

## **From Counting Failures to Anticipating Risks: Possible Futures for Patient Safety**

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The patient safety movement, from the beginning, has been stimulated by ideas from the fields of human factors and high reliability organizations [1,2] and health care leaders consistently refer to the potential value of these human factors results as a guide for methods, investment, and change [3,4].

Jump starting improvements in patient safety by simply importing and acting on these lessons has not proven easy or straightforward. Building new partnerships with the disciplines that study human performance, learning new concepts about the extraordinary diversity of factors in human performance, and adopting foreign methods is a slow, difficult process [5]. In this process health care is retracing or recapitulating the learning steps and experiences of the human factors research community as it struggled over the last two decades to learn the counter-intuitive lessons about how people contribute to success and failure in modern complex systems [6].

A critical view of that history, given the current position of the patient safety movement in the learning steps and given the pressures and changes ongoing in health care, indicates that the next decade will produce four transitions in emphasis and focus:

1. from a culture of reporting incidents to one of learning from incidents;
2. from an accounting approach that tabulates events to a synthetic approach that searches for patterns;
3. from looking backward at past events to looking forward in anticipation of future risks;
4. from a focus on error to a focus on complexity.

## **Basic Patterns in the Human Factors of Complex Systems**

The history of the struggle to understand the sources of failure in complex systems is remarkable for its surprises [7-11]. Each time a set of assumptions about the sources of failure and a plan for intervention strategies seem definitive, surprising new failures and side effects of interventions have occurred which overturn those assumptions.

As it moved through a series of learning steps, the research found that doing things safely, in the course of meeting other goals, is always part of operational and organizational practice. As people in their different roles are aware of potential paths to failure, they develop “failure sensitive strategies” to forestall these possibilities, but these strategies may be limited, brittle, or stale.

When failures occurred against this background of usual success, researchers found multiple contributors--each necessary but only jointly sufficient - and a process of “drift toward failure” as planned defenses eroded in the face of production pressures and change. As shown in the literature selected for Chapter 6, the research revealed systematic, predictable organizational factors at work, not simply erratic individuals. The research also showed that to understand episodes of failure one had to first understand usual success--how people in their various roles learn and adapt to create safety in a world fraught with hazards, tradeoffs, and multiple goals [12].

In contrast to failure, researchers studied organizations that manage potentially hazardous technical operations remarkably successfully [13,14]. Surprisingly, success was not related to how these organizations avoided risks or reduced errors. Rather the evidence indicated these high reliability organizations created safety by anticipating and planning for unexpected events and future surprises. These organizations did not take past success as a reason for confidence. Instead they continued to invest in anticipating the changing potential for failure because of the deeply held understanding that their knowledge base was fragile in the face of the hazards inherent in their work and the changes omnipresent in their environment. Safety for these organizations was not a commodity, but a value that required continuing reinforcement and investment. The

learning activities at the heart of this process depended on open flow of information about the changing face of the potential for failure. High reliability organizations valued such information flow, used multiple methods to generate this information, and then used this information to guide constructive changes without waiting for accidents to occur.

When learning, not culprits, came to the fore, the central theme that leapt out of the evidence is that the enemy of safety is not other less competent, motivated people, but rather complexity [15-16]. Complexity grows as a result of economic pressures (new levels of efficiency and productivity) and as a result of increasing capabilities. A look behind the label human error usually reveals a breakdown in the usual methods used to “cope with complexity” [11]. Other industries have learned that accidents may represent symptoms of an inadvertent, gradual accumulation of complexity in operations. As a result, they began to adopt criteria of design of equipment and processes based on simplicity, as has occurred in nuclear power and process plants [16].

### **Four Transitions**

In the pursuit of patient safety, health care institutions will recapitulate many of the same learning steps that generated the current research base, a portion of which is represented in this volume. Quickly or slowly, progress on safety will entail shifting emphasis and focus in at least four ways.

#### **Learning**

The first transition underway in the patient safety movement is a shift from a culture of reporting incidents to one of learning from incidents. In this transition new methods will be adopted to escape from hindsight bias in retrospective reviews of incidents and injuries [11,17,18].

After an accident, we know all of the critical information and knowledge needed to understand what happened. But that knowledge is not available to the participants before the fact. In looking back as reviewers we tend to oversimplify the situation the actual practitioners faced, and this tends to block our ability to see the deeper story behind the label human error. Hindsight is not foresight.

Researchers have used methods designed to remove hindsight bias to see the multiple factors and contributors to incidents, to see how people usually make safety in the face of hazard, and to see systemic vulnerabilities before they contribute to failures. Research has developed a variety of techniques to reduce hindsight bias [19]. These are available to use and modify as necessary to learn from past events in health care.

The transition to learning cultures will also be marked by the development of new systems of accountability that support an open flow of information and learning about vulnerabilities to failure. As the patient safety movement circulated the new message about a systems approach, tension arose with another common belief that practitioners and managers should be “accountable” to patients and to other stakeholders. But accountability in this common belief is operationalized in terms of pursuit of culprits and threats of disciplinary actions and stigmatization.

These two trends collide in a basic double bind for the patient safety movement: blame, even if disguised as accountability, drives out information about systemic vulnerabilities, stops learning, and undermines the potential for improvement [20], as discussed by Haas in Chapter 7.

