen to narrow our inquiry into the process aspect of the 'transmission of information across interdisciplinary boundaries'. Missing information is a chronic danger in interprofessional teams with 'inconstant membership, routine expectations and divergent professional workflow' (Lingard et al., 2006 p. 479); characteristics congruent with both maternity and acute care teams. Vulnerabilities inherent in interprofessional relationships have been well documented (West, 2000, Zwarenstein and Bryant, 2007). The quality of teamwork has been found to be directly and positively related to the quality of patient care and innovation in healthcare (Borrill et al., 2001, Lemieux-Charles and McGuire, 2006, West et al., 2003). Much has been

written about the characteristics of effective teamworking (Borrill et al., 2001, West, 2004). Guidance in terms of developing particular approaches to working with others and the necessary teamworking and social skills has been offered in the recently published King's Fund report (O'Neill, 2008). This study will develop this further by analysis of service innovation designed to overcome problems at this level.

In the next section a brief overview of the key innovations aimed to facilitate management of escalation is presented. We then focus our inquiry into the origins and implications of the standardised communication tool and learning acquired from other high risk industries.

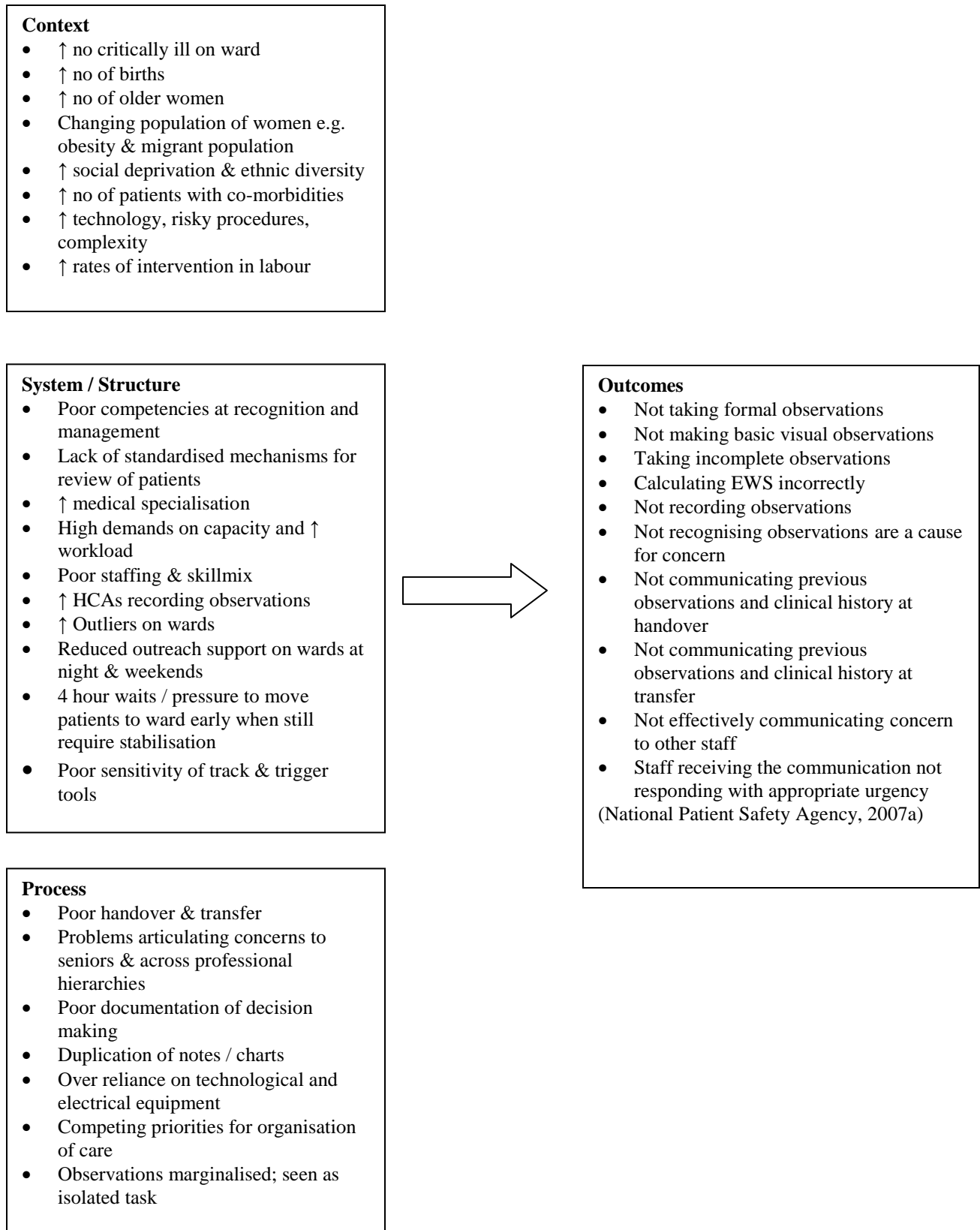


Figure 1: Failure to rescue: contributory factors in maternity /acute care

3 SOLUTIONS OFFERED

3.1 Escalation of care

A number of innovations have been introduced principally aimed at facilitating earlier identification and treatment of deterioration in ward based patients. These include the Medical Emergency Team (MET) (Goldhill et al., 1999b), Early Warning Systems (EWS) , the 'Acute Life-threatening Early Recognition and Treatment' (ALERT) course (Smith, 2000, National Outreach Forum, 2003), Critical Care Outreach Services (CCOS) (Audit Commission, 1999, Department of Health, 2000a, NCEPOD, 2005) and changes to current education provision to equip providers to care for acutely ill patients outside critical care environments (National Outreach Forum, 2003). A framework of team competencies for recognising and responding to acutely ill patients in hospital has been compiled by the Department of Health and is currently out for consultation (Department of Health, 2008).

