

ARTICLES

Doing No Harm: Enabling, Enacting, and Elaborating a Culture of Safety in Health Care

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Executive Overview

Medical error has reached epidemic proportions, and researchers have developed insufficiently sophisticated models of safety culture to match the complexity of the challenge of safety in health care. This has left providers and researchers with an inadequate conceptual toolkit for improving safety. To rectify the resulting crisis we consolidate fragments of management research into a comprehensive and integrative framework of how patient safety is produced and sustained through safety culture. Safety culture involves actions that single out and focus safety-relevant premises and cultural practices that reduce harm. This entails (a) enabling, which consolidates the premises for a safety culture; (b) enacting, which translates consolidated premises into concrete practices that prioritize safety; and (c) elaborating, which enlarges and refines the consolidation and translation. We close by discussing the implications of our framework for future research on key issues such as efficiency-safety trade-offs, interactions among components of the framework, and feedback loops.

In the face of competing priorities (e.g., efficiency), organizations often inadequately prioritize safety relative to other goals (Perrow, 1984). Although safety challenges plague many industries, the problem is especially acute in health care. Health care presents a challenging paradox by pairing the mandate to “do no harm” with mounting evidence that much harm is done in the course of delivering care. In 1999 the Institute of Medicine (IOM) released a report titled *To Err Is Human*, in which medical error was cited

as the eighth leading cause of death in the United States (more than motor vehicle accidents, breast cancer, or AIDS), responsible for as many as 98,000 deaths annually (IOM, 1999). A 2002 report by the Centers for Disease Control (CDC) stated that almost 2 million Americans acquire infections in the hospital, contributing to those 98,000 deaths each year. More specifically, 48,600 central-line bloodstream infections occur annually, with one third of those patients dying (Buerhaus, 2007). Additionally, an estimated 2% to 4% of patients (between 670,000 and 1.3 million) fall during their hospitalization in the United States annually, with 2% to 6% of those falls (13,000 to 78,000) resulting in injury. In sum, as many as 88 people out of every 1,000 will suffer injury or

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illness as a consequence of treatment (Spear, 2005).

Despite this evidence and repeated calls to action over the past decade, health care has proved resistant to safety improvement (Agency for Healthcare Research and Quality, 2007; Wachter, 2010). Why do safety problems persist? A main culprit is the autonomy and individual accountability that define the professional culture of medicine. This culture, fueled by physicians' efforts to maintain professional control and discretion over their work (Abbott, 1991, 1993), allows for persistent safety failures in two ways. First, ineffective care delivery systems are changed in a piecemeal and ad hoc manner that fails to sufficiently address their underlying issues (IOM, 2001; Tucker & Edmondson, 2003). Change occurs in this manner because the discourse of patient safety shifts from mishaps requiring systemic interventions to more familiar local problems (e.g., catheter-associated infections) that can be solved quickly by physicians using existing technologies and modes of operating (Wears, Perry, & Sutcliffe, 2005). Second, the professional culture of medicine contributes to the incomplete, ineffective, and piecemeal implementation (Nembhard, Alexander, Hoff, & Ramanujam, 2009) of otherwise promising technological (e.g., computerized physician order entry and electronic medical records) and process (e.g., clinical practice guidelines) solutions, resulting in a minimal impact on safety (e.g., Koppel et al., 2005; Leape, Berwick, & Bates, 2002; Parente & McCullough, 2009).¹

Complex safety problems rooted in an entrenched professional culture require integrated and holistic solutions that match their complexity. A safety culture can provide a sufficiently complex, integrative solution because it "bring[s] together large numbers of people and imbue[s] them for a sufficient time with a sufficient similarity of approach, outlook and priorities to enable them to achieve collective, sustained responses which would [otherwise] be impossible" (Turner

& Pidgeon, 1997, p. 46). Thus, the development of a safety culture involves actions that single out and focus safety-relevant premises and cultural practices that reduce harm. This entails (a) enabling, which consolidates the premises for a safety culture; (b) enacting, which translates consolidated premises into concrete practices that prioritize safety; and (c) elaborating, which enlarges and refines the consolidation and translation.

