IS QUALITY SAFETY?
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Thesis/Project work submitted in partial fulfillment of the requirements for the MSc in Human Factors and System Safety

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ABSTRACT

Background: Although healthcare did not, in general, think substantially about patient safety until the collective magnitude of the problem became clear and could no longer be ignored there is now widespread agreement that enhancing patient safety is an important public policy issue However, despite political and public pressures and wide-spread implementation of a range of activities and development of specific tools to support organizations to improve patient safety, healthcare has not yet achieved the status of being a high reliability industry. The model often used in healthcare is that accidents are thought to occur when individual components or processes fail to meet criteria. This model of risk and safety builds on the assumption that safety, once established, can be maintained by keeping the performance of a system's parts (human and technical) within certain bounds (e.g. people should not violate rules and procedures). This model – the classic quality model – distorts efforts to achieve safety. The classic quality model was developed to ensure that the system meets pre-specified criteria. The goal of quality assurance activity is to keep performance variability under control. Despite considerable theoretical and empirical evidence to the contrary many in healthcare think safety automatically follows from an emphasis on quality assurance. However, there are important conceptual and practical reasons to understand the difference between quality and safety. Research objectives: The aim of this research was to begin to explore the extent, and in what ways, safety and quality are conflated in healthcare, at both the sharp and blunt end of care in an acute care institutional setting within a large health authority in Canada. The key questions are: How are the notions of patient safety operationalized through local context?; How is safety thought about and constructed?; How is it discussed?; How is it neglected? Research methods: The methods involved critical appraisal of selected literature related to safety in complex systems and interviews with key informants (6 acute care registered nurses; 2 acute care nurse managers; 5 acute care senior decision makers). Qualitative research was used to uncover actors' perceptions and framework of understanding of safety. Accordingly, semi-structured face-to-face interviews were conducted. Results: The literature review shows that, in both the US and Canadian healthcare systems, most safety related strategies focus entirely on activities that have more to do with quality than safety. Seven major themes emerged from the analysis: designing robust organizations (with three sub-themes: prescription, compliance, and rules and standardized procedures are important but insufficient to create safety); experience, adaptation and the efficiency-thoroughness trade-off; teamwork and communication; leadership; competing system challenges; trouble-shooting and vigilance; and, learning from near misses and critical incidents. None of the informants hold to a strictly linear model of creating safety, supporting the premise of this research that there are important conceptual and practical reasons to distinguish between quality and safety. However, some traditional thinking about safety persists. For example, although the interplay between robustness and flexibility was acknowledged, senior decision makers tend to focus more on safety as a risk management exercise or as a control problem, where certain behaviors need to be constrained and others encouraged. It was at the sharp end of care that peoples' discussion moved back and forth between the notion of a robust system (marked by simplification and standardization of work flows, such as the formal rules developed for medication administration) and the acknowledgement of the need for flexible work practices. Indeed, the nurses reported that safe practice involves a combination of rules, standards, protocols, education, experience as well as the flexibility to adapt work practices in the face of uncertainty and changing conditions. Furthermore, it was also noted by every nurse that experience is an important ("huge") factor, and the capacity to adapt is most often determined by experience.

Conclusions: Empirical data and expert opinion suggest that the conflation of quality and safety potentially limit the development and scope of relevant solutions. Quality efforts are important and central to good care, but the system shouldn't settle on an illusion that doing more and more of the same will create something conceptually and practically different. The crucial issue not yet fully addressed in this research is the tension between developing a robust organization and allowing for flexibility in practice. Moving forward in patient safety will require that the interplay between robustness and flexibility be openly acknowledged, examined, and better understood.

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THESIS MAIN BODY

BACKGROUND

When patients entrust themselves to our care, we make two implicit, but key professional and organizational promises – 'we promise to do everything possible to help patients; to provide good (possibly excellent) care; and, we promise not to hurt them' (Reinertsen & Clancy, 2006). However, there are many instances where people do not get the care that they need (McGlynn et al 2003) or are inadvertently harmed through the process of care (Kohn, Corrigan, & Donaldson, 1999; Vincent, Neale & Woloshynowych, 2001; Baker, Norton, Flintoft, Blais, Brown & Cox, 2004; Leape & Berwick, 2005; Davis, Lay-Yee, Scott Briant, Scott, & Schug, 2002).

While being concerned with quality for many years, healthcare did not, in general, think systematically about patient safety until the magnitude of the problem became very clear and could no longer be ignored. There is now widespread agreement that enhancing patient safety is an important public policy issue (Leape & Berwick, 2005). However, despite political, professional and public pressures and wide-spread implementation of a range of activities and development of specific tools to support organizations to improve patient safety and quality (Berwick, 2006; Safer Healthcare Now!, 2007; The Joint Commission Website, 2007; Institute for Healthcare Improvement, 2007; National Patient Safety Agency, 2007; National Patient Safety Foundation, 2007), healthcare has not yet achieved the status of being a high reliability industry (Amalberti, Auroy, Berwick & Barach, 2005; Wachter & Pronovost, 2006). High reliability organizations have been defined as 'complex organizations engaged in high-hazard activity that continually face unexpected developments, yet manage to have fewer than their fair share of accidents' (Rivard, Rosen & Carroll, 2006).

Adverse events that harm patients and failure to deliver services based on "best practices" can both be viewed as defects in the system. But these are '*defects of two distinct types'* that arise from different dynamics of the system (Reinertsen & Clancy, 2006). In the first instance the system has failed to recognize, anticipate and mitigate potential problems (safety). In the second instance the

system fails to perform according to recognized standards of "best practice" that are known to enhance care processes with the goal of maximizing patient outcomes (quality). The common element in both instances is that the system is most often operating in an environment of resource constraints and conflicting goals.

While emerging theoretical (Dekker, 2006a; Hollnagel, 2008) and applied work (Personal communication with Roger Resar, 2007; Personal communication with James Bagian, 2007) view quality and safety as related but distinct concepts, in the healthcare arena these two types of harm are often talked about as if they are the same (or at least overlap in significant ways). Despite the National Patient Safety Foundation's *Agenda for Research and Development in Patient Safety* (The National Patient Safety Foundation, 2000) acknowledging that quality and safety are not 'synonymous', much of the literature related to organizational safety and quality in healthcare continues to conflate the concepts (Dekker, 2007; Personal communication with James Bagian, 2007; Gruneir and Mor, 2008; Martin and Harnage, 2008). This pattern is also seen repeatedly in the media, regional and national strategies (both within Canada and abroad), educational initiatives and institutional governance (Safer Healthcare Now!, 2007; Wachter & Pronovost, 2006; National Health Service Quality Improvement, 2007; Queensland Government, 2007; Nova Scotia Government, 2007; National Steering Committee on Patient Safety, 2002; Institute for Healthcare Improvement, 2007; Vancouver Coastal Health, 2007; Agency for Healthcare Research and Quality, 2007; The Joint Commission, 2008). In practical terms conflating the concepts can result in investing efforts in solving the wrong problem and potentially misappropriates limited human and financial resources. For example, most of the examples referred to above are focused on activities designed to improve the quality of care (such as campaigns to raise awareness about the importance of proper hand washing or the appropriate use of antibiotics) rather than preparing frontline staff to cope with the complexity that they face on a daily basis as well as the unexpected nature of adverse events.

CONFLATING QUALITY AND SAFETY: THE PROBLEM

Quality is a distinctive characteristic or property of a person, object, or process that enhances care, usually denoting some degree of achievement or excellence. When used in relation to management, the term quality may be easily defined as reduction of variability though compliance with specifications, standards or guidelines (Wikipedia, 2008); e.g. International Organization for Standardization (ISO) 9000 defines quality as 'degree to which a set of inherent characteristics fulfils requirements'. Accreditation activities attempt to achieve similar goals. Safety entails protecting against physical, social, financial, political, emotional, occupational, or other types of consequences of failure, error or harm arising from care (Wikipedia, 2008). In complex high risk systems, safety is the realm of dealing with novel unexpected events arising from latent factors within the system (human and technical) – it is proactive and requires dynamic, interactive cognitive processes such as "sensemaking" (Weick, 1988); whereas creating quality involves improving something that exists to enhance an ongoing process (Personal communication with Sidney Dekker, 2007).