In maternity, a Modified Early Obstetric Warning scoring System (MEOWS) has also been offered as a way forward (Lewis, 2007). A performance and governance monitoring chart, similar to a dashboard in a car, for ensuring that clinical governance standards are systematically put into place has been successfully introduced to Northwick Park Hospital (Department of Health, 2007a). The NPSA is also working with the Royal College of Obstetricians and Gynaecologists (RCOG) and Royal College of Midwives (RCM) on a project that involves the development and testing of two safety packages using care bundle methodology developed by the Institute of Healthcare Improvement in the USA. One of the care bundles is around the care of women for whom electronic foetal monitoring is clinically indicated (Acolet et al., 2008).

These response strategies fall into two categories: a ward level response (involving micro processes e.g. increased level of physiological monitoring by ward staff) and organisational level responses (macro structural change e.g.

implementation of a critical care outreach team) (NICE, 2007a, McQuillan et al., 1998). We have chosen to focus on strategies aimed at empowering frontline staff which aim to increase levels and recognition of physiological monitoring by nursing or midwifery staff and escalate medical / surgical or obstetric teams responsible for the patient's care. Our particular area of interest is service level innovation aimed at improving transfer across organisational and professional boundaries; by effectively minding 'the gap'. In effect innovations designed to override professional and gendered power hierarchies in order to get the appropriate level of help for patients.

3.2 National Guidelines – the drive to standardise care

Recommendations from previous national inquiries aimed at frontline interventions include clear standardised plans for individual patients detailing particular parameters to be monitored and the frequency of observations plus an explicit statement of those parameters that should trigger a request for review (NCEPOD, 2005). In acute care, the importance and value of respiratory rate monitoring has been emphasised. NICE guidelines for acutely ill patients in hospital include recommendations for physiological track and trigger systems, detailed types of observations (e.g. heart rate, respiratory rate, blood pressure, level of consciousness) and times of assessment (at admission, at least 12 hourly and if abnormal physiology detected) (NICE, 2007a). Staff should be competent in monitoring, measurement, interpretation and prompt response to the acutely ill patient. In maternity, clear guidelines have been written regarding the indications for CTG monitoring (NICE, 2007b). Four Royal Colleges are also currently developing a report, Safer Childbirth: Minimum standards for organisation and delivery of care in labour, which seeks to provide clear guidance for the expected standard of care for women during birth (Department of Health, 2007a).

EWSs are simple algorithms based on bedside observations that have been recommended to identify patients at risk (Department of Health, 2000a, Intensive Care Society, 2002). They record physiological parameters of systolic blood pressure, heart rate, respiratory rate, urinary output, temperature and level of consciousness (Goldhill et al., 1999a). EWSs are 'either based on exceeding any one of the set criteria or on the allocation of points to physiological observations which are then added to give a score' (McGaughey et al., 2007 p.2). A certain criteria or score then triggers a process of action for early intervention and prompt initiation of treatment. The EWS has recently been modified for use in maternity (Lewis, 2007).

This drive to standardise and direct is in keeping with a wider policy driven commitment to regulate and govern particular high risk aspects of care. Protocols were first introduced in the late 1960s and 70s in an attempt to explicate and regulate the professional's work and enhance the science of medical practice (Berg, 1997). Since the 1990s there has been an international growth in protocols, standards, guidelines and pathways. Advocates argue that these tools may enhance the quality of care and reduce unwanted variations in practice (Berg, 1997, Bragato and Jacobs, 2003). 'They are vehicles through which order can be brought to all those practices where variation reigns' (Berg, 1997 p. 1082) From almost nowhere, 'they appear to have become the tool of choice for ensuring (or so it is claimed) quality of care, equity of treatment, optimal allocation of resources and a rational division of labour between healthcare professionals' (Pinder et al., 2005 p.761).

However, whilst NICE guidelines and EWSs provide guidance as to the frequency and particulars of parameters to be monitored plus triggers to prompt calls for help, they are not primarily designed to facilitate the *governance of transfer of information* across professional and occupational boundaries. Ensuring clarity around responsibilities and clear protocols governing transfers has been identified as the way forward (Department of Health, 2007b). The

World Alliance for Patient Safety initiative 'Action on Patient Safety: High 5s Project' has the commitment of the UK in taking forward standardisation of handover to address the problem of 'incomplete or unclear communication of information, responsibility or accountability for a patient's care'. Standardising communication at handover provides a window of opportunity to restructure how work is normatively constructed (Patterson, 2008) and has been widely advocated (Borowitz et al., 2008, Philibert and Leach, 2005, Joint Commission International Centre for Patient Safety, 2006, NICE, 2007a, Clinical Governance Support Team). Ideology underpinning the standardisation of briefing tools is linked to enhancing situational awareness (Haig et al., 2006). This is predicated on the causal links between communication activities, intermediary processes such as enhanced knowledge and purposeful action and the quality and safety of collaborative care processes (Lingard et al., 2006).

3.3 Team working

Medical, civil aviation, nuclear operations and military teams have all been identified as examples of action teams; they work in environments characterized by conditions of time pressure, ambiguity, stress, incomplete information and severe consequences of error (Paris et al., 2000, Patterson et al., 2004). Focusing on the relationship between team performance and the immediate work context reflects the stance adopted by the Human Factors approach to patient safety. It has been hailed as a progressive way of combating the problems of clinical error and promoting patient safety (Department of Health, 2000b, Vincent, 1993, Reason, 2000, Leape, 1999). Much of the interest has been generated through application of concepts from the aviation industry safety model of crew resource management (CRM) which developed in recognition that human factors were responsible for the majority of accidents and incidents in aviation (Helmreich, 2000). Research in aviation psychology has demonstrated that attitudes regarding stress, hierarchy, teamwork and error are not only predictive of safe performance in high-risk conditions, but also sensitive to team training

interventions (Helmreich and Foushee, 1993, Helmreich et al., 1986, Sexton et al., 2000, Stout et al., 1999). Team processes such as situation awareness, shared mental models and assertiveness in decision making have been targeted as a means to improve patient safety (Stout et al., 1999) and effective teamwork (Knox, 2003, Leonard et al., 2004, Simpson and Knox, 2003). Normal accident theory (NAT) focuses on the complexity and 'tight coupling' of system components as sources of accidents (Perrow, 1984). Regular structured briefings are offered as a way of coupling a team and revealing latent dangers shaped by professional territorialism, rotating team membership and a culture of individualism (Lingard et al., 2006).