We consolidate fragments of management research into a comprehensive model of a safety culture that captures the complexity and dynamism of sustaining safe performance in organizations. Specifically, we argue that to embed safer practice in organizations, these organizations need a coherent culture that sustains the salience and further development of relevant practices. We explore these issues in a single industry—health care—to help illustrate the problems and solutions that exist. The paper will unfold as follows: first, we offer an overview of safety culture and contextualize it to the health care industry; second, we offer an in-depth look at the three practices that lead to a safety culture (enabling, enacting, and elaborating); we conclude with a review of emerging issues in safety culture.

Safety Culture Defined and Contextualized

Safety culture is a facet of organizational culture, the latter often defined as an emergent ordered system of meaning and symbols that shapes how an organization's members interpret their experience and act on an ongoing basis (Schein, 2004). Organizational culture encompasses what is valued, beliefs about how things work, and behavioral norms for how work is carried out. In health care, safety culture encompasses the shared values, attitudes, and behavioral norms that determine the degree to which all organizational members direct their attention and actions toward minimizing patient harm during delivery of care (IOM, 2004). Safety culture also entails an ongoing struggle to detect and correct misidentifications, misspecifications, and misunderstandings that pose threats to safety (Reason, 1997; Schulman, 2004).

The preceding paragraph represents a standard

¹ To the extent that changes do occur they are often piecemeal because the professional culture of medicine views safety as an individual responsibility, privileges professional role over the organizational system, and is reactive and local (Carroll & Quijada, 2004; Nembhard et al., 2009).

definition of culture. But such a definition is insufficient to make inroads in understanding the complicated dynamics of a safety culture. We need a more nuanced picture of organizational culture, as it is not as monolithic as is often assumed.

Patient safety is assumed to be a shared value organization-wide, but that value differs in its priority and meaning among professional and medical specialties (e.g., Singer, Rosen, Zhao, Ciavarelli, & Gaba, 2010). These specialty-specific interpretations themselves vary considerably when applied to ambiguous, complex, unique cases. The resulting safety culture is at best a “transient monolith” since it is vulnerable to competing priorities. Sustaining an organization-wide safety culture necessitates the consolidation and reconciliation of diverse concerns about safety (enabling), the operationalization of these concerns in ways that link specialties (enacting), and ongoing refinement of cross-specialty safety practices (elaborating).

Safety culture differs from the related concept of safety climate. Safety climate refers to the shared perceptions of existing safety policies, procedures, and practices (Zohar, 2008). The expression of safety climate in specific and identifiable policies and practices means that it captures the “surface features” of an incipient safety culture (Denison, 1996; Flin, Burns, Mearns, Yule, & Robertson, 2006). It is these “surface” perceptions that leaders attempt to make explicit, deepen, and broaden in the interest of a more coherent, impactful safety culture. Safety climate perceptions are tied to such things as a leader’s level of commitment to safety (e.g., through safety practices, procedures, and other investments in safety), the priority placed on safety (i.e., the extent to which safety is subordinated to other goals), and the extent to which safety information is disseminated and understood (Katz-Navon, Naveh, & Stern, 2005; Zohar, 2003). Safety climate helps to stabilize and institutionalize a safety culture by sending clear signals to employees on the front line about the substance and importance of safety (Hartmann et al., 2009; Hofmann & Tetrick, 2003).

Creating and sustaining a safety culture is difficult due to the unique features of health care delivery. We present five specific features here.

First, safety is inherently challenging because it is a “dynamic non-event” that is difficult to specify and visualize (Weick, 1987, p. 118). Patient care worsens this because safer courses of action are often non-obvious. For example, hospital administrators don’t necessarily track when a patient *doesn’t* fall. Instead they focus on the more obvious outcomes, such as infection rates and length of stay.

Second, human disease is inherently complex and may manifest itself differently across patients. Even when the diagnosis is apparent, the best course of treatment may not be (Argote, 1982; Nembhard et al., 2009). Patients are medically fragile and, when released too soon, create further cognitive and organizational demands (Weinberg, 2003). The combination of disease complexity, patient acuity, and time pressure often obscures the safer course of action for a given patient and limits the ability of formal safety rules and procedures to prevent further harm (Naveh, Katz-Navon, & Stern, 2005).