Failure to distinguish between the two concepts raises an important issue: Does the conflation of quality and safety potentially limit the development and scope of relevant solutions? Empirical data and expert opinion suggest it may. For example, in both the US and Canadian healthcare systems there are still a lot of safety related strategies that focus entirely on highly targeted (often diagnostic specific) activities (Wachter & Pronovost, 2006; Safer Healthcare Now!, 2007) that have more to do with quality (e.g. adhering to standards, rules and protocols) than safety (Dekker, 2006; Personal communication with James Bagian, 2007; Personal communication with Roger Resar, 2007). Details from the *Safer Healthcare Now! Campaign* exemplify this. The current list of activities include: 'delivering reliable, evidence-based care for acute myocardial infarction, to prevent deaths from heart attack; preventing central line infections, by implementing a series of evidence-based interventions in all patients requiring a central line; preventing surgical site infections, by reliably delivering the correct perioperative

antibiotics at the proper time; or preventing ventilator-associated pneumonia, by implementing a series of interdependent, scientifically grounded steps' (Canadian Patient Safety Institute, 2007). The Canadian Patient Safety Institute (2008) has just launched Phase II of the *Campaign* entitled "Together, Let's Improve Healthcare Safety! with a similar set of targeted activities, and interestingly, the promotional material describes it as a "quality improvement campaign". A similar strategy, or "campaign" is used in the US and the specific activities are described in the *100,000 Lives Campaign* literature (Institute for Healthcare Improvement, 2007).

These "campaign" activities are examples of "good care" and are recognized standards of "best practice" known to enhance care processes, and thus address one of the "promises" (Reinersten & Clancy, 2006) we make to patients; but will these highly specific activities alone solve the problem of patient safety? Indeed, Bagian takes the stance that:

> *'The current approaches to safety (such as the ones described above) are limited since very little of the activity is transferable to other healthcare system problems. Instead of teaching people how to learn, the healthcare system most often tells people what to do. One of the biggest challenges in healthcare is that most healthcare workers are not trained to solve novel problems. The biggest challenge in healthcare is to understand systems thinking and to come up with systems based solutions' (Personal communication with James Bagian, 2007).*

Solving novel problems and responding to surprising events is critical to safety since one of the key challenges of creating safety in complex non linear systems like health care is that the knowledge base is inherently and permanently incomplete (Hollnagel, 2007). In healthcare, work situations are always underspecified (i.e. the conditions of work frequently do not match what has been specified or prescribed), and thus when unpredictable components or dynamics arise within the system, adaptation is often necessary. There will always be a gap between work as imagined and work as actually done, and hence performance variability is both normal and necessary in complex non linear systems (Hollnagel, 2007). However, these understandings of "normal work" in complex systems are rarely discussed in healthcare; moreover, current approaches that rely on

rules, procedures and checklists largely ignore the role of adaptation in creating safety (Personal communication with James Bagian, 2007; Personal communication with Roger Resar, 2007). On the contrary, performance variation is often seen as the culprit, the cause of adverse incidents (Dekker, 2002). Although senior managers and expert resources support practitioners at the sharp end[1] with a range of tools, there continues to be heavy reliance on rules, standards and procedures and the expectation for strict compliance (Personal communication with Roger Resar, 2007; Personal communication with David McLeod, 2007; Joint Commission Resources, 2008). This approach reflects a more traditional management model whereby organizations attempt to manage risk through the development of robust systems most often achieved through targeted, prescriptive practice (Nathanael and Marmarais, 2006; Rasmussen, 1997; Grote, 2004) aligned with the classic quality model, discussed below (Personal communication with Sidney Dekker, 2007). Current educational efforts often tell people what they already know (e.g. "wash your hands") and rely on guidance that is largely prescriptive in nature rather than being reflective about how they can manage uncertainty and competing goals to achieve safe care processes. Moreover, MacKenzie et al (2008) in their discussion of complex adapative systems note that 'the leader must understand the nature of health care delivery at the microsystem level—the parts. Because there are many parts, there is not one microsystem change, or "silver bullet," that will fix a problem'.

MISUNDERSTANDING "HUMAN ERROR" CONTRIBUTES TO THE CONFUSION

Although most contemporary rhetoric now acknowledges the need to take a systems approach to understanding critical incidents in healthcare and some effort has gone into team building, improved communications (e.g. use of simulation) and personal mastery (Personal communication with James Bagian, 2007; Personal communication with Roger Resar, 2007;

[1] People who work at the "sharp end" of care generally have some sort of individual direct influence on the care of individual patients, such as physicians, nurses, physiotherapists, etc.

Personal communication with Peter Doris, 2007); most investigative efforts seeking to account for incidents and accidents continue to focus on one or more instances of human actions gone wrong, which in turn are explained as "human error" (Personal communication with James Bagian, 2007; Personal communication with Roger Resar, 2007; Personal communication with Julie Morath, 2007; Personal communication with David McLeod, 2007; Personal communication with Sidney Dekker, 2007).

A fundamental fact in healthcare, more so perhaps than in other risk-critical industries, is that people are the means by which care is provided, they are thus always in proximity to incidents when these occur. Hence it is natural to consider them in some way involved with the incident and they frequently are as a simple result of their proximity. How one infers the human role in incident assessment, however, is another matter. A variety of theories and models have been developed to help understand what "human errors" actually are and how they can be reduced; although with limited success (Dekker, 2001; Hollnagel, 2006; Dekker, 2002; Woods, 1999). There are two major views of human error. The first, often referred to as the "old view" (Dekker, 2002) maintains that:

- Human error is the cause of many accidents
- The system in which people work is basically safe; success is intrinsic, and the chief threat to safety comes from the inherent unreliability of people;
- Progress on safety can be made by protecting the system from unreliable humans through selection, proceduralization, automation, training and discipline.

In contrast to the "old view" there is a second view, often referred to as the "new view" of human error (Dekker, 2002). The key features of the "new view" are:

- Human error is a symptom of trouble deeper inside the system; safety is NOT inherent in systems;
- Systems themselves have multiple goals (often contradictory) that people are expected to pursue simultaneously; thus people working within systems have to juggle multiple

demands and are faced with making trade-offs, and yet despite all of this are also the ones that create safety;

- Human error is systematically connected to features of people's tools, tasks and work environments and progress on safety comes from understanding and influencing the dynamics occurring between these;
- Human error is NOT an explanation, but demands (when it occurs) an explanation.

LIMITS OF THE CLASSIC QUALITY MODEL

As noted earlier, dynamic systems, whether in healthcare or other risk critical domains are complex, frequently unpredictable and thus give rise to situations in which safety inadvertently but inherently is compromised whether arising from the specific technology and processes used in patient care, or high level management decisions shaping the macro level features of the system (Dekker, 2002; Dekker, 2005; Hollnagel, 2006). Moreover, safety is compromised by the pursuit of other important organizational goals (Personal communication with Roger Resar, 2007; Personal communication with James Bagian, 2007; Hollnagel, 2007). Within such a dynamic and highly inter-active system environment the "view of human error" and the choice of accident model embraced can critically influence learning since these provide quite different frames to acknowledge and understand organizational and systemic contributions to incidents (Hollnagel, 2004; Dekker, 2005).

The model often used in healthcare is that accidents are thought to occur when individual components or processes fail to meet criteria ("old view" of human error). This model of risk and safety builds on the assumption that safety, once established, can be maintained by keeping the performance of a system's parts (human and technical) within certain bounds (e.g. people should not violate rules and procedures) (Dekker, 2006). Dekker argues that this model – the classic quality model – distorts efforts to achieve safety. The classic quality model was developed to ensure that the system meets pre-specified criteria. The goal of quality assurance activity is to

keep performance variability under control – organizations develop policies, rules and protocols to keep performance within a particular bandwidth (Dekker, 2007). This model it seems has now reached the limit of its ability to improve further change in healthcare (Dekker, 2007) since it does not focus on the dynamic organizational and environmental factors that contribute to failure, but rather on barriers (people, technology and processes) that "failed". Consequently the solutions arising from a linear perspective most often emphasize the need for new policies, rules or technology to enhance control (Dekker, 2002; Personal communication with Roger Resar, 2007), an approach that is more aligned with the "old view" of human error noted above. In contrast, non linear models support the development of recommendations that are systems focused but which create the least constraints of sharp end activity, allowing flexible response to immediate as well as blunt end[2] demands, as this is where the largest impact on error reduction can be made (McReady, 2000; Woods & Cook, 1999; Personal communication with Rob Robson, 2008).