3.4 Standardised Communication Tools

Standardising the handover process has been offered as a possible solution to variability and error in knowledge transfer (BMA Junior Doctors' Committee, 2004, Australian Resource Centre for Healthcare Innovations, 2005). Standardised tools are perceived to enable the transmission of critically important pieces of information in a common and predictable structure, generating familiarity in the way people communicate and facilitating the sharing of mental models (Leonard et al., 2004). Certain tools purport to explicitly address the *process* of data gathering and decision making across occupational boundaries by focusing on interactions between nurses or midwives and doctors. One such model, recommended both nationally and internationally by bodies such as the World Health Organisation, NPSA, IHI and the NHS Institute for Innovation and Improvement is SBAR (National Patient Safety Agency, 2007a, Joint Commission International Centre for Patient Safety, 2006, Joint Commission International, 2007). Supporters of the tool advocate that it overcomes professionalised hierarchies and communication differences between professions that result from training differences; traditionally nurses are taught to communicate by being descriptive, detailed and narrative while doctors are trained to summarize, diagnose and fix things (Powell, 2007, Leonard et al.,

2004). The tool purports to work as a great equaliser when staff have different levels of expertise, language barriers exist and people are rushed or interrupted; it gives everyone permission to communicate and make recommendations (Hemmila, 2006).

SBAR stands for 'situation' (what is going on with the patient?), 'background' (what is the clinical background or context?), 'assessment' (what do I think the problem is?) and 'recommendation' (what would I do to correct it?). The tool was adapted by Doug Bonacum 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. Briefings utilising SBAR standardise communication at shift changes (Arora et al., 2008) and at times when the clinical workload needs reviewing. In Kaiser Permanente in the US, maternity teams have utilised SBAR to enable staff to use a common language to optimise chances of problem recognition with foetal monitoring (Leonard et al., 2004). The tool provides nurses and midwives with the license to demand a review from the medical team; using criteria removes any emotional component to the process and barriers to effective interprofessional communication can be mitigated (Leonard et al., 2004, Manning, 2006). Embedding a situational briefing model such as SBAR, appropriate assertion and critical language 'can greatly enhance safety' (Leonard et al., 2004). SBAR has been implemented as part of a raft of safety measures for the Safer Patients Initiative (SPI)³. It has also been adapted for the UK by the NHS Clinical Governance Support Team adding another dimension of 'sharing information'. The adapted version ('CHAPS'⁴) has been successfully introduced to maternity units.

What is the evidence base supporting the introduction of these innovations? It is important now for us to examine the research underpinning these technologies in order to increase our understanding of their origins and potential merit. Particular

³ SPI was set up by the Health Foundation in the UK in 2004 to support four Trusts to improve patient safety. This has now been extended to include a further 20 sites.

⁴ Clinical picture, History, Assessment, Plan, Share information

attention will be paid to the application of concepts and methods from other industries.

4 THE EVIDENCE BASE

4.1 Introduction

'The main gap in the research literature on complex service innovations in health care organisations is an understanding of how they arise, especially since this process is largely decentralised, informal and hidden from official scrutiny' (Greenhalgh et al., 2005 p. 17). Concern has been voiced that certain economic, political or ideological factors may either stifle or lead to new policy initiatives, without any evidence from research informing the process (Mulhall, 1995). The NHS has been criticised for being a 'poor' utiliser of technology i.e. failing to adopt or inappropriately using technology (Nutley et al., 2002). Research into interventions that improve inter professional working and cross-unit communication outside of hospitals has been identified as an area where further research is needed (Ovretveit, 2007). An examination of the evidence base underpinning not only the structured communication tool, but other patient care information systems (e.g. guidelines, care pathways and early warning systems) that seek to cast a spotlight and standardise the rationalities of clinical work, is essential to facilitate understanding of the contextual factors influencing their adoption.

4.2 Standardised Tools

Interestingly to date there is a lack of strong evidence to identify standardised tools as an appropriate model of response for caring for deteriorating patients (NICE, 2007a). Despite little rigorous evaluation of innovations such as clinical pathways, guidelines and EWSs (Saint et al., 2003, Rotter et al., 2007, Campbell et al., 1998, Goldhill, 2000), their popularity continues to grow. Some studies have demonstrated effectiveness in changing the process and outcome of care

(Davies et al., 2008, Balas and Boren, 1999, Andrews and Waterman, 2005) such as reducing length of stay, improving patient outcomes, interdisciplinary co-operation and staff satisfaction (Quaglioni et al., 2004, Choong et al., 2000). Conversely there are also studies documenting no benefits (Roberts et al., 2004, Yueh et al., 2003, Davies et al., 2008, Kaplan, 2001). Caution is needed in interpreting and generalising findings to other professions and settings due to the poor methods observed in most studies (Thomas et al., 1999). In the light of this, Rotter et al are currently conducting a systematic review and meta-analysis of clinical pathways (2007). The National Institute for Health Research have also funded two projects evaluating the impact of protocol based care (Rycroft-Malone et al., 2007, Patterson, ongoing).

With regard to EWSs there is limited evidence on their ability to predict patient outcomes or impending deterioration (Gao et al., 2007). Ensuring effective use of EWS has also proved problematic (Sterling and Groba, 2002) and the adoption of EWS does not invariably result in improved clinical outcomes (Subbe et al., 2001). Poor methodological quality standards and wide variations between different systems locally restricts comparison of outcomes and standardisation of care (Gao et al., 2007, McGaughey et al., 2007).

