



Building Clinical and Organizational Resilience to Reconcile Safety Threats, Tensions and Trade-Offs: Insights from Theory and Evidence

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Abstract

Healthcare delivery settings are complex adaptive and tightly coupled, interrelated systems. Within the larger healthcare system, a key subsystem is the “clinical microsystem” level. It is at this level that clinicians are faced with high levels of uncertainty in their daily work – uncertainty that impacts the quality and safety of care that patients receive. The first aim of this paper is to enhance healthcare leaders’ understanding of what is currently known about safety threats and strategies to manage the inherent tensions and trade-offs that occur in everyday practice. The second aim is to inform strategies that build clinical and organizational resilience through a multi-level framework derived from the collective theoretical and empirical work. Together, this information can strengthen safety practices throughout healthcare organizations.

Five years after the release of the Canadian Adverse Event Study (Baker et al. 2004), the challenges of managing tensions between optimizing patient outcomes while efficiently managing healthcare prevail in Canada. Healthcare delivery settings are characterized as complex adaptive and tightly coupled, interrelated systems (Cook and Rasmussen 2005). Within the larger healthcare system, a key subsystem

is the “clinical microsystem” level. It is at this level that clinicians are faced with high levels of uncertainty in their daily work – uncertainty that impacts the quality and safety of care that patients receive (Tucker and Spears 2006). Thus, it is paramount that attention be paid to system vulnerabilities at the clinical and organizational interface to enhance our understanding of how to reconcile safety threats in healthcare (Barach and Johnson 2006). As part of this understanding, we require insight into the more complex and deeply structured organizational systems inherent in healthcare processes (Waring et al. 2006).

The first aim of this paper is to enhance healthcare leaders’ understanding of what is currently known about safety threats and strategies to manage the inherent tensions and trade-offs that occur in everyday practice at the clinical microsystem level. This description is elaborated by empirical evidence from three patient safety studies. The second aim is to inform strategies that build clinical and organizational resilience through a multi-level framework derived from the collective theoretical and empirical work. Together, this information can strengthen safety practices throughout healthcare organizations.

Understanding Threats, Tensions and Trade-Offs in Clinical Microsystems: What the Literature Tells Us

Attention to safety in healthcare must include a focus on clinical microsystems, the groups of clinicians and staff who work together with a shared clinical purpose to provide care for a defined patient

population (Batalden et al. 1997; Nelson et al. 1998). There are four key components that define the nature of microsystems: (1) patients for whom care is provided, (2) professionals providing the care, (3) processes the microsystem uses to provide services and (4) patterns that characterize the microsystem functioning (Barach and Johnson 2006; Godfrey et al. 2003). Microsystems evolve over time in response to the balancing act of healthcare professionals meeting patient needs within the context of work processes and patterns specific to the environment in which they provide care (Barach and Johnson 2006). Relating this balancing act to patient safety, the clinical microsystem is where patients, practitioners and patterns of practice interact to determine the safety of care processes (Espin et al. 2006a) and their response to emergent safety threats. Thus, managing complex situations within healthcare requires attention to emergent threats at both clinical and organizational levels (Joyce et al. 2005).

Current thinking about patient safety also draws heavily from how other safety critical industries (aviation, petrochemical, nuclear and railway) conceptualize risk and safety. Of particular relevance to exploring threats, tensions and trade-offs in patient safety is Reason's accident causation model, commonly referred to as the "Swiss cheese model," and Amalberti's system migration model (Amalberti 2001; Amalberti et al. 2006; Cook and Rasmussen 2005; Reason 1997). A key tenet of Reason's model is that errors are expected to occur in complex organizations, partly as a result of human cognitive function (Reason 1997). In this framing, accidents or errors are the result of a combination of active failures at the sharp end and a series of failed or unnoticed latent failures that lead to an accident or error. These latent failures are usually less apparent and include organization or design flaws that contribute to the occurrence of errors that have the potential to cause harm. Reason describes the existence of system defenses, barriers and safeguards to mitigate the potential for errors or failures. These defenses can have many layers, including organizational (personal safety equipment, standard operating procedures), team (nature of teamwork) and individual (cognitive function) within the work environment. In the context of healthcare, latent conditions such as understaffing, poor communication among healthcare professionals and not following standards of practice can all contribute to an active failure or error in patient care. Accordingly, attention to safety threats needs to be directed upstream on the conditions that enable or exacerbate the potential for error (Leape 1999).