Third, the design of health care work exacerbates its inherent challenges and creates threats to safety. The high degree of specialization in health care makes it hard for practitioners to agree on what constitutes an error and what constitutes an appropriate response to error (Khatri, Baveja, Boren, & Mammo, 2006). These differences make it harder to detect, correct, and learn from errors or unexpected events (Espin, Lingard, Baker, & Regehr, 2006; Tamuz & Thomas, 2006).

Fourth, health care is plagued with routine “operational failures” (e.g., missing equipment and supplies) that disrupt caregivers’ work. As such, operational failures divert caregivers’ scarce attention from focused treatment to temporary workarounds (Tucker, 2007; Tucker, Singer, Hayes, & Falwell, 2008; Tucker & Spear, 2006).

Fifth, as noted earlier, the professional culture of medicine also presents unique challenges for building and sustaining a safety culture. The strong history of individual accountability for error in medicine often results in “blaming and shaming” individuals for the errors that do occur (Carroll & Quijada, 2004). This fosters silence even when unsafe conditions are recognized (Blatt, Christianson, Sutcliffe, & Rosenthal,

2006; Sutcliffe, Lewton, & Rosenthal, 2004). Caregiver autonomy (Abbott, 1991, 1993; Rivard, Rosen, & Carroll, 2006) and the privileging of the profession over the organization (Carroll & Quijada, 2004; Nembhard et al., 2009) allow caregivers to normalize unsafe conditions (e.g., see Weick & Sutcliffe, 2003), making it difficult to diffuse and broadly implement safety innovations (Singer et al., 2009).

Despite these difficulties, research has shown that certain cultural practices can reduce patient harm. With hospital accreditation now requiring an assessment of safety climate, and new Medicare policies that deny hospitals reimbursement for some conditions that result from lapses in safety, leaders of health care organizations have more incentive than ever to scan broadly and diligently for such practices. Spurred by these incentives as well as the human costs of safety failures, health care leaders are looking for solutions in a variety of places, particularly to cultural practices in industries with superior safety records. The Institute of Medicine (2001, 2004) has detailed how practices from other industries might apply to health care and how health care organizations might go about implementing them. Specifically, health care has looked to aviation for innovative practices for managing unexpected events (e.g., crew resource management) and mechanisms to spur reporting of errors and near misses (emulating the Aviation Safety Reporting System). Health care leaders have also looked to the Toyota Production System (Spear, 2005) as a potential model for producing high-quality outcomes without compromising efficiency (e.g., Young & Wachter, 2009).

Safety practices also come from interorganizational collaboratives, advocacy organizations that diffuse best practices, and researchers developing and testing new ideas. The Institute for Healthcare Improvement's (IHI) "breakthrough" interorganizational collaborative trains its members on the process of improvement, but more importantly provides a forum for the member organizations to share and learn from each others' innovative practices (Nembhard, 2009). The IHI and other organizations advocating for safer health care delivery (e.g., the Lucian Leape Institute and the National Patient Safety Foundation) also work to disseminate

evidence of practices that enhance safety to their memberships and the broader health care community.

Lastly, health care leaders have looked to research as the source of new practices (e.g., Tucker, Nembhard, & Edmondson, 2007) and, at times, have partnered with leading researchers (e.g., the Keystone Initiative in Michigan; see Pronovost et al., 2006). It is our argument that, regardless of their origin, these practices are gathered into a coherent safety culture through processes of enabling, enacting, and elaborating. Below we describe these three processes in greater detail.

Enabling Safety Culture

To enable is to single out and draw attention to safety-relevant aspects of the larger organizational culture, and to create contexts that make it possible for people to translate these aspects into meaningful activities in their local health care routines. To enable a safety culture is to effectively consolidate, elucidate, and direct those features of an organization's culture that pertain directly to patient safety. Evidence suggests that there are at least two ways in which leaders enable safer practices on the front line: first, by directing attention to safety, and second, by creating contexts where practitioners feel safe to speak up and act in ways that improve safety. Both ways encourage people on the front line to act more deliberately when caring for patients.