McGaughey et al reviewed the evidence behind the implementation of outreach and EWS to improve the early identification and management of deteriorating patients on general hospital wards (2007). They noted the diversity and poor methodological quality of most studies investigating outreach. Two cluster-randomised control trials were included in their review: one randomised at hospital level (23 hospitals in Australia) (Hillman, 2005) and one at ward level (16 wards in the UK) (Priestley et al., 2004). The former showed no statistical significant difference between control and medical emergency team (MET) hospitals. The UK based trial in contrast found that outreach reduced in-hospital mortality compared with the control group. Factors such as heightened awareness, issues of low EWS sensitivity, short timeframe for the implementation

of outreach, absence of an enforcement policy were identified as potentially having an impact on the findings (McGaughey et al., 2007).

The research design utilised by Priestley included staff training and frequent presence of the outreach nurse. 'It could be that the follow up of patients, training in acute care and the introduction of specific calling criteria to help identify deteriorating ward patients had an impact on outcomes by breaking down traditional hierarchical organisational barriers which may impede the communication process' (McGaughey et al., 2007 p.8). In the Australian study documentation of the EWS charts in the 15-minute period before the event were absent or incomplete in 50% of unplanned ICU admissions and unexpected deaths (Hillman, 2005). 'This has serious implications for the total number of patients that can be identified as 'at risk' if the predetermined criteria for evaluating deterioration are not being recorded' (McGaughey et al., 2007 p. 8). In addition, a low rate of MET calls preceding unplanned ICU admissions and unexpected deaths was evident in patients who had documented calling criteria suggesting a reluctance to call for help (Hillman, 2005). Limitations of both studies included possible contamination of the study sites and limited generalisability. Despite the authors' conclusion that the lack of evidence requires further multi-site RCTs to determine potential effectiveness (McGaughey et al., 2007), many influential national bodies have advocated their use in guidance for improving care of the deteriorating patient (Lewis, 2007, NICE, 2007a).

It also appears that there are interprofessional differences in improvisation and violation in relation to adoption of innovations such as guidelines and protocols. Doctors strongly advocate the freedom to reject protocols or innovate in individual cases, and are less likely to report violations or judge the behaviour of colleagues negatively, even in cases with a bad outcome (Lawton and Parker, 2002, Parker and Lawton, 2000, Manias and Street, 2000). However, policies and protocols can provide nurses and midwives with a means of mediating

communication and legitimising their knowledge (Manias and Street, 2000). Nurses have been found to use vital signs and EWS to effectively 'package' information about patient deterioration; this empowers them and improves communication with medical staff by providing the nurses with 'convincing referral language' (Andrews and Waterman, 2005). By enhancing the scientific status of nursing's practice, protocols can be seen to strengthen its position in relation to other professions such as medicine (Taylor, 1991, McCloskey and Bulechek, 1992). Likewise pathways and communication technologies can generate opportunities for a remapping of professional boundaries (Tjora, 2000, Pinder et al., 2005).

4.3 Application of literature from other industries

There is a rich literature from other industries which has been shown to demonstrate the potential applicability of human factors' interventions within the field of health care. Team processes such as situation awareness and shared mental models in decision making have had some success in improving safety in aviation; this has resulted in the adoption of these processes as a means to improve health care safety (Stout et al., 1999, Gaba, 2000). The need to standardise communication arises from the following premises:

- The greater the concern in flight related matters, the greater the need for clear communication (Hamman, 2004).
- The propensity for miscommunication increases in medical teams due to their interdisciplinary nature each with its own jargon; effective lasting solutions for different disciplines requires utilising systems approaches (Hamman, 2004).
- Closed loop communication has been successfully introduced into the military to ensure messages are received and interpreted as intended (Burke et al., 2004). Closed loop communication relies on the use of standardised terminology and procedural type communication.
- Homogeneous communication creates a context for crews to detect anomalies more quickly.

- Standardising communication facilitates the appropriateness of juniors speaking up when problems are observed (Helmreich, 2000) and doing so in a manner that does not demean or infringe on the rights of others, still respecting their expertise and seniority (Burke et al., 2004).

However empirical work within the *distinctive cultures* of the healthcare industry is still urgently needed (Davies et al., 2000). Importing concepts and methods from other high risk domains without a detailed understanding of the defining differences within the context of healthcare teams is likely to be problematic (Musson and Helmreich, 2004). Whilst 'the application of CRM principles to the healthcare environment is a promising concept', 'the baseline data required for development of effective team training interventions has yet to be established' (Lyndon, 2006 p.544). A number of the studies e.g. (Bowers et al., 1998, Stout et al., 1999) used simulation training as a basis for their interventions. Generalising findings from simulation studies to the complex world of healthcare could be difficult (Amalberti et al., 2005). Lyndon also notes methodological constraints to a number of these studies: self-selection bias, homogenous sample populations and small sample size (2006).

In addition, it has been recognised that the 'aerospace industry has a highly defined vocabulary and interactions may, a priori, be more standardised than in other team environments' (Bowers et al., 1998). Various authors note that by its very nature, 'medical practice is much less proceduralised than flying an aircraft' (Flin and Maran, 2004, Hamman, 2004, Tamuz and Thomas, 2006). Pilots and air traffic controllers use professional judgement in applying procedural controls whereas physicians work is usually guided by professional judgement with standard operating procedures taking a secondary role (Tamuz and Thomas, 2006). Most work settings in medicine also do not benefit from the obvious safeguard of having two individuals of similar or virtually identical training sharing responsibility for one task; medical teams are more heterogenous and not always static (Hamman, 2004). Tamuz & Thomas highlight other significant differences

in the contexts of aviation and hospitals; in the nature of their regulatory environments, spatial and organisational distribution of professional and occupational groups and organisational complexity. Whilst the cockpit is one single subunit, hospitals are an amalgam of units with lines of authority resembling a matrix structure and complex systems of performance assessment based on professional and bureaucratic authority hierarchies (Tamuz and Thomas, 2006).