Dekker (2007) explains that in **linear** production systems, such as Toyota or McDonalds, the notion of quality may overlap substantially with safety because:

1. The systems can be decomposed into meaningful elements;
2. The failure-probability of individual components can be described and analyzed individually;
3. The order or sequence of events is predetermined and fixed;
4. When a combination of events occur they be described as non-interacting; and the influence of context is limited and generally quantifiable.

However, since the process of "producing" healthcare is neither linear nor fixed, a linear approach is *a priori* not sufficient for learning and thus enhancing safety. Relying on the classic

[2] People who work at the "blunt end" of care generally set policy, and make decisions about staffing levels and performance objectives, allocate resources, and are involved in activities such as risk management and training senior management and the Board

quality model to understand safety in healthcare is not adequate and will not have desired effects. This is because the achievement of enhanced quality does not, cannot automatically guarantee safe care (Dekker, 2007). Thus, conflating quality and safety can limit efforts to improve safety. A new model that clarifies the conceptual and important practical distinctions between safety and quality is required.

A NEW MODEL FOR UNDERSTANDING SAFETY

Resilience engineering has recently emerged as a new way of thinking about safety in complex, risk critical, dynamic organizations. Central to the resilience engineering perspective is the understanding that the state of safety in complex, high risk, event driven organizations is dynamic. In these settings, safety is not just the absence of accidents, hazards or risks as these are inherent in the work itself. Since safety is seen as always competing with other industry goals (e.g. financial viability, throughput and quality) in resilience engineering it is necessary to accept this reality and strike an acceptable balance (Resilience Engineering Network, 2006). Experts in resilience engineering argue that high reliability organizations have developed the capacity to maintain organizational balance in the presence of continuous stress and competing goals, and to recover the balance after a mishap (Hollnagel, Woods & Leveson, 2006). Furthermore, experts in resilience engineering argue that "resilience" is about 'enabling local competence for coping with uncertainties' (Grote, 2004) and caution organizations about the value of trying to minimize or control risk through rules (Amalberti, 1999; Dekker, 2003; Grote, 2006).

ARE THERE GOOD REASONS TO DISTINGUISH BETWEEN QUALITY AND SAFETY?

Although there are a few exceptions (Personal communication with Rob Robson, 2007; Personal communication with Jim Bagian, 2007; Personal communication with Roger Resar, 2007), as noted above, safety and failure in healthcare is most frequently understood within the

framework of linear accident models (aligned with the classic quality model). Moreover, the majority of healthcare organizations in both the US and Canada rely almost entirely on a linear model (i.e. root cause analysis is based on a linear perspective) to analyze critical incidents and learn from near misses and failure alike (The Joint Commission, 2008; Canadian Patient Safety Institute, 2006; Personal communication with Paul Beard, 2008). As noted earlier Resar (Personal communication, 2007) holds that the healthcare system to date lacks a broad understanding of systems thinking, and this may help to explain why healthcare organizations hold to a linear understanding of accidents that relies on fairly simple cause and effect explanations of incidents. Furthermore, until recently there have been few models available that help to explain accidents in complex systems (Hollnagel, 2008); therefore, it is not entirely surprising that the healthcare system started developing solutions and strategies using non linear models when it has.

One of the implications of conflating the concepts of quality and safety is that in institutional settings, safety activities are almost always structured within the portfolio that manages the clinical and administrative activities related to quality (National Audit Office, 2007; Royal Children's Hospital, 2007; Personal communication with Rob Robson, 2007; Personal communication with Emily Christoffersen, 2007). Since there is currently nothing akin to the safety management systems that exist in other complex high risk environments (Personal communication with Terrence Kelly, 2006; Personal communication with Karlene Roberts, 2007), individuals have the dual responsibility for managing both quality and safety. Thus, there is a potential to continue to blur an understanding of the important conceptual differences between quality and safety, and ignore the practical reasons to keep them separate. In particular, structuring quality and safety activities within the same portfolio may increase the tendency for people at both the sharp and blunt ends of care to continue to assume that 'safety is a dividend of quality' (Dekker, 2007).

If the goal of the healthcare system leaders and practitioners is to reduce the *'two types of system defects'* that Reinertsen and Clancy refer to (2006) – '*each viewed as distinct and arising from*

different dynamics of the system' – there are a number of reasons why it is fundamentally counterproductive to rely on linear models to understand and investigate critical incidents and/or link the activities of safety and quality structurally within the institution. First, when the concepts are closely linked the risk is that people responsible for governing, managing and providing healthcare may think these concepts mean the same thing. Thus, using similar strategies to address them will appear an inherently reasonable, logical course of action. Conflating the concepts implicitly creates the belief that enhancing quality, automatically manages safety. Based on the experience and knowledge from high reliability industries and experts in resilience engineering, this belief is not valid (Reinertsen & Clancy, 2006; Dekker, 2006; Personal communication with Terrence Kelly, 2006; Personal communication with Bob Dodd, 2006). Thus it is unlikely that solutions that follow from a set of beliefs, based on a linear model of incidents and failure, will effectively tackle the challenge of preventing or mitigating adverse events "defects" in a complex, dynamic environment.

Second, enumeration and investigation of adverse events takes a different perspective when it is viewed as a concept distinct from quality (Dekker, 2006a; Dekker, 2007, Dekker, 2006b). As noted above, in complex dynamic systems people often adapt their actions given the context at hand and this is viewed as part of the "normal performance variability" that takes place as part of "normal work". A non linear approach provides investigators with the basis to find out why people's actions and assessments made sense to them at the time; rather than identifying what rule, protocol or process the person violated; conclusions that are retrospectively easily reached when relying entirely on linear approaches such as root cause analysis (Dekker, 2007). A non linear perspective views safety as an emergent property of the system and therefore incidents cannot be explained by simply examining the individual components of the system and/or trying to identify a root cause ("the first story") (Hollnagel, 2008; Dekker, 2002; Starbuck, Farjoun, 2005); there is always a second story revealing the complexity existing surrounding the incident at the time it occurred (Cook, Woods, Miller, 1988).

The third difficulty, and closely linked to the second, is that when safety is subsumed under the concept of quality, it makes it more likely that people will cling to the "old view" (Dekker, 2002) of human error when things go wrong. As noted earlier, a fundamental fact in healthcare, more so perhaps than in other risk critical industries, is that since people are the means by which care is provided, they are thus always in proximity to incidents when these occur. Hence it is natural to consider them in some way involved with the incident and they frequently are as a simple result of their proximity. How one infers the human role in incident assessment, however, is another matter. If a linear approach is taken, investigators can easily take the position of retrospective outsider, looking back on a sequence of events that seems to lead to an inevitable outcome, and pointing out where people went wrong, or where individual components of the system failed (Dekker, 2002), thus perpetuating the tendency to blame the person closest to the point of care. Moreover, investigators will be inclined to look for the rules, standards or protocols that were violated, which is problematic for two reasons. First, as noted above, the approach seriously limits what the investigator can learn about failure in non linear systems, and the recommendations that follow will be unlikely to prevent reoccurrence. Second, there has been substantial discussion about the importance of disclosure with patients and families following adverse events (Wojcieszak, Banja & Houk, 2006; Mello, Studdert, Kachalia & Brennan, 2006; Leape, 2006); however, there continues to be a lot of ambivalence about whether, and how best, to do this. In particular, among risk managers, there are fears that disclosure of an adverse event would create liability problems for the institution and for those closest to the point of care, negative personal repercussions (Personal communication with senior healthcare managers, leaders and consultants during a routine meeting of the Western Health Information Network April 13, 2007). Linking safety with quality implicitly creates these fears, and thus powerful obstacles to moving forward with disclosure activities precisely because adverse events are seen as the outcome of rule, standard or protocol violation.

On conceptual grounds there are important differences between the notions of quality and safety and there are potential disadvantages and risks for merging or integrating the concepts in healthcare. Most important there are important practical reasons for understanding the differences between quality and safety in healthcare, such as: the development of organizational safety strategies with a systems focus; enumerating, investigating, analyzing and learning from near misses and critical incidents; and, moving forward with disclosure activities.