Direct Attention to Safety

One means to direct attention to safety is to start with perceptions of the safety climate. These perceptions indicate how employees currently view patient safety based on their perceptions of their leaders' commitment to safety (e.g., through safety practices, procedures, and other investments in safety), priority placed on safety (i.e., the extent to which safety is subordinated to other goals), and dissemination of safety information (Katz-Navon et al., 2005). For example, a supervisor who disregards safety procedures whenever production falls behind schedule or who punishes people for mistakes signals a low commitment to safety (Carroll & Quijada, 2004; Zohar, 2000). However, safety climate competes with other climates (e.g.,

efficiency, service) that originate in different interpretations of what the organization expects, rewards, and supports (Zohar, 1980). As such, neither a safety culture nor a safety climate comes ready-made; it is constituted through coherent and consistent managerial action.

Research within the health care industry has shown that leaders enable safety culture by creating a context that directs greater attention and action toward safety. In doing so they create conditions where there are fewer treatment errors (Hofmann & Mark, 2006; Katz-Navon et al., 2005; Naveh et al., 2005), fewer infections (Hofmann & Mark, 2006), and lower incidences of preventable complications (Singer et al., 2009). To create context is to work with climate perceptions, which means to make those perceptions tangible by use of examples. Examples come from leader actions that prioritize safety. Leaders enable a safety culture when they anchor climate perceptions in actual work—for example, by more frequently engaging in safety-related interactions with subordinates (Zohar, 2002). When leaders direct attention to safety climate, this enables people to understand more clearly the specifics of safer practice (Carroll & Quijada, 2004; Zohar, 2000).

Leaders who foster a safety climate through their personal example both disseminate safety information and show how a safety commitment is practiced in daily functioning (Barling, Loughlin, & Kelloway, 2002; Zohar, 2002). The effects of a leader's personal safety practices are amplified when they are paired with an organization-wide priority on safety (Katz-Navon et al., 2005; Naveh et al., 2005). When leaders lend substance to perceptions of a safety climate this tends to heighten safety motivation (i.e., willingness to exert effort) and participation in voluntary safety activities (e.g., helping coworkers with safety-related issues and attending safety meetings) (Neal & Griffin, 2006). A more explicit and grounded safety climate also produces better adherence to safety protocols, more open and constructive problem-solving in the face of errors (Hofmann & Mark, 2006; Singer, Lin, Falwell, Gaba, & Baker, 2009), and increases in employee reporting of errors and incidents (Naveh, Katz-Navon, &

Stern, 2006; Weingart, Farbstein, Davis, & Phillips, 2004). Formal organizational practices can also increase attention paid to safety. For example, managers draw attention to safety when they visit patient care areas to observe and discuss patient safety issues with frontline care providers. These visits, particularly if documented, can translate into action plans that are fed back to the front line. These managerial actions have the potential to signal an organization-wide commitment to safety. Two recent studies showed that executive walk rounds² increased the perception that hospital leaders viewed safety as a high priority and were committed to safety and responsive to safety issues identified by those on the front lines (Frankel et al., 2008; Thomas, Sexton, Neilands, Frankel, & Helmreich, 2005).

Make It Safe to Speak Up and Act

A safety culture is also enabled when leaders create a context in which employees are empowered to speak up and act to resolve threats to patient safety. Leaders create safe conditions for frontline employees to speak up by building high-quality relationships with employees (Ashford, Sutcliffe, & Christianson, 2009). High-quality relationships are more likely to emerge under conditions of psychological safety—the shared belief that it is safe to take interpersonal risks (Edmondson, 1999). Leaders create psychological safety in a number of ways, including subtle acts such as changing the language used in an organization from threatening terms such as “errors” and “investigations” to more psychologically neutral terms such as “accidents” and “analysis” (Edmondson, 2004), by being more inclusive by means of words and deeds that appreciate others' contributions (Nembhard & Edmondson, 2006), and by pardoning employees who disclose their unintentional mistakes (Edmondson, 1996). Psychological safety, in turn, leads to higher levels of engage-

² Although executive walk rounds vary from hospital to hospital, they generally consist of visits by hospital executives to patient care areas to discuss patient safety issues with frontline caregivers. Executives ask them to discuss events, situations, or processes that could put patients at risk for harm and give suggestions for improving safety. In the best cases, discussions are documented and lead to actions and feedback to participants.

ment in patient safety improvement projects (Nembhard & Edmondson, 2006; Tucker, 2007).