Similarly, differences have been identified between the military and medicine (O'Connor et al., 2008); the culture and organisational norms of military personnel do not necessarily equate with civilian medical teams; different consequences would ensue if a subordinate challenged a manager's decision in the two disciplines. It is much easier within the military to find team level outcome measures which provide high level metrics for distinguishing high and lower performing teams (e.g. number of target identified, targets destroyed (O'Connor et al., 2008)). Challenges particular to the NHS context have been identified as barriers between different professional groups, multiple lines of management accountability, perceived status differentials and absence of organisational structures for supporting teams (Boddington et al., 2006). Different social norms and behaviours (notably around individualism / collectivism, power distance, uncertainty avoidance and division of roles between sexes) exist within the UK and US again limiting transferability (Salas et al., 2001).

4.4 Standardised Communication Tool

To date there is no rigorous evidence base that the use of scoring systems or structured communication tools effectively bridges power differences and hierarchies between professions (Robson, 2002). The benefits of CRM type training are in the experiential group processes and shared experience; the process is dynamic, individualised and facilitative. This however is in sharp contrast with uni-dimensional reductionist approach of the communication tool.

With the possible exception of nuclear submarine handovers, no high-reliability organisation has yet been found to use a structured verbal update during a handover transition (Patterson, 2008 p.4). The use of 'most important first' as an ordering heuristic for topics in the verbal update negotiates dealing with data overload conditions where it is not pragmatically possible to review all the information theoretically available. Functions of problem recognition, analysis, sense-making and planning are not easily conveyed in a structured format. Ordering by 'most important first' also reduces the likelihood that interruptions will occur prior to finishing the verbal handover (Patterson, 2008).

However, small scale improvements have been documented in aspects of communication relating to the quality and safety of patient care (Catchpole et al., 2007). Using the analogy of a Formula 1 pit stop and expertise from aviation, a standardised handover protocol changed the impact of teamwork on the handover process reducing technical errors and information omissions (Catchpole et al., 2007). Haig et al reported a decreased rate of adverse events after implementing the SBAR tool (2006). A perinatal patient safety project at Kaiser Permanente in the US incorporating SBAR as part of a raft of human factor interventions has reportedly demonstrated 'successful implementation' at pilot sites; measured by staff perceptions of safety (Leonard et al., 2004, Knox et al., 1999, McCarthy and Blumenthal, 2006b, McCarthy and Blumenthal, 2006a). Outcome data is currently being collected on 'failure to rescue rates', 'number of medico-legal claims' and 'customer satisfaction' (Knox et al., 1999, Nunes and McFerran, 2005). SBAR has also been successfully adapted for urgent and non-urgent situations within a rehabilitation setting (Velji et al., 2008). A pre-post test design was used to evaluate the study which showed staff found it useful in both individual and team communications. There was also a positive, but not significant impact on patient satisfaction and an increase in safety reporting of incidents. It is worth noting that neither Kaiser Permanente nor Velji et al have included process measures designed specifically to evaluate changes in communication following implementation of SBAR. It is also notable that the

majority of survey respondents in Velji's were nursing staff; less than ten percent of medical staff participated.

A preliminary review of interventions designed to reduce avoidable mortality in 12 English Trusts was undertaken on behalf of The NHS Institute for Innovation and Improvement (Matrix Research and Consultancy, 2006) using interviews, literature scoping and data review. SBAR was not one of the core interventions⁵ introduced; it is therefore difficult to assess the extent of its uptake beyond anecdotal reports. Interestingly the research noted that the core interventions in common with many of the other initiatives (arguably including SBAR) exhibited similar characteristics: low cost; simple processes, but complex implementation; and long implementation periods. The evaluation found that the HSMR had reduced over an 18 month period, a variety of process improvements and cultural change were identified. However evidence related to costs and cost-effectiveness of interventions was limited. Importantly, degree of clinical engagement and slow implementation and limited resources and reliance on good will were identified as barriers associated with implementation. A further evaluation by the University of Birmingham and Leicester including utilisation of the EWSs and SBAR within the four first wave SPI sites is due 2009.

It therefore appears that current recommendations for the implementation of various innovations designed to improve detection and treatment of deteriorating patients are largely based on 'expert consensus views' and on the basis of a number of small scale studies. They have been made with the expectation that optimal configurations of response will be approved and delivered locally. The lack of evidence base reflects a significant gap in the application and implementation of service level innovation. The danger is that using local small scale evaluations as evidence for success demonstrates little acknowledgement that 'single studies can be biased, are often methodologically flawed and highly time and context dependent' (Wilson et al., 2008 p. 336). Methodological

⁵ The core interventions were early warning scoring systems, critical care outreach teams and care bundles

problems defining appropriate process and outcome measures in order to measure the effectiveness of complex interventions such as these have added to the problem. Substantial resources have been expended on the development, implementation and maintenance of many of these interventions; it is therefore important for us to provide empirical evidence as to their value (Robson, 2002).

5 A SOCIAL SCIENCE PERSPECTIVE

5.1 Introduction

Reviewing technology in action through a sociological lens can demonstrate how technological developments have been embodied within practice and professional and interprofessional relations (Heath et al., 2003). Heath et al's paper richly demonstrates how practical circumstances and context in healthcare influence the ways that technologies and tools come to be perceived and understood. 'Embedded, shared ways of seeing and understanding, of defining, if not constituting, the sense and significance of the tool or technology, pervades the characterisation of how these artefacts came to be made at home within the practical circumstances in which they are deployed and used' (Heath et al., 2003 p. 83). This section will firstly look at the ideology underpinning the utilisation of protocol based care and then extend this debate to the characteristics and cultures of organisations and power dynamics between professional groups.

5.2 The utility of a rationalist model

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). The drive to standardise professional performance to a more rules-based, audited practice

and re-formulate professional boundaries to promote a flexible workforce and de-regulate the professions has promoted their utilisation (Power, 1997, Strathern, 2000, Gellner and Hirsch, 2001).