CONTEXT, DESIGN AND METHODOLOGY

The aim of this research was to begin to explore the extent, and in what ways, safety and quality are conflated in healthcare, at both the sharp and blunt end of care in an acute care institutional setting within a large health authority in Canada. The key questions this research seeks to answer are: How are the notions of patient safety operationalized through local context? How is safety thought about and constructed? How is it discussed? Or is it neglected?

This work sought to understand the ideology of safety practice amongst operators at the sharp end, and how in practice these issues are worked out. It also sought to understand the ideology of safety at the blunt end of the system since, as noted above, the blunt end of the system shapes (constrains and/or supports) the practice of operators at the sharp end through regulatory, economic and technological requirements and management practices (Woods & Cook, 1999). It compared the differences and similarities between how the sharp and blunt ends of care both think about, and seek to construct safety. Primary methodologies include a critical appraisal of selected literature related to safety in complex, dynamic systems, and triangulation interviews with key figures in health care.

The literature review involved synthesis of selected key peer review and "grey literature"[3], with a focus on the nature of safety in complex, dynamic organizations and industries and ideas about how safety is created and sustained (1996 through 2007). With respect to the interviews, the key informants included six registered nurses working in acute care, two nurse managers responsible for acute care units, and five senior decision makers. The interviews with registered nurses included both junior (less than three years experience) and senior (more than three years experience) nurses. Qualitative research was carried out here to uncover actors' perceptions and framework of understanding of safety. Accordingly, semi-structured face-to-face interviews were conducted. An interview guide was developed to support the discussion and contained a series of open questions which evolved from general to specific questions.

The following questions structured the interviews with registered nurses:

1. How long have your worked as a registered nurse?
2. How long have you worked on this unit?
3. How do you define the term safety?
4. What factors and activities help contribute to patient safety at your institution, in general, and, in particular, on your unit?
5. What do you think would improve patient safety in acute care hospitals, in general, and, in particular, on your unit?
6. How does the term safety vary from context to context?

The following questions structured the interviews with nurse managers and senior decision makers:

1. What is your role in the organization?

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[3] 'Grey literature' is used to describe publications not published commercially or indexed by major database vendors. Grey literature may be ephemeral (of questionable relevance or quality), but it continues to have an impact in research, teaching and learning. It is occasionally the sole source for specific research questions. While this research may be published eventually, in many cases it is not. Finally, grey literature is usually not subject to peer review, and must be scrutinized accordingly. (UBC Library resources) Available at http://toby.library.ubc.ca/subjects/subjpage2.cfm?id=877. Accessed March 27, 2008.

2. How long have your worked in the health care sector?
3. How long have you worked in this organization?
4. How do you define the term safety?
5. What factors and activities help contribute to patient safety at your institution?
6. What do you think would improve patient safety in acute care hospitals?
7. Does the work you do contribute to safety? If yes, in what ways?
8. How does the term safety vary from context to context?

ETHICAL APPROVAL AND DATA COLLECTION

After obtaining ethical approval from the University of British Columbia Behavioral Review Ethics Board, and relevant organizational ethical approval, the interviews were conducted by a health services researcher, at a mutually agreeable time at the persons' place of work during November and December 2007. Interview times ranged from one hour to one and one half hours.

ANALYSIS OF INTERVIEWS

An inductive process of coding the data and identifying analytical themes as they emerged from the transcribed data was performed. The analysis also sought to identify differences among the interview groups that might be explained by the individual's role in the organization and experience. The questions outlined above provided a structure for analyzing the data. There are some overlaps among the themes. For example the notion of communication was discussed as an important idea on its own; however, was also identified as an essential feature of effective leadership.

A literature review that included the work of opinion leaders from the fields of high reliability and resilience engineering provided a theoretical background to the analysis.

Specifically, accident theory and modeling, investigating critical incidents and accidents, sense making, mindfulness, organizational design and learning were reviewed

RESULTS

Defining patient safety

After preliminary conversation with each key informant about their role within the organization, current responsibilities, relevant background information and education, the interview would begin with some general discussion about safety. Each informant was asked to define safety. Most of the key informants began the discussion with the response that "that is a difficult question" and took some time to reflect before responding. Although a variety of terms were used to define safety all of the informants acknowledged the feature of delivering care that is based on "best practice" while at the same time avoiding harm to the patient. For example:

> *Patient safety is making sure that you get the patient where they should be, getting the care that they should get, to the standard that they should be getting and in the most efficient and effective manner without putting them at risk…or recognized and identified risk because there are some procedures which involve some risk (registered nurse).*

Moreover, the majority of informants indicated that patient and staff safety should not be viewed as separate pursuits, and believe they are inextricably linked as the following example shows:

> *I don't know if you need to say patient safety, safety is for everybody, because if you are keeping the patients safe, you are also keeping your staff safe, you are keeping your environment safe. The patients go everywhere, so it's not like you can just say I am going to worry about patient safety, as a rule. If your staff are not working in a safe manner, or not working with safe equipment or with things that allow them to do the job safely, you are not going to have safety for the patient as well. It kind of goes hand in hand. I don't see them as being separate (registered nurse)*

With respect to whether there is a distinction between quality and safety, one of the nurse managers articulated their understanding of the link between quality and safety, commenting on the absolute need for standards and protocols – that these are tools that support a safe practice environment – but also notes that safety is far more than just the rules and standards.

> *A quality practice environment is a safe practice environment. Any of the quality improvement initiatives that we embark on, even if quality is the main focus, certainly patient safety is a theme that is discussed e.g. changing standards or change in practice…and looking at the literature, we always ask is this the safest way to deliver care, and it's certainly a theme. And there are organizational committees that I've sat on where we're looking at larger scale standardization or changes in practice or changes in guidelines, the two are used somewhat interchangeably or you can't really discuss one without discussing the other, but I do see them as two separate things (nurse manager).*

Major themes

A number of major themes or dimensions emerged from the analysis of the rest of the interviews. **Table 1.0** describes these and shows the relative emphasis given to each theme by the key informant groups. The themes are described throughout the remainder of results section and discussed at length in the discussion section. A scale of 1 to 3 describes the level of emphasis given to each theme during the interview, with 1=not mentioned; 2=mentioned; 3=talked about a lot—i.e. main focus of discussion. The degree of emphasis was determined by counting not only the number of times a particular idea was raised during the discussion but more importantly, the proportion of interview time that was spent talking about the idea and to what extent the idea was explored in some depth as opposed to simply being mentioned.

Designing robust organizations

With respect to the theme of designing robust organizations, three sub themes emerged and involved issues related to prescriptive practice and compliance, and the notion of the absolute importance of rules and procedures, but the acknowledgement that compliance to rules and procedures alone will not create safety. There were notable differences regarding the emphasis that each group placed on the respective sub themes.

The senior decision makers raised issues that mirror the priorities of the *Safer Healthcare Now! Campaign* (Canadian Patient Safety Institute, 2007); with the focus of the discussion on activities such as preventing medication errors, reducing infection rates and improving compliance with hand washing. Designing safer systems, based on the classic quality model, through prescriptive practice and working to improve compliance with "best practice" and standards were the key messages. Organizational factors such as the use of technology and adherence to standard procedures in the areas of evidenced-based clinical practice and performance accountability, supported by data development and information technology were cited as ways to promote patient safety. Protecting the system through a complex set of barriers or safeguards, aligned with the classic quality model, was also emphasized; for example:

> *There is an opportunity to become better at anticipating where a problem might occur and then building safeguards into the system which makes it difficult for those problems to re-occur (senior decision maker).*

A linear perspective is embedded within this comment and is juxtaposed with what is now understood about safety in complex systems, which recognizes the reality that most critical incidents are surprises arising from the unexpected combination of events, and are unlikely to reoccur in a predictable pattern.

Nevertheless, the senior decision makers also appeared to recognize and understand the complex issues associated with creating safety in socio-technical systems,

> *It's very, very important that we recognize the total scope of the work that gets done, that we understand how much of it, can you make quite rigid and predictable with solid rules and how much of it is a function of the fact that you are dealing with real people and new technology. In healthcare there is this whole level of new technology and learning which has a big change component, so as you look at all these system changes that occur you have to build in the fact that you are constantly going to be getting new information, and the system has to be flexible enough or resilient enough so you can build those things*

in. These require resiliency in the system, if you don't put these pieces in and you look at it and pretend it's Toyota, it won't work (senior decision maker).