A number of studies have shown that empowering employees can help to enable a safety culture. In a study of trauma teams, Klein and colleagues (2006) found that the best leaders used “dynamic delegation”—they gave junior members of the team leadership of the team based on the severity of the event and their expertise. This practice provides “stretch opportunities” that enable junior leaders to better recognize, describe, and manage dynamic threats to safety (Klein, Ziegert, Knight, & Xiao, 2006). An “empowering” leadership style also allows employees to think, apply their knowledge (e.g., speak up), and learn by doing. For example, an empowering approach applied during low- to moderate-severity trauma events resulted in greater learning by team members without compromising patient safety (Yun, Faraj, & Sims, 2005). Finally, a study by Shortell and colleagues found that when leaders engage in open and candid conversation with employees and provide them with adequate resources to act, safer outcomes result (Shortell et al., 1994).

Organizational practices themselves can enable patient safety by creating a structured, safe forum where threats to safety can be identified and resolved. For example, Virginia Mason Medical Center’s executives visit the front line and ask staff to describe specific events that prolonged hospitalization, caused a near miss, or compromised the efforts of people to do their work (Spear, 2005). The leaders then empower these same employees to act on safety issues through a patient safety alert process that makes it possible for any employee to immediately halt any process that’s likely to cause harm to a patient (Spear, 2005). Similar results were found in a study by Tucker et al. (2008), which showed that leaders enable safer actions by observing frontline work systems and conducting formal safety communication forums with frontline employees to highlight and prioritize safety concerns. The concerns that are revealed include threats such as difficulty contacting medical personnel, insufficient notice of patient-procedure schedule changes, redundant documentation, and unfamiliarity with procedures (Tucker et al., 2008). When frontline employees

are given broad decision-making authority within health care organizations, it creates a context for richer interactions that improve information quality (Preuss, 2003), cross-functional relationships (Friese, Lake, Aiken, Silber, & Sochalski, in press), and coordination (Gittell, Seidner, & Wimbush, 2010).

Enacting Safety Culture

As we explained earlier, enabling is to single out and draw attention to safety-relevant aspects of the larger organizational culture, and to create contexts that make it possible for people to translate these aspects into meaningful activities in their local health care routines. Enabling itself, however, is not sufficient to produce a safety culture. There must also be consistent translation, enactment, and reenactment of safety guidelines into meaningful practices by frontline employees (Reason, 1997). Putting the enabled safety focus into practice is crucial because frontline communication failures caused 70% of all preventable errors resulting in death or serious injury from 1995 to 2003 (JCAHO, 2004, cited in Baker, Day, & Salas, 2006). Communication failures include suppressing information to avoid appearing incompetent or offending those in power (Sutcliffe et al., 2004). Missing or withheld information means that frontline caregivers lack the tools to detect and make sense of an emerging threat to safety (Sutcliffe et al., 2004). It also means that frontline caregivers do not possess the information to pursue an alternate course of action that could enhance safety (Blatt et al., 2006).

Therefore, enacting a safety culture requires highlighting and accurately representing latent and manifest threats to safety and acting to reduce them. However, as noted earlier, accurate representation of threats is difficult because health care problems are often complex, vague, and dynamic, with pieces of information dispersed across many locations and parties (Pidgeon, 1997). The problem of representation is worsened by the fact that health care workers often fail to revise situation assessments once they are given new data (e.g., fixation errors; see Cook & Woods, 1994; Rudolph, 2003). To cut through these difficulties a richer picture of the threats to safety and their

implications for enactment can be produced through high levels of voice and mindful organizing. To enact a safety culture also means effectively and swiftly mobilizing resources to resolve threats. Actions that attempt to resolve threats often consist of individual workarounds that allow care delivery despite poor work systems (Tucker, 2004; Tucker & Edmondson, 2003), but truly resolving threats requires mobilizing the necessary resources to address their underlying causes (Faraj & Xiao, 2006; Tucker & Edmondson, 2003). Finally, the enactment of collective problem-solving and cross-functional coordination combines to heighten patient safety.