However social scientists are critical of rationalist models in which the existence of common goals, predetermined tasks and a limited number of formal procedures is assumed (Berg, 1999 p.93). Managing patients' trajectories is a collective, cooperative enterprise (Berg, 1999 p.91). Health care work is characterised by its distributed decision making, multiple viewpoints and 'inconsistent and evolving knowledge bases' (Gerson and Star, 1986, Timmermans and Berg, 1997, Star, 1995). Concrete attempts to focus on individual nurses or doctors and model the decision making process neglect the very nature and importance of the social articulation processes that hold these complex work practices together and manage unanticipated contingencies effectively (Patterson, 2008). Paradoxically articulation work tends to be *invisible* to outsiders (Star, 1991, Wagner, 1995).

Competing theoretical perspectives on medical technologies offer insight into the tightly interwoven domains that technology and organisation occupy (Berg, 1999 p.90). Technological determinism perceives medical technology as a driving political force to mould social interactions; social essentialism views technologies as neutral tools which function as social catalysts and technology in practice perceives technology *itself* as the co-ordinate of clinical and organisational aspects of health care (Timmermans and Berg, 2003). It is difficult to single out one technology as an isolated tool because 'technologies are embedded in relations of other tools, practices, groups, professionals and patients and it is through their location in these heterogeneous networks that treatment, or any other action, is possible in health care' (Timmermans and Berg, 2003).

In addition, despite the rhetoric advocating a shift in focus from individualistic to a systemic view, mainstream safety discourse can also be criticised for conflating

the level of analysis to the psycho-social, to the level of the individual and the immediate work environment rather than considering contributions at the meso (organisational/cultural) and macro (social/political) level (Waring et al., 2006, 2007). Safety activities within this individualistic framework not surprisingly focus efforts on controlling those factors that produce human error; introducing warning alarms, standardising tasks and introducing guidelines (Waring, 2007). The predominant focus thus remains at the *micro* level of the individual or group performance, albeit in a systemic context. Whilst organisational networks, occupational cultures and political pressures are recognised as influences on patient safety, 'they are not developed theoretically or empirically as distinct and inter-related levels of analysis' (Waring et al., 2006 p. 229).

The structured communication tool is predicated on an assumption that it can fill in the gaps in practitioners' knowledge and assist in the decision making process. The nurse, midwife or doctor is perceived as an overburdened individual, whose limited cognitive abilities at a time of stress threaten the quality of care and require structured support. In the case of the nurse or midwife, the tool aims to enable the transmission of concise, salient information empowering the individual to overcome established hierarchies in speaking out and asking for help. The doctor who is now in receipt of the necessary clinical information can then prioritise and act appropriately. However, the problems are tied to 'individual limitations and failures, rather than, for example institutional shortcomings and contradictions' (Clark et al., 1991, Berg, 1995).

Indeed there is also the risk of unintended outcomes that the tool may actually *reduce* quality of care as the practitioner no longer needs to think about what action to take; reducing professional autonomy and de-skilling practitioners. Forcing the nurse-doctor dialogue into a standardised procedural framework could normalise routine-following at the expense of social decision making. 'Bureaucratic systems can create extreme rule-mindedness that deflects

individuals from actions that are most beneficial to the organisation' (Vaughan, 1999 p. 281).

In addition, Engeström and colleagues question whether work organization within healthcare conforms to the standard definition of the term 'team' which denotes a relatively stable configuration (1999). Using several case studies from primary care and paediatrics they redefine the active construction of constantly changing combinations of people and artefacts over lengthy trajectories of time, distributed in space, as 'knotworking' and shift their focus of analysis to the 'unstable knot'. The knot performs a bundle of tightly interconnected actions; it is fragile because it relies on the fast accomplishment of intersubjective understanding, distributed control and coordinated action between actors who otherwise have relatively little to do with each other.

It is likely that the dominant ideology of individualism demonstrated both at the level of professional beliefs and the solutions offered may constrain a team's ability to embrace certain innovations such as the standardised communication tool (Amalberti et al., 2005). Contradictions exist between distributed and negotiated team working or more appropriately 'knotworking' on the one hand and the deep-seated division of labour perpetuating solo performance and responsibility on the other (Engestrom et al., 1999).

Rather than viewing healthcare system as safe by design, but at risk because of its human components, Cook and colleagues (2000) offer an alternative view that it is only when conditions overwhelm or nullify the mechanisms practitioners normally use to detect and bridge the gaps that accidents occur. Complex healthcare systems are acknowledged to involve many gaps or discontinuities in care between people, stages and processes. The chances of breakdown in communication or productivity are increased alongside increasing specialisation resulting in a need for greater coordination (Arora et al., 2008). These gaps are most readily seen 'when they are aligned with organisational and institutional

boundaries that mark changes in responsibility or authority, different roles of professionals or formal divisions of labour' (Cook et al., 2000 p.792). In most instances, practitioners competently detect and compensate for these gaps. Analysis of high performing trusts whose systems support practitioners to manage the gaps may usefully illuminate further information around these detection and compensation processes. This project will not only focus on the interplay of communication and decision making between nurses or midwives and doctors during episodes of escalation, but how gaps are managed.

5.3 Characteristics of organisations

West examines problems resulting from increasing specialisation in her analysis of characteristics of organisations (West, 2000, 2006). She notes the compartmentalisation and division of labour that leads to problems of coordination, communication and cooperation. Other features she draws attention to are the homophily principle (the tendency for individuals to form relationships with others who are like themselves on particular social dimensions e.g. education, gender and race) (McPherson et al., 2001) and the diffusion of responsibility. The former has ramifications for communication; structural barriers based on hierarchy, profession and sex are likely to make relationships difficult. This will be developed further in the next section. The diffusion of responsibility that comes with the creation of organisations can lead to collective abdication of responsibility and governance. Lastly, West notes that wider socio-economic and political pressures within organisations may compete with and take priority over goals targeted at improving patient safety. Her sociological analysis of risk and safety within healthcare settings generates useful insights into the complexity of system influences on communication processes and illuminates organisational causes of failures in referral, handover and transfers across boundaries of care.