These comments were countered with the argument that nonetheless there are particular aspects of healthcare delivery which are known to be good practice, and that these can be tackled with approaches such as those used in linear production systems.

But the good thing is so far, we have been trying to identify the elements that are like Toyota, and legible prescriptions, cleanliness, infections…those are basic ones...The focus so far on safety has been prescriptive and that's fine.. it gets it going….and creates some basic guidelines…The danger is that in the future we won't have an approach that is complex enough to capture the reality of the way the system works (senior decision maker).

Concerned about a potential onslaught of criticism from the public if the well understood risks (e.g. risk of infection if caregivers do not routinely wash their hands between caring for patients) are not managed effectively, leaves the senior decision makers feeling like they have little choice but to limit their efforts to fairly concrete activities. These activities are aligned with the so-called "low hanging fruit" prescribed in the *Safer Health Care Now! Campaign* literature (cited in an earlier section of this paper) Indeed, when asked if it might be feasible to move forward on two fronts, one related to standards, rules, procedures and the other related to strategies based on an understanding of resilience, the decision maker replied:

I think all that we can do is take it one step at a time so what's been very positive is it's (safety) on the table and there are some basic things that we should be doing that we are not doing as well yet as we could, and those are the ones that are very, very basic, and there is no excuse for an ineligible prescription…you can write in a way that is legible….or you can automate it….so one way or another at least you can be clear, so those are very basic things that there is no debate around; so lets get those done, and as we evolve we can begin to talk about how far you can take that sort of rigidity in terms of prescription, that's where we need a lot of debate and discussion on how far you can take it (senior decision maker).

I think sometimes we've fallen down on the real basics, the equivalent of airbags and parking brakes, all those kinds of things, those are fundamental…you do those really, really well, you have zero tolerance for not doing that and then I think the public has more openness to listening to you when you want to talk about some of the more complex areas….and then I think there is more tolerance to listen; otherwise I think people can get quite hysterical about why can't you get your staff to wash their hands (senior decision maker).

You make it very difficult to talk about resilience with any kind of intelligence when you haven't covered off the basics that are so obvious (senior decision maker).

The preceding comments make it clear that although the senior decision makers acknowledge both the role of prescription and the place for resilience, they were nonetheless somewhat divided on, if not wary about, the issue of publicly tabling the more complex issue of creating a resilient organization – one that is robust and yet remains flexible. The reluctance to explore the juxtaposition of these two ideas is largely out of their fear that it would not be acceptable to the public, legislators and policy makers (to whom they are accountable) who expect that individuals responsible for managing healthcare organizations will achieve compliance for practices (such as hand washing) that are known to be established standards of care.

For one nurse manager patient safety involves the inclusion of processes and structures and systemic requirements necessary to ensure the staff have the tools and the resources and ability to act safely in the care that they are providing. Examples of tools and resources included adequate equipment, guidelines and policies. However, unlike the discussions with the senior decision makers the nurses and nurse managers not only understood that rules and regulations alone don't create safety but also appeared to feel quite comfortable openly talking about the "flexibility" and "adaptation" that is critical to safety in their day to day practice. In their minds it is absolutely clear that rules, protocols and procedures **must coexist** with flexibility and adaptation. Furthermore, the nurses and nurse managers recognize in very practical terms how following the

rules or standardization (a very linear approach to safety) can sometimes actually create safety problems:

> *Sometimes it is the way that individual orders are written, sometimes it is the way medications are labeled or are coming from pharmacy, sometimes it is the way that some of the standardization that happens in some of our automated systems, such as our medication administration records are automated and printed out and there are standardization in terms of delivery times, and sometimes those can conflict with the reality of patients coming in 24 hours a day, with orders just in time. A particular type of standardization is causing an issue that is potentially leading to errors, so that type of thing is often identified and followed up on (registered nurse).*

It was clear that the nurses not only understand but feel quite comfortable discussing the reality of their daily work—it is "normal" for them to be deeply engaged in both "following the rules" *and* "adapting these rules" when required, and as described in the next section, that experience is critical to knowing when and how to adapt. The quintessential perfect compliance with rules and procedures was not part of their discussion, and indeed they hold that absolute compliance can actually get you, and more importantly your patient, into trouble.

Experience, adaptation and the efficiency thoroughness trade-off

The key points made by nurses working at the sharp end of care are the dimensions of experience, the need for adaptation and an understanding that they are constantly shifting back and forth between efficiency and thoroughness as they go about their day's work. In particular, the nurses and nurse managers understand that experienced nurses are more likely to recognize, interpret and understand the early warning signs that signal potential problems and that prompt them to adjust their care accordingly. Experience is not only necessary for recognizing potential problems, but also understanding how and at what point to adapt their approach. For example, with respect to experience:

> *I would like our more senior staff to stay. As a more junior person, who am I going to approach when I have questions? Experience is a huge contributor to safety (registered nurse).*

Furthermore, all of the nurses and the nurse managers talked about the need to start looking at the imminent large scale retirements that will be replaced with new, less experienced practitioners (and unfortunately not even at the same volume that they are retiring). Many nurses felt that the system should be looking at innovative methods to create a support system of mentorship, and one nurse suggested:

> *If we are not going to have the knowledge and level of experience on the floor, how are we going to meet that gap and deal with the risk that it puts us to in terms of patient safety, just not having that level of experience on the floor. I think we need to start looking at how we retain some of those nurses who want to retire, even if we bring them as full time mentors, with no patient assignment (registered nurse).*

As noted above, the nurses understand that rules and procedures are necessary, but alone don't create safety, indeed, from this person's perspective, following the rules too strictly can create problems:

> *All you have to do is look at a person who is very rigid about the rules and you can see how they put themselves and others in danger sometimes, because they are so rule oriented, that they are not adaptable (nurse manager)*

Registered nurses also stressed the unpredictable nature of safety, again highlighting that safety is not just about following protocols, but requires adaptation and an understanding that there is inevitably a gap between work as imagined and work as actually done. For example:

> *Regular things in everyone's practice, e.g. doing the seven checks for medications, the safety checklist that we do every shift, making sure suction is operable, safety equipment is available, it is the little things that contribute to patient safety, but obviously nothing can be predicted, cause we've had occasions where we've done our checks and you think your patient is okay, but then your patient slips and falls. Because we have such high acuity patients, sick patients, we are so busy, stuff like that can happen, so there are definitely unforeseeable things that can happen, as much as you can, you try and do the harm reduction but yet at the same time it's a fine balance. You can't guarantee safety. In school you are taught one*

thing, you are taught okay this is kind of how things go, but then you come into the real world, and it is completely different from what the textbook tells you what happens (registered nurse).

Interestingly, the capacity to handle unplanned for, unanticipated uncertainty arising externally, or because the "textbook" conception is underspecified or wrong is described in the literature (Hollnagel, 2008) as a key feature of organizational resilience, and aligned with a non linear perspective on safety.

Teamwork and communication

Second only to the emphasis on experience and adaptation, all of the nurses spent considerable time talking about the dimensions of teamwork and communication. In particular, a critical feature of getting through each day safely is related not only to the people you work with (e.g. mix of knowledge, skills and the level of their experience) but most importantly the quality of relationships with those people. Nurturing positive professional relationships amongst team members is central to getting through one's day safely. In the following example, the nurse mentions team work and emphasizes the importance of interpersonal trust.

Working as a team definitely contributes to safety. I get along really well with my colleagues and I know that I can depend on them to oversee my patients when I'm on a break. We are always checking on each others' patients and I know that contributes to safety. It comes down to the relationship you have with your colleague. If you don't know the person well enough you don't have the freedom….some of the dynamics are a bit different. When you work with someone continuously you know their strengths, and we learn to trust and rely on each other (registered nurse).

Related to the notion of interpersonal trust, a nurse manager gave two examples of the value open communication had for team members, and believes it is a critical feature of information flow, supports the development and maintenance of positive relationships within the unit, and thus enhances safe practice. In the first instance, "safety huddles" are highlighted as a relatively recent mechanism that supports the flow of information:

I think our safety huddles are a good thing and if you create a climate where people feel safe talking to each other, they will unload some of the things that they bring to their workday. When I have new staff start and they are doing their orientation, I always speak with them about the importance of clarifying things with people (nurse manager).