Building on Reason's work, migration models (Amalberti 2001; Amalberti et al. 2006; Cook and Rasmussen 2005) offer a more dynamic interpretation of error by examining the ways in which safety threats are managed in the wider socio-organizational context, or operating space, of healthcare (Waring et al. 2006). For example, in the "going solid" model of system dynamics, Cook and Rasmussen (2005) focus on the nature of

the operating space, which is defined as the envelope created by economic, workload and optimal performance boundaries. (In nuclear-energy generation, management of the steam boiler requires the presence of both steam and water. When the boiler becomes full of water due to a change in temperature, the resulting situation is hazardous and difficult to manage. This is referred to as "going solid.") The operating space is "safe" when the tension between economic and workload demands are balanced. When working in the safe zone, staff have adequate resources to mitigate against safety threats. In contrast, when economic and workload tensions are unbalanced, the operating space moves to the unsafe zone, where staff may not have adequate resources to prevent errors and mitigate safety threats.

Healthcare often operates at the margin of acceptable performance in order to minimize economic costs and workload. Clinical managers are painfully aware of how staff often work at the limit of their capacity and of how seemingly small changes can send them beyond the margins of acceptable performance. For example, the complexity in healthcare subjects clinicians to a daily work pace where memory lapses around safety threats occur. In this context, being busy or rushed may trigger clinicians to "go solid" – to forget about a care process or treatment or err in clinical judgment due to lack of recognition of deteriorating conditions.

Amalberti et al. (2006) further elaborate on error by including the concept of violations, which are unavoidable, deliberate deviations from standard procedure. They view violations as paradoxical in nature: on one hand; they may increase performance and be encouraged by management; on the other hand, extreme violations can lead to actual harm or a catastrophic event. For example, a person may gravitate toward and eventually engage in a less safe act (i.e., workarounds and shortcuts) as a way of managing environmental demands and constraints. In this context, standards are inherently elastic; they can be violated to some degree with practice still remaining free from error. Over time, these actions migrate to become the acceptable practice, or cultural norm, and are no longer recognized as violations by colleagues and co-workers. Amalberti's work highlights two reasons why we need to attend to the paradoxical nature of practice standards if we are to manage threats to safety: (1) professionals exercise latitude in decision-making – thus, deviation from standards is unavoidable; and (2) risks in healthcare are not homogeneous but inherent to specific clinical situations – thus, the degree to which standards can be violated error free is unknowable.

Three Studies That Illustrate Threats, Tensions and Trade-offs in Clinical Microsystems

The following three studies used qualitative inquiry as a venue to provide further insights and understanding into threats, tensions and trade-offs at the level of the clinical microsystem.

Study One: Near Misses – Paradoxical Realities in Everyday Clinical Practice

To gain insight into how near misses are experienced in healthcare, Jeffs, Affonso and MacMillan (2008) carried out a study to define and describe what constitutes and contributes to near-miss occurrences and what is needed to ensure safer processes of care. This qualitative study involved a large sample (120 interviews with patients and family members and 37 focus groups with nurses and pharmacists from nine healthcare organizations in Ontario) that provided a narrative dataset that was analyzed using a multi-level, thematic approach. Three illustrative themes emerged on how patient safety threats and their respective tensions and trade-offs are being managed in everyday clinical practice. The first theme, *near misses as a metaphor of system vulnerabilities* captured the everyday clinical realities experienced by healthcare professionals juggling workload priorities. Several study participants identified links between working conditions in healthcare and the subsequent breaks in care processes. Closely aligned with the first theme, *diligent and vigilant pattern recognition prompts recovery patterns* emerged as another key theme. Study participants indicated that sometimes health professionals were not picking up the cues to recognize patterns that pointed to a deterioration in patient status. To mitigate against current safety threats, a third theme emerged – the need to *re-orchestrate the system to create synergy in care processes*. Patients and family members were particularly sensitive to the subcultures operating on the clinical units. In this context, there were calls for more collaborative communication within the health team and coordination among the various treatments and interventions.