Accountability has been emphasized in the debate on patient safety because how decision makers are held accountable is presumed to influence how they make decisions and the quality of those decisions. Social links such as accountability can indeed be powerful forces influencing human decision making, and these relationships have been studied in organizational dynamics, social cognition, and human-machine interaction [21-23]. This information is being integrated with ethical and legal scholarship to stimulate the innovation of new systems for managing accountability relationships [24,25].

The patient safety movement’s slogan of “moving beyond a culture of blame” is a call to abandon poor systems of accountability, not an absence of accountability. The systems approach examines the reciprocating cycle of giving accounts and calling to account between the sharp end of practice and the blunt end of organizational context to

determine the lawful effects of different factors. Poor systems of accountability can undermine practitioner performance and systems learning in predictable ways. The patient safety movement will evolve through a search for new answers to the question—How is a safe environment for learning about the potential for failure created in a publicly accountable system of health care delivery? [25].

### **Patterns**

The second transition underway in the patient safety movement is a shift from an accounting approach that tabulates events to a synthetic approach that searches for patterns. In this transition inquiry and learning will shift from a focus on counting individual adverse events and near misses to methods that compare and contrast multiple cases to identify underlying patterns.

In the past cycles of research, learning was facilitated and leveraged when inquiry went beyond the surface descriptions of who, what, where and when (the phenotypes of failures) and began to discover underlying patterns of systemic factors (genotypical patterns). Genotypes are patterns about how people, teams, and organizations coordinate activities, information, and problem solving to cope with the complexities of situations that can arise [15].

Note that these patterns fall into the domains of psychology and engineering and are not unique to medicine. Thus, to understand and predict human performance in health care, as in any complex setting, different languages and concepts that describe the various components of human performance must be utilized, including:

- patterns in human judgment [26];
- patterns in communication and cooperative work [21,27];
- and patterns in human-computer cooperation, [28-30].

The search for patterns will require a process of going back and forth between two different perspectives (health care and human performance) in a partnership where each party steps outside of their own area of expertise to learn by looking at the situation through the other's perspective.

## **Anticipation**

The third transition underway in the patient safety movement is a shift from looking backwards at past events to looking forwards in anticipation of future risks.

One of the most productive areas of work on human error in the last 10 years has studies to identify what has characterized high reliability organizations [13,14,31,32]. As noted earlier, high reliability organizations create safety by anticipating and planning for unexpected events and future surprises.

The general lesson is that as capabilities, tools, organizations and economics change, vulnerabilities to failure change as well--some decay but new forms appear. The state of safety in any system is always dynamic, and stakeholder beliefs about safety and hazard also change. Progress on safety depends on anticipating how these kinds of changes will create new vulnerabilities and iatrogenic risks even as they provide benefits on other scores.

This is critical because the basic pattern in complex systems is a drift toward failure as planned defenses erode in the face of production pressures and change. The learning processes must be tuned to the future to detect the emergence of the drift toward failure pattern, to explore and compensate for negative side effects of change, and to monitor the changing landscape of potential paths to failure. This means that organizational learning will shift toward mechanisms that create foresight about the changing shape of iatrogenic risks, before patients are injured.

## **Coping with Complexity**

As the transitions to learning, to the search for patterns, and to anticipating changing risks intensify, a fourth shift will occur. The patient safety movement will focus on complexity, not error. As the enemy of safety is complexity, the movement will search for ways to simplify the operation of health care systems in order to improve their reliability and resilience.

When criteria based on simplicity are fundamental to design and evaluation of changes, a gestalt shift occurs. As a result, organizations will see alternative ways to integrate new capabilities and to use new technology that:

- eliminate hazards;
- reduce the likelihood that missteps will injure patients;
- increase the visibility of errors and their potential effects, before patients are injured, and;
- increase the ability of sharp end practitioners to bridge gaps and create safety.

Learning the value of simplicity and putting this into action will occur first as health care introduces new forms of information technology, because improper computerization can simply exacerbate or create new forms of complexity to plague health care delivery [11].

The search for simplicity in health care delivery will prove difficult since increasing capabilities and increasing productivity pressures exacerbate many forms of complexity, if unchecked. [30,33] Since some forms of complexity will be necessary parts of or side effects of improved capabilities and productivity, the patient safety movement will increasingly focus on developing techniques and resources to help practitioners cope with different forms of complexity. For example, complexity can be balanced by new tools to look ahead and to coordinate with others [30, 33]. Ultimately, our ability to meet the safety expectations of patients and the public will increase as we develop ways to monitor, manage, tame, and cope with changing forms of complexity.

### **Conclusion**

The future of patient safety will be marked by efforts to develop learning cultures through new models of accountability. As organizations become willing to be open to information about risks without a search for culprits, methods to search proactively for underlying patterns will come to the fore. This process of inquiry will help teams and organizations anticipate changing vulnerabilities and new paths that could expose patients to risks of injury as a result of care. Inquiry will highlight how people cope with complexity usually successfully and identify how new forms of complexity may challenge the ability to maintain success. Interventions to tame complexity will be innovated and evaluated.

Together, these efforts to *create foresight* will allow the patient safety community to recognize, anticipate, and defend against iatrogenic risks that arise as health care organizations and technology change, before any patient is injured.

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