In the second instance, the nurse manager talks about the value of open communication to avoid potential misunderstandings and foster collaboration and cooperation amongst team members.

If you see something in the way of behavior of a co-worker that you don't understand, and you go and talk to another co-worker, the two of you will usually push it around and think it could be this or that, and eventually you settle on something and all of a sudden it becomes a fact, without bothering to check with the person, so a lot of it is about communicating with people, and communicating and asking or disclosing. So, if you come to work and you've just had a fight with a significant other and you feel ready to cry and you are doing all you can not to cry, and you are having trouble concentrating, just tell people I'm having a bad day today, [and they] will you look out for me?

Although the majority of examples around teamwork and communication focused on the quality of nurse-nurse interactions, none of the informants failed to comment on the importance of cross disciplinary communication.

The communication across disciplines is critical for safety. I don't think you can give proper care unless everyone has their input. We always ask (registered nurse).

And not only was it considered important to ask for clarity around treatment plans and orders, it was also considered crucial to speak up and let people know when you are not comfortable with the proposed plan, or you think the patient requires another assessment. Not surprisingly, comfort with this behavioral aspect of teamwork was related to experience. With experience comes confidence. The more experienced the nurse is, the more comfortable they are asking for clarification of or even challenging the patient's treatment plans.

All of the nurses recognize that "transitions" are particularly important with respect to safety, and if information flow is not working and there are missing pieces of information, that it can put the patient at risk. Transitions include what happens during admission, discharge and the handoffs that occur at shift change, or when patients are transferred from the operating theatre back to the unit. The key issue is that nurses recognize that the process of caring for patients is complex and involves multiple caregivers, procedures, treatments and often a variety of locations for the delivery of care. The caregivers need to be kept fully informed. They also indicated that in a system that is almost always functioning at overcapacity, it is easy for information to "fall between the cracks", due to competing demands that include multiple interruptions throughout one's day, lack of clarity in written communication, and non standardized techniques related to transitions. In the following example, communication, not just within the team, but with the patient, their family and friends is critically important; as well as the communication associated with the coordination of care across the continuum of healthcare services (e.g. community-based care).

> *When people are going home, I want to find out who is taking you, how are you getting there, and here are some contact numbers in case you get home and find that you've missed asking us a question, that you really need an answer for, do you have your prescription, your follow-up appointment, and is someone is going to be with you, you are not going to be alone necessarily.*

One of the nurse managers, whose position mediates frontline nurses and decision makers, spoke about the importance of communication, teamwork and learning, especially in light of the number of relatively inexperienced nurses who working on her unit.

> *The senior staff here do have a real passion for teaching and spending time with new practitioners…a lot of mentoring, a lot of support. That broken record that is drilled into everyone here: Ask questions, ask questions; never be afraid to ask a question. There is no stupid question. I had experiences myself as a new practitioner, it is not necessarily the culture we have on every unit, there is definitely that stigma of nurses eating their young, and sort of treating novice practitioners…giving them that space to*

prove themselves, versus the space to learn and the space to be supported and really creating the environment and culture that it takes to be safe. And in order for them to be safe, they need to feel that they can ask anybody for help, that they can ask questions, that it is okay if they don't know something. I think as soon as the culture is such that you are judged for not knowing something, that's when I get scared, because that's when I think that if they are not going to ask, and they are going to guess, but they don't know enough (nurse manager).

Surprisingly, the senior managers did not raise the topic of communication and teamwork amongst frontline staff during the interviews; however, since the focus of their discussion was related more to the issue of standards and compliance, as one would expect, the discussion did include comments about their struggle with how best to communicate with frontline staff in order to achieve compliance. Implicit within the discussion was consideration of how the blunt end communicates with, and manages, the activity and performance of people on the frontline. Absent, was any notion of the importance of, or the need to learn more about how work gets done on the frontlines and/or mechanisms to foster an understanding with regard to blunt end versus sharp end perceptions of safety, and why these might differ given their roles, responsibilities and accountabilities.

The role of leadership

Without exception the nurse and nurse managers talked about leadership as a key contributor to safety; however, when they referred to leadership it was mostly limited to their immediate "leader" the nurse manager, rather than the senior leadership within the facility, suggesting a possible disconnect with senior leadership and also reinforcing the notion that senior leadership may have an incomplete understanding of the nature of how "normal" work gets done on the frontlines; a concern that is also raised by experts from the field (Personal communication with James Bagian, 2007; Personal communication with Roger Resar, 2007; Mackenzie et al 2008). With respect to their immediate leader, the nurses spoke about how the staff morale is affected by the manager's attitudes, management style, and they believe that morale has an impact

on safe practice. The nurses referred to specific factors such as valuing the team members' contributions, being visible on the unit, facilitating group participation and team decision-making on the unit.

The nurse managers talked about the behavior of the senior management team and how it is important for them to give more than "lip service" to safety initiatives, noting that the practical support of senior management influences the success and sustainability of safety initiatives.

> *It's important that people champion these things in a meaningful way, not just saying "do it" because we need a little more help than that. It helps to know there is support available…I think they (senior decision makers) have acknowledged how important it (safety) is by having people in charge of safety and devoted to safety, people with designated roles give it credibility that they actually do care about safety (nurse manager).*

Both of the nurse managers emphasized that leadership involves building relationships with people, and indicated that they are committed to becoming more visible on the unit and available to interact with their staff. One nurse manager influences the culture on the unit by being visible and proactive with new staff and keeping one message forefront and clear:

> *It's okay to ask questions if you don't know something (nurse manager).*

Although senior decision makers did not directly talk about "leadership" per se, they did talk about what they do to raise the profile of safety amongst their Board members, with a focus on both issues of accountability (e.g. "balanced score cards", which is more aligned with the classic quality model of keeping performance within a particular bandwidth than the dynamic nature of safety) and the value of understanding why incidents occur and what can be learned from the incident. In short, the decision makers know that it is important to keep safety on the agenda of people in powerful positions and who influence major hospital policy.

> *We've tried to bring in the discipline of looking at patient safety as one of our key indicators, bringing it to the Board, bringing it to the Safety and Quality Committee, and having regular updates, so it is part*

of the balanced score cards. We have a weekly presentation at our executive team on incidents… where patients… where there has been either an adverse incident or the potential for an adverse incident and again discussing that with the entire senior team: was it a system problem, was it a human error, what could be done, and then also looking at it as learning not just for one unit or one department but potential for learning across the system (senior decision maker).

Competing system challenges

One of the nurse managers summed up the predicament facing the healthcare system over the coming decade by declaring that amid signs of continuing human resource challenges (associated with both the retirement of senior nurses and problems recruiting and retaining new nurses), along with the fast pace of technological change and demand for healthcare by an aging population, keeping patients safe will continue to be a major challenge.

Experience and workload will be big challenges in the next 10 years. Experience is going to continue to drop and the workload is going to continue to increase, because we can't really change those things…people are retiring and people entering the system, don't have the same experience. The acuity is going up and the workload will absolutely go up. We have a gap in our ability to fill nursing vacancies and it will climb substantially by 2009. We need to look outside the box and how do we support the practitioners that are left, to be safe. I do think we need to look at some innovative methods to create those support systems of mentorship, if we are not going to have the knowledge and level of experience on the floor, and how are we going to meet that gap and that risk that it puts us to, in terms of patient safety, just not having that level of experience on the floor. I think we need to start looking at how we retain some of those nurses who want to retire, even if we bring them as full time mentors, with no patient assignment (nurse manager).