5.4 Organisational culture – homogeneity versus diversity and conflict

The view that organisational phenomena (including cultures) are concrete entities able to be described, explained and interpreted as an independent variable suitable therefore for manipulation, conforms to the modernist conception adopted by many of the NHS reforms (Davies et al., 2000). Underpinning this notion are certain assumptions: that health care organisations have identifiable cultures; that culture is related to performance; that a culture can be altered to impact on a performance; that the intervention will provide a worthwhile return on investment; and that it will outweigh any dysfunctional consequences (Scott et al., 2003a). Whilst there is some evidence that organisational culture may be a relevant factor in performance, trying to establish relationships and disentangle causality between the two proves difficult; culture are more likely to be multiple, complex and contingent (Scott et al., 2003a). It is likely that 'culture and performance are created together in a reciprocal and mutually reinforcing manner that is thoroughly dependant on wider context and influences' (Scott et al., 2003a p.115).

Previous attempts at cultural transformation have been limited in terms of penetrating the deeply entrenched values, beliefs and power bases that underpin clinical practice (Davies et al., 2000). It is likely that whilst artefacts (physical and behavioural manifestations of culture) may be more readily manipulated, values and assumptions are more resistant to external influence. In addition, few large, complex organisations are likely to be characterised by consensus and harmony (Antonsen, 2008) or a single dominant culture (Scott et al., 2003b). Different subcultures (within occupations or professions) may be associated with different levels of power and influence (e.g. dominance of the medical culture in NHS and recent rise of management culture (Davies et al., 2000).

Postmodernist perspectives perceive organisations as socially and discursively constructed; focus is redirected on the governance and control of what is legitimised as knowledge (Davies et al., 2000). Rather than seeking an integrated

set of cultural attributes, diversity and difference is celebrated. Culture is seen as means of understanding and working with groups to challenge existing accounts and balances of power as opposed to a means of control (Davies et al., 2000). Different approaches to managing cultural diversity to achieve fit and synergy between groups with differing levels of power and legitimacy have been offered (Child and Faulkner, 1998).

Broadening our analytical lens beyond individual or group behaviour to look at the socio-cultural and institutional context of work brings the division of labour or professional hierarchies into sharp focus as means of re-framing safety. There is a subtle layering of hierarchy and responsibilities; professional boundaries are important sources of identity and belonging. Professional 'silos' may prevent significant advances in safety (Williamson and Barach, 2005). Vaughan's study of organisational 'dark sides' draws attention to the sources of error and disaster which are often located deep within the social organisation of work (Vaughan, 1999). Lingard et al draw attention to powerful and problematic belief systems that are inherent in the health care field; that 'individual excellence' persists as a standard and expectation and that the work of one professional is fundamentally independent from that of other professions (Lingard et al., 2006).

This may to a large extent explain why implementation of guidelines and standardised tools has been so problematic. Their implementation has historically been perceived as a linear and technical process at the level of the individual (Greenhalgh et al., 2004). However, innovation requires changing the system and therefore demands organisational in addition to individual change (Grimshaw et al., 2004). Complexity is advanced when aimed at a wider multidisciplinary system (Livesey and Noon, 2007). The evidence base for particular health care technologies and practices is often contested and continually redefined to fit the local context which often creates power struggles among professional groups (Ferlie et al., 2001, Fitzgerald et al., 2002, Pinder et al., 2005). Robust, scientific evidence is not itself sufficient to ensure changes in

practice; scientific evidence is not clear, accepted and bounded (Fitzgerald et al., 2002).

5.5 Cultural differences between professional groups

Professional groups have different types of social networks. Nurses operate in formal, vertical networks which are effective for cascading codified information and passing on authoritative decisions (Greenhalgh et al., 2004). In contrast, doctors tend to operate in dense, horizontal networks; these networks can be highly effective for spreading peer influence and supporting the construction and reframing of meaning (Greenhalgh et al., 2004). However, this is contingent on a few members of the network becoming convinced of the efficacy of a certain new practice or procedure. There is also the potential for the clique or cohesive group to control members' behaviour and resist the change in direction suggested by an outside agency (West et al., 1999). Any attempts to facilitate change 'will be difficult, because it will often involve group processes rather than simply convincing individuals of the need to change' (ibid p. 644).

Given the differences in professions, rank and informal cliques within the health service it is not surprising that communication problems arise at the interface between professional boundaries. 'Because meanings cannot be separated from social structure and social relations, communication consists of signs symbolically marking authority, power and differences' (Vaughan, 1999 p. 282). Narratives are inseparable from the system of social practices which constitute them (McDonald et al., 2006). Presentation of clinical information or 'story-telling' at handover has been found to provide an important mechanism for staff to demonstrate their competence (Allen, 2001). Story-telling also has the function of establishing boundaries; shared language helps to accompany solidarity and a common sense of identity, but also as a means of exclusion (Allen, 2001). By constructing descriptions of patients in particular terms, nurses can communicate suggestions for action to the doctor. They can also choose to omit details and

therefore to some extent control the subsequent decision-making process (Tjora, 2000).

Historically, the status and development of nurses' knowledge has been largely influenced by the dominance of medical power (Doering, 1992). The hierarchical structure of legitimated knowledge supports medicine's dominance and is used as a mechanism to underplay the value of other health professions (Kenny and Adamson, 1992). There is evidence that institutionalised deference still remains a powerful influence (Ehrich, 2006); whilst nurses present themselves as possessing considerable expertise, they have been found to avoid challenging doctors technical abilities (Allen, 2001) and are subject to manipulative dialogues (Manias and Street, 2001). Ehrich in her discussion of The Ayling Inquiry noted that the consultant concerned blamed the midwives' inability to *express themselves explicitly* as the reason why their concerns were not heard (Ehrich, 2006). Andrews and Waterman, in their grounded theory study of problems faced by general ward staff in detecting physiological deterioration, found that nurses lacked confidence to articulate their knowledge to other staff (2005).