Study Two: Persistence of Unsafe Practice in the Operating Room – Exploring Organizational and Psychological Factors

Espin and colleagues (2006a) examined how healthcare professionals interact with one another in the context of perceived errors of care, and explored the factors influencing the persistence of unsafe practice (Espin et al. 2006a). Operating room nurses, surgeons and anesthesiologists were interviewed and provided with team-based error scenarios to prompt discussion during the interviews. The 28 participants' responses were qualitatively analyzed using three theoretical approaches. The analysis revealed factors that contributed to the continuance of unsafe practice in the operating room environment. Reason's theory of vulnerable system syndrome provided insight into the definition of *error* as an individual's deviation from standard of practice, and the participant's lack of insight into system weaknesses. If no standards existed, negative events were attributed to chance or accident. Tucker and Edmondson's (2003) concept of first- and second-order problem solving elucidated scope of

practice as an important factor in nurses' reasoning process to report an error event or not. First-order problem solving values individual vigilance evident in nursing participants' decisions not to report errors outside of their own professional boundaries. Finally, Amalberti's model of practice migration (2001) illustrated participants' descriptions of the factors surrounding unsafe practices that arose within the scenarios provided. For example, the most dominant force was market pressures, which participants described within the context of the operating room as doing as many cases as possible. These three theoretical approaches elucidated the factors that promote the persistence of unsafe practices in the workplace.

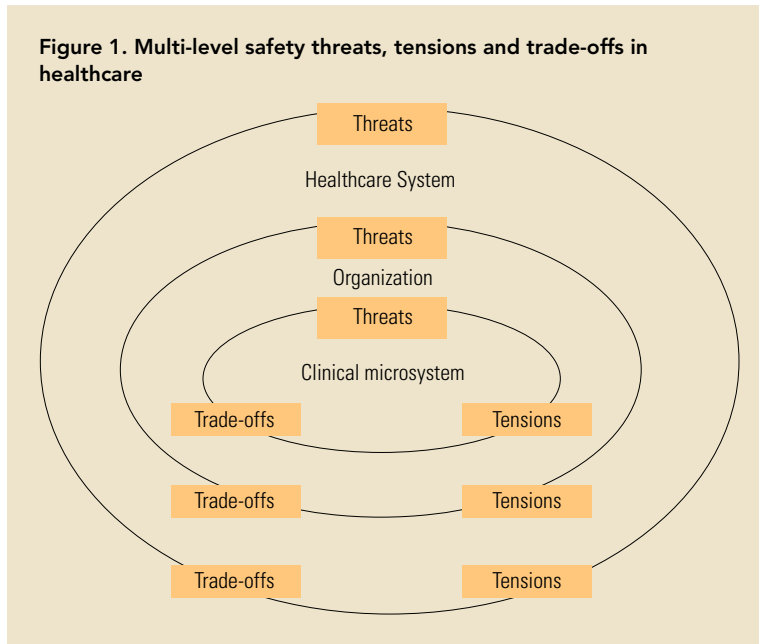
Study Three: Leadership to Promote Patient Safety Culture and Learning in Critical Care

In the third study, Tregunno and colleagues (in press) used grounded theory approach to explore threats and contextual factors that characterize patient safety culture in critical care. This study explored the perceptions of multiple direct care providers (nurses, physicians and allied health and nurse leaders) to learn about critical care teamwork and the role of nursing leaders in transforming the safety culture. The study was conducted in six acute care teaching hospitals in Ontario. Data were collected from 188 participants in 31 homogeneous focus groups. Study findings suggested a substantial overlap between the four provider groups in their perceptions of the factors that influence their ability to provide safe patient care. The most commonly reported work environment threats to patient safety included inadequate physical space, a lack of isolation capabilities, inappropriate handwashing facilities, a lack of available and functioning equipment and medication shortages. In addition, a number of operational issues were reported to threaten patient safety, including the following: a heavy workload, staff shortages, the use of agency nurses, frequent rotation of residents, the presence of internationally educated physicians, the rapid rate of clinical innovations and keeping pace with changing knowledge, administrative delays and the challenge of balancing teaching and practice. There was agreement among the provider groups that improvements were needed in interdisciplinary communication, increased respect and value for professional contribution, greater understanding of the roles, responsibilities and accountabilities of various team members and shared mental models of patient goals. These views expressed by participants provide a powerful narrative of an operating space characterized by pervasive and uncomfortable tensions between patient safety threats that are linked to provider knowledge and experience and those that are linked to workplace conditions. Additional work is required to clarify professional roles, practice standards, competencies and the skill base of team members in the context of professional accountability.