Moreover, the other nurse manager noted a range of factors that compete with and affect safety. For example:

I have noticed an increase in incident reports and this year alone I had seven or eight critical incidents, that relate directly to overcapacity, new staff, who are so green, busyness on the ward, it's

multifactoral; but the overcapacity and the push to decrease length of stay and move people in and out quickly, has impacted the standards of care, plus the shortages, so there is a lot of overtime…there's never any down time, never any time for reflection, and I find that people don't think as much and you couple that with new graduates who don't have life experience and yes, it becomes unsafe

Trouble-shooting and vigilance

When the nurses were asked how they create safety in their daily practice, all of the nurses, regardless of their level of experience spoke about trouble-shooting and vigilance as the most important aspects of keeping their patients safe. As noted earlier, they understand and appreciate the importance of rules and standards of care, but they also understand that "out of the blue things can go wrong", and quite unexpectedly at times. Hence it is important for them to keep the possibility of risk alive in their minds as they go through their daily work. As one nurse described her perspective:

I think its how you look at it and accept where you are and what you are doing. If your norm is that you are always going to work in a safe environment or you are going to make that attempt to make your environment safe, safe for you, safe for your patient, safe for your co-workers, so that the risks are minimized to people; then you are going in with the attitude that you are always on the lookout for the things that make an unsafe environment for you. You might not identify all of them, but at least you've got that alertness about you, whereas if you don't have that in your radar at all, you can't see the forest for the trees, you will see them walk past an unsafe situation…If I stop and move that chair, or put a break on that chair, I may think I really don't have the time, someone else will do it, but maybe a patient will walk past and use it as a balancing point and go down, or someone else may get hurt as a result of that…it is the alertness, having an attitude that I want my space around me to be safe (registered nurse).

Another nurse explained how she uses vigilance to mitigate against potential unexpected events:

I will go down in the morning when the residents are finished their early morning teaching session and talk to the most senior and find out what their day is going to be like, what are they planning to do –

doing long cases or short cases, are they here or at another site, and it gives me some idea of where they are in the day, that if I have an emergency what's the probability of me getting an answer back on my page…in a fast form, and if I hear something that is going to impede that then I usually at that time try to come up with a back up plan…okay, so it does not sound like you are going to be able to answer pages very quickly today, if we need someone fast who is our go to person, so that's clear in the morning (registered nurse).

Finally, a third example of how one of the nurses described how she creates safety in her practice on a daily basis.

When I go in to the bedside, I always ask what is the worst thing that can happen to me today in this room today, if this patient were to code, do I know what to do, where is the oxygen, how do I get this bed flat, am I familiar with the equipment at the bedside, there is the oxygen, does it work, turn it on, make sure I actually have oxygen, there is the suction, turn it on, make sure I actually have suction, do I actually have whatever device I need in the room or is it sitting outside the door, or do I have any idea where it is, and it's going to take me 10 minutes to find it, while my patient is choking (registered nurse).

Learning from near misses and critical incidents

Finally, with respect to learning from near misses and critical incidents, it was the nurse managers who spoke about this topic the most. This is not surprising in this particular hospital, since they are the ones who deal directly with managing the process of investigating critical incidents on their units.

One of the themes related to learning and discussed by the nurses and the nurse managers is the issue related to "blaming". Everyone understood that practitioners are often afraid of being blamed, when things go wrong. They recognize that there has been a shift in culture, and that it is no longer "correct" to blame others, a change led largely by the IOM's report "To err is human: Building a safer health system" (1999) and subsequent changes in the organizational philosophy (at most healthcare institutions) whereby senior decision makers would emphasize more the importance of understanding and learning from critical incidents than

blaming and punishing. Nevertheless, some of the nurses recalled situations where they do feel that either individually, or as a professional group, they have been blamed for things that go wrong. The nurses and nurse managers understand that if people are afraid of being blamed, they will be less likely to report near misses (critical incidents being hard to "hide) and that this can inhibit learning.

Most of the nurses talked candidly about mistakes they have made, and although there was occasionally some emotion that accompanied the discussion, there wasn't a sense of shame. Indeed, they recognized that professionals can make mistakes, and the important thing is to learn from your mistakes. For example:

> *Most recent one was accidentally giving the wrong dose of an IV medication and I never ran down so fast o catch up with my patient…..I realized as soon as I pushed it and I signed for it. I realized it was completely wrong….it was a very busy day, it is one of those situations where I thought I had pulled out XXX even thought it was XXX that was ordered… it was a flustered moment for sure. I've had many an incident report written in my day and every one has been a learning experience.*

The nurses appear to see that there are many informal learning opportunities that occur throughout their workday, and take on the role of advising colleagues, if they see something that concerns them. They acknowledge that communication style is extremely important if you want to do this effectively without generating animosity amongst team members. There is also the recurring theme (discussed elsewhere in this paper) that people are often afraid to ask questions, and that this fear can threaten learning, and safety:

> *I have written a couple of incident reports on people more junior, and I have pulled aside people and have said, maybe you should do this instead of that. Most of the time, it depends on the relationship you have, but the majority of the time it is totally accepted. I had one more junior nurse and I noticed the pressure was slightly higher and I pulled her aside and advised her, so it was a good teaching moment. I've never had a negative response to it. But everyone is different. I hope that nurses will seek*

help if they don't know what to do. Sometimes people don't seek help and are afraid to say they don't know how to do something (registered nurse).

Other informal activities, such as storytelling (i.e. sharing about how things went wrong and how the situation was handled effectively, or not) in the staff lunchroom were also cited as an important tool for learning.

DISCUSSION

Although many of the themes described above intersect they are individually identifiable as themes in theory, suggesting that it is in practice that they seem to merge and integrate. Similarly, all healthcare professionals in this study talked about patient safety and quality in almost the same breath.

The senior decision makers, managers and registered nurses do not believe that the "old view" of human error is sufficient to understand and reduce critical incidents in healthcare delivery. However, there was a marked difference in the emphasis that each group placed on the different themes, and is likely explained by their different roles and accountabilities within the organization. For example, both groups agreed that rules and standardized procedures are necessary components of the work environment and help to keep the system safe. However, senior decision makers spent an inordinate amount of time talking about the value of rules, guidelines and standardized procedures, and the concomitant challenges with compliance, than any other topic. Part of this emphasis on rules might be explained by the reality that people at the blunt end of the system are charged with the responsibility for setting organizational policies, rules and regulations, and like most people will measure their success by how well they have achieved their mandate, thus a preoccupation with the issue of compliance and normative rules. Nurses on the other hand saw procedures as an essential component of their everyday work, but also understand that the conditions of work frequently do not match what has been specified or prescribed, and that adaptation is often necessary. The nurses spent a lot of time talking about

the unpredictable components or dynamics that arise within the system and emphasized that adaptation is often necessary. The nurses also understand that experience is critical for knowing how to judge whether that which they used before will work in the current situation. There is always a tension regarding when and how to adapt rules and protocols to the set of circumstances in which they find themselves. The experienced person is more likely to know when and how to do this through tacit knowledge and vigilance. While at one level, complex systems are generally well protected from vulnerabilities with substantial "barriers" (e.g. checklists, standardized communications and procedures), beyond this level of protection, safety is created through the ability of practitioners to recognize local pitfalls, uncertainty and novel concatenations of events, thus forestalling or mitigating them through adaptation and vigilance. The nurses understand that healthcare delivery is an unpredictable business and their understanding of the need to adapt and be ready for the unexpected suggests that they understand that safety is not a linear process. The description of how they create safety in their daily practice supports the notion that they recognize that the classic quality model is not sufficient to ensure safety.

The senior decision makers also understand that a linear production model, such as that used by Toyota is not sufficient to explain the complexity of healthcare; nonetheless they tended to cling to some of the Toyota "solutions", a perspective that emphasizes new policies, rules or technology to enhance control, an approach that is more aligned with the "old view" of human error. This is not entirely surprising since managers are rarely in the position to make observations of how work is done. Rather the work they perform as managers, colors how they see ward work. They live and work with abstractions of what they think ought to be done, and rely on metrics such as "benchmarks" and "report cards" that measure compliance with constructed standards (that may have little to do with how work actually gets done) and that have been set by both government and senior management teams. From this perspective incidents are prevented by strengthening barriers and defenses, thus safety is ensured by measuring performance indicators and variation, and understanding past events to develop solutions for the

future. Senior management is currently unprepared to grapple with and discuss the reality that performance is an emergent phenomenon and neither failure nor success can simply be explained by malfunctions of specific components (human or technical). One of the key challenges for the senior decision makers seems to revolve around the difficult and complicated issue of compliance. And yet, as we've learned from the nurses, perfect compliance is not desirable and can create problems with safety. The interviews with the senior decision makers highlight the clash in thinking that occurs between the notions of prescription and practice. Interestingly, although the nurses recognize that prescription and practice sometimes clash, and that there are resulting tensions from this clash, they accept the clash, and do the best they can under the given set of circumstances, to get their work done, adapting as necessary. However, the interviews with the senior decision makers suggest that it is extremely difficult for them to juggle these competing tensions, and currently don't think it is even feasible to talk about both realities, due largely to what they view as outside political pressures from the public and the provincial government, to whom they are accountable. Unfortunately, this reluctance to fully recognize and more importantly, openly address, the tension between prescription and practice will not get them very far in understanding and learning from critical incidents, since implicitly it leads them to focus on human actors as causal in adverse events, rather than seeing them merely in temporal and spatial proximity to those events. The preoccupation with compliance may interfere with senior decision makers making a meaningful connection with people on the frontlines to understand "normal" work in the context of competing priorities and unexpected events. It could be more productive for senior decision makers to begin to understand "normal" work and also understand why people did what they did, rather than judging them for doing what in retrospect the organization thinks they "should have" done.