5.6 Communication as a cultural process

What is contestable is the extent to which these processes can be manipulated. We know that 'strong boundaries between professional groups at the micro level of practice slow innovation spread' (Ferlie et al., 2005 p. 117). Knowledge about the standardised communication tool may diffuse within the different communities of practice, but it is likely to 'get stuck' where practice is not shared (Ferlie et al., 2005 p. 129). Rather than legitimising the discourses employed by the different occupations, there is also the concern that the tool in trying to legitimise practice could *potentiate* conflict and competition between the groups.

Power argues that the growth of auditing, originating from accounting firms, has now permeated organisational life and become central to a certain style of

controlling individuals (1997). The normative basis of techniques such as standardising and summarising which underpin the communication tool, also eclipse other aspects of work notably the social structures and cultural values of the organisation. Reaching a common classification is difficult given individuals in different occupations assess their collective experience from different professional perspectives (Tamuz and Thomas, 2006). It also makes an assumption that it is possible to describe and implement 'one best way' (Taylor, 1911) of delivering care (Berwick, 2003). What is of interest here is the cultural mechanisms which select certain dangers for attention and processes to overcome these (Douglas, 1986). McDonald et al found that many senior doctors viewed guidelines as useful for directing inexperienced doctors and other health professionals, but by implication described themselves as not needing these as they already had the necessary knowledge and experience (McDonald et al., 2006).

Thus power is demonstrated in relation to targeting particular *groups* as sources of the problem of failure to rescue and in the selection of specific tools as a means to overcome these. SBAR purports to structure communication in a 'neutral way'; however to some extent it is modelled on SOAP (Subjective, Objective, Assess, Plan) which is a US *medicalised* standardised documentation tool. Contrasts between styles of assessment and underpinning professional ideologies are acknowledged as a source of ineffective communication; however, the solution is to re-orientate the *nurse* or *midwife* to focus on pathophysiological parameters in handover and referral. Many nursing evaluations are based on everyday knowledge more than medical knowledge and draw on their previous experience of dealing with clients with similar problems (Tjora, 2000, Cioffi, 2000a, Grossman and Wheeler, 1997). Nurses have demonstrated their experience at distinguishing patients 'at risk' (Grossman and Wheeler, 1997) and have claimed their decision making to be intuitive-experiential (Cioffi, 2000a, Cioffi, 2000b). 'Hence they are able to detect small changes that precede clinical deterioration' (Cioffi, 2000a p.266). The regulation of these communication

practices may have the potential to stifle what may be considered intuitive and experiential; devaluing the merit of subjective data in defining patients at risk.

Interestingly little prescription is evident in terms of regulation of the receipt of information. The success of SBAR relies on the sender *and* the receiver of the communication believing that they both own the problem under discussion (McFerran et al., 2005 own italics). In addition, the value of assertion needs to be recognised by the receiver. This necessitates overcoming historical and firmly entrenched power dynamics based within the clinical setting. There is a cultural paradox in healthcare where service innovators expect habits of a lifetime to be changed by a simple intervention. Although individuals trained in SBAR may understand the benefits of it, the cultural elements still remain in the workplace, and with insufficient identification, integration, any good results are likely to be simply diluted by time and inertia. Promoting assertiveness has proved problematic within both commercial and military environments (Wilson-Donnelly et al., unpublished) . Based on the evidence to date of poor uptake of protocol based care amongst doctors there appears little guarantee that utilisation of this communication tool will secure compliance and change in behaviour from the medical staff.

The communication tool could be seen to introduce redundancy into the organisational system (Tamuz and Thomas, 2006) which could have unexpected interactions among the system components. If embraced, the medicalised focus of the tool could lead to devaluation of tacit knowledge with implications for patient safety. Alternatively, if not valued and widely integrated into standard practice for escalation there is the added potential that individuals will apply their own contingent standards; possibly increasing the margin for error as an unintended consequence. There is an additional danger with placing faith on systematic processes in that failure of the staff to comply will offer opportunities for blame of particular professional groups and potentially contribute to a climate of anxiety and secrecy (McDonald et al., 2006, Ehrich, 2006). A further tension

exists between how the concepts of clinical discretion and autonomy can coexist with the drive for accountability and greater rationality within the health service (Hafferty and Light, 1995).

6 CONCLUSION

Failure to recognise and respond appropriately to early signs of deterioration has been identified as a problem both nationally and internationally. Historically the view has been that compromises to patient safety are largely due to clinical practice variations, evidence of practitioners' cognitive limitations. Within the domain of failure to rescue, innovations such as structured communication tools are offered as a way to mediate interprofessional hierarchies and 'mind the gaps' caused by patient journeys traversing different boundaries of care.

'Technologies as central mediators in the construction and reproduction of novel worlds – including professional identities and the overall organisation of health care work should be high on our research agenda' (Timmermans and Berg, 2003 p.108). A sociological *lens* is posited as a means to enhance our understanding of the structured communication tool within both maternity and acute care and to illuminate the sociological importance of its practised and routine deployment within specific courses of action, conduct and professional interaction.

This programme of work on innovations draws from a research priority identified at a national and international level highlighting a need to develop and test safety solutions and actions from a theoretical base and other settings using multi-disciplinary research teams and methods (Ovretveit, 2007). Much of the current theoretical debate about patient safety has been informed by cognitive and behavioural psychology, ergonomics and the human factors approach (Waring et al., 2006). In addition, issues of power and conflict in organisations are rarely addressed in safety culture research. Like Antonsen (2008) we suggest that perspectives of power and conflict are necessary in order to provide a realistic

account of organisational life. Thus the wider sociological literature on the organisational sources of safety and danger are drawn upon in an attempt to extend this discourse beyond the current field of debate. Knowledge from this field can be used as a framework to explore innovations such as standardised communication tools in order to locate them within a wider model of quality and safety improvement (West, 2006), and help facilitate understanding of implementation processes.

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