Summary

The above study findings revealed that, in some situations, the likelihood of safety threats converting to potential harmful outcomes was greater than in others. These situations usually

involved clinicians feeling uncertain in the midst of a chaotic, rushed work environment. When faced with these complex situations that pit clinical and organizational priorities against each other, clinicians often managed the tensions by taking shortcuts. These shortcuts involved deviating from organizational policies and procedures in order to manage the task at hand. For the most part, the trade-offs made by clinicians did not result in harm to the patient. Moreover, these types of safety threats were rarely reported in the clinical unit or hospital-wide reporting system. However, the potential for shortcuts to drift toward acceptability or become the “new standard of care” can disrupt the processes and patterns that characterize the microsystem functioning and make the safety threats less visible and more difficult to respond to.



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Building Clinical and Organizational Resilience

Collectively, descriptions of the theoretical concepts from safety science coupled with empirical findings from the three studies reviewed provide insights on how safety threats are experienced and managed in healthcare. Figure 1 illustrates the interplay of the tensions and trade-offs associated with managing safety threats at the clinical microsystem level juxtaposed with organizational and system pressures. Given the realities of the practice

environment and the everyday threats, tensions and trade-offs managed by clinicians, we propose two ways that healthcare managers and leaders can use the model of multilevel safety threats to enhance clinical and organizational resilience and improve patient safety comes. First, leaders must augment their understanding of the interplay between the healthcare system and organizational and clinical levels, where healthcare is delivered. For example, leaders need a clear understanding of the impact of standards for funding, accreditation and professional regulation at the system and organizational levels, and their influence on the delivery of safe care at the level of the microsystem. Policies and procedures become embedded into role expectations and performance management and evaluation systems for clinicians, but these may have unintended effects. In addition, leaders and managers in practice settings play an important role in keeping regulatory bodies aware of the need for contextually relevant practice standards, and these groups can work together to derive collaborative regulation (Tregunno et al. 2007).

Second, to ensure safer healthcare is designed and delivered, leaders need to address the current practice realities to build clinical and organizational resilience. Specific strategies to mitigate threats and manage tensions and trade-offs in safety include the following:

1. Design and endorse organizational structures and processes that maximize clinicians’ scope of practice and their ability to uphold practice standards
2. Foster collective responsibility and a constructive approach for clinicians to identify safety threats, potential errors and near misses; this collective responsibility involves collaborative and concerted efforts at the team and individual levels
3. Enhance clinicians’ ability to develop a more comprehensive understanding of the dynamic nature of patient safety in their work environment

Recently, the Canadian Patient Safety Institute released the Competency Framework for Health Care Professionals. This framework includes six core competency domains to guide inter-professional practice (Table 1) and is an excellent resource for healthcare leaders to use in their efforts to build clinical and organizational resilience.

Conclusion

This paper aimed to demonstrate the importance of attending to system vulnerabilities and threats at the clinical and organizational interface. Understanding how clinicians identify and

manage the threats by reconciling the inherent tensions and trade-offs provides important insights on the nature of patient safety at the microsystem level. Healthcare leaders need to build clinical and organizational resilience to keep clinicians operating at a safe point in their everyday clinical practice. **HQ**

Table 1. Safety competency framework domains

1. Contributing to a culture of patient safety
2. Working in teams for patient safety
3. Communicating effectively for patient safety
4. Managing safety risk
5. Optimizing human and environmental factors
6. Recognizing, responding and reporting adverse events

Source: Frank, J.R. and S. Brien, eds., on behalf of the Safety Competencies Steering Committee. 2008. *The Safety Competencies: Enhancing Patient Safety across the Health Professions*. Ottawa, ON: Canadian Patient Safety Institute. Reprinted with permission.

Acknowledgements

Funding for study one was provided by the Ministry of Health and Long-Term Care in Ontario entitled Exploration of the Phenomenon of Near Misses to Delineate Nursing's Contribution to Patient Safety Science Study Grant Number 06161. Funding for study three was provided by the Canadian Health Services Research Foundation (CHSRF). The views expressed in this manuscript do not necessarily reflect those of the Government of Ontario or the CHSRF.

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