Discussions with the registered nurses suggest that they keep the discussion of risk alive and that nursing staff critically monitor safety and speak up when they see an unsafe situation. Vigilance figures importantly in their daily practice. The nurses and nurse managers maintain that

through routine practice and occasional (but necessary) adaptations in that practice and subsequent reflection and sharing with their peers, that learning occurs. It is maintained that informal story telling of significant past events is where important learning occurs.

Communication, teamwork, handoffs and transitions and other activity that requires exchange of information have been identified as some of the key issues related to safety. Surprisingly the topic was absent from the interviews with senior decision makers; however, given their mandate within the organization they are likely not as sensitive to point of care operations and concerns as to blunt end strategy and issues. Furthermore, since it appears that there are few occasions where the senior decision makers actually meet and talk with those doing the work, they likely have minimal understanding of how the organizational constraints influence every day activities like handoffs and transitions. Hence, they likely have little understanding of these activities in the context of "normal production pressures" and other competing goals, assuming that these activities "just get done". Thus the issues that potentially surround the accomplishment of these tasks are not automatically front and centre in their thinking, when it comes to discussion about safety. Like front line workers, who knew or heard little about top down safety strategies, both managers and these workers view safety through the "lens" of where they are in the organization and the kinds of work they do. The majority of registered nurses reported that communication is open and honest on their unit and think it is an important contributor to keeping things safe. Nurturing interpersonal trust is necessary for good communication and team building. The nurse managers also recognize that open communication is important for information flow and contributes to safety. Both the nurses and nurse managers understand the challenges of junior staff who are less experienced. In particular, the staff need to feel "safe" so that they feel free to admit what they don't know, and they also need mentoring with respect to issues around when and how to adapt to the rules and standardized procedures.

Actively engaging leadership at all levels of the system, blunt end and sharp end is important. At the blunt end, the importance of senior leadership (including the Board) being

actively engaged in the safety agenda should not be underestimated. Close to the sharp end of care nurse managers who remain actively engaged with their staff, through visibility and discussion is critical. At the sharp end of care, individual nurses show leadership as mentors and through the risks they take in advising colleagues when they see practices that leave them feeling uncomfortable.

Finally, it was surprising to find that none of the nurses at the sharp end were aware of the formal hospital initiatives around safety, such as the activities associated with the Safer Healthcare Now! Campaign. The exception to this is their awareness and active participation and support of "safety huddles". This observation reinforces the notion that the approach that healthcare is currently taking is that many activities are introduced in isolation from each other (are often very clinically targeted, e.g. ICU central line management) and thus nurses working at the general unit level don't get to hear about these initiatives. Furthermore, it raises the question about the impact of these targeted approaches to the overall organizational learning. Indeed, as noted by Bagian (Personal communication with Jim Bagian, 2007) very little of the activity from these initiatives is transferable to other healthcare system problems. The initiatives are a good example of, instead of teaching people how to learn, the healthcare system most often tells people what to do in some normative sense. Instead, the healthcare system needs to teach people how to be skeptical, questioning and report problems, rather than seeing these behaviors as career limiting steps. In healthcare people are used to learning a fact and the learning is often not based on an understanding, rather rote memorization. In contrast, it is important to encourage people to ask questions such as: How do I define problems? How do I solve them? How do I balance the solution with the competing organization dynamics? These sorts of questions and ensuing behaviors promote organizational resilience and safety. As noted earlier in this paper, one of the biggest challenges in healthcare is that most healthcare workers, like most workers, are not trained to solve novel problems. The biggest challenge in healthcare in regards to safety is to understand systems thinking and to come up with systems based solutions.

CONCLUSIONS

The results show that none of the informants hold to a strictly linear model of creating safety, in part, supporting the premise of this paper that there are important conceptual and practical reasons to distinguish between quality and safety. Nonetheless, the classic quality linear model of safety persists. There is also a difference amongst the groups' perceptions of safety, and the difference is most noticeable between the perceptions of the senior decision makers and the registered nurses. First, although the interplay between robustness and flexibility was acknowledged by all groups, it is not clear that the tension between the two realities is really understood and there is reluctance at the senior level to openly address the tension. At present, the senior decision makers tend to focus more on safety as a risk management exercise or as a control problem, where certain behaviors need to be constrained and others encouraged. Second, most efforts at unit-specific or organization-wide investigation and learning still focus on things that go wrong – analyzing incidents and adverse events and looking for instances of human actions or technical support gone wrong, an approach that is aligned with the classic quality model where the effort is on keeping performance within a particular bandwidth. Intriguingly, although the nurses seemed to recognize and understand that they often create safety by adapting rules and policies and protocols when necessary, no one so far suggested that it might be useful to examine instances of why things go right in the face of extreme circumstances, and seemingly against all odds.

Discussion at both the sharp and blunt end of care moved back and forth between the notion of a robust system (often marked by simplification and standardization of work flows, such as the formal rules developed for medication administration) and the need for a flexible work practice, but suggesting that the acknowledgement of the need for flexible work practices may not be based on any real understanding of what flexibility in this context means, and how or why it should be nurtured and encouraged. The notion of flexible work standards and the implicit

sense of loss of accountability that may occur with allowing decision making to migrate to the point of care (i.e. to those in the best position to know the dynamics of the situation and thus may have the best insights on what action best fits local context) may be critical to understanding why senior decision makers resist the kinds of organizational changes that would contribute to resilience and safety. It was at the sharp end of care that this idea was discussed with the most frequency and fluidity; and that is likely to be a function of the experiences they face (e.g. competing demands but perhaps not having a full understanding of safety as an emergent aspect of practice). Indeed, the nurses reported that safe practice involves a combination of rules, standards, protocols, education, experience as well as the flexibility to adapt work practices in the face of uncertainty and changing conditions. Furthermore, it was also noted by every nurse that experience is a critical factor, and the capacity to adapt is most often determined by experience.

One of the reasons that there continues to be confusion between the notions of quality and safety could be that there is an understanding by all groups that rules, protocols and standards are necessary but not sufficient to create safety; therefore, it is difficult to talk about the latter, without mentioning the former. Healthcare delivery is complex due to (among other things) the biological variance of patients, rapid introduction of new technology and tasks that are highly technical and require specific expertise. The inherent complexity of care delivery requires a strong regulatory framework and quality activities help to ensure an acceptable standard of care. However, since incidents emerge from unexpected dysfunctional interactions between system components; people on the frontline need to remain vigilant and try to anticipate what could go wrong (the unpredictable nature of safety) and foster the ability to respond to surprise or the instability of the system, congruent with Weick's understanding (2001) that "safety is a dynamic non event". In practice, the ideas are merged and integrated. Furthermore, since there are different perspectives on the importance of prescription versus flexibility and adaptation in practice, depending on one's role and accountability within the organization, this could in and of itself help drive the confusion.

The findings from this study suggest that the tension that exists between developing a robust organization while allowing for flexibility in practice may not be getting adequate attention in healthcare. The reluctance to grapple with and openly address this critical issue likely perpetuates the confusion between quality and safety. Moving forward in patient safety will require that the interplay between robustness and flexibility be openly acknowledged, examined, and better understood.

LIMITATIONS OF THIS WORK

There are inherent limits to research based on one time face-to-face interviews with individuals. Nonetheless, interviews of this kind can capture the ideas about safety that other research methods may neglect. Here the emphasis was on the safety issues as individuals chose to focus on and how they defined them.

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