Highlight Threats to Safety

Enacting a safety culture relies on the willingness of frontline employees to disclose errors and near misses and to transmit their concerns upward in the organization (Carroll & Edmondson, 2002; Stern, Katz-Navon, & Naveh, 2008; Tangirala & Ramanujam, 2008). Unfortunately, health care professionals are reluctant to report errors, especially errors of commission³ (Henriksen & Dayton, 2006), due to fear of reprisal (Edmondson, 1996). For example, Blatt and colleagues (2006) found that medical residents spoke up in only 14% of reliability lapses (i.e., errors). Of even greater concern, residents spoke up only 39% of the time when there was a known, specific opportunity to prevent patient harm (Blatt et al., 2006).

When enabling conditions are present (e.g., psychological safety, safety climate, etc.), however, speaking up and listening have a stronger impact on quality of care and patient safety. First, when employees voice concerns it calls attention to latent and manifest errors, which then makes it possible to discuss, learn from, and collectively avoid these errors in the future (Edmondson, 1996). When conditions are such that frontline staff feel free to speak up, they report more errors (Naveh et al., 2006). Second, voice—an employ-

ee's expression of challenging but constructive ideas (Van Dyne & LePine, 1998)—provides the opportunity for ongoing process improvement. For example, perinatal units that encouraged employees to challenge operating routines in an orderly way had better safety performance and fewer malpractice claims (Knox, Simpson, & Garite, 1999). Orderly challenging means providing constructive feedback in the moment (e.g., a nurse speaking to prevent a physician from omitting steps in a procedure) that can prevent errors and minimize the impact of errors that do occur (Wilson, Burke, Priest, & Salas, 2005). Third, enacting voice provides a constructive foundation for fuller development of action. Consistent voice behavior in work units expands a repertoire of shared experiences regarding what works and what doesn't (Edmondson, 2003). In the dynamic context of emergency and operating room teams, voice also facilitates the free and open transfer of information necessary for coordinated real-time responses to unexpected events (Edmondson, 2003).

In addition to individual voice behavior, practices informed by mindful organizing enact greater patient safety. Field research on nearly error-free high-reliability organizations (e.g., nuclear power plants; see Schulman, 1993) has shown that mindful organizing proactively triggers actions that forestall and contain errors and crises. Mindful organizing forms a basis for frontline employees to interact continuously as they develop, refine, and update a shared understanding of the situation they face and their capabilities to act on that understanding (Weick & Sutcliffe, 2006; Weick & Sutcliffe, 2007; Weick, Sutcliffe, & Obstfeld, 1999).

Mindful organizing consists of five interrelated organizational processes—preoccupation with failure, reluctance to simplify interpretations, sensitivity to operations, commitment to resilience, and deference to expertise (Weick et al., 1999). Preoccupation with failure is an ongoing wariness that drives proactive and preemptive analysis of possible vulnerabilities and treats any failure or near miss as an indicator of potentially larger problems (LaPorte & Consolini, 1991; Weick & Sutcliffe, 2007). Reluctance to simplify interpretations means actively seeking divergent view-

³ An error of commission occurs as a result of action taken, such as a drug administered at the wrong time, in the wrong dose, or through the wrong route, or surgeries performed on the wrong site. In contrast, an error of omission occurs as a result of action not taken, such as a dose of medication that should have been administered, or a lapse in carrying out a procedure or process.

points that question received wisdom, uncover blind spots, and detect changing demands (Fiol & O'Connor, 2003; Schulman, 1993; Weick & Sutcliffe, 2007). Sensitivity to operations means creating and maintaining an integrated big picture of operations through ongoing attention to real-time information (Weick et al., 1999). A commitment to resilience involves ongoing enlargement of capabilities to recover from unexpected events. Such capabilities include greater skill at improvisation, learning, multitasking, and adapting (van Dyck, Frese, Baer, & Sonnentag, 2005). Lastly, deference to expertise occurs when decisions migrate to the people with the greatest expertise in handling the problem at hand, regardless of formal rank (Roberts, Stout, & Halpern, 1994).

Recent research in health care settings suggests that components of mindful organizing are common across efforts to enact a safety culture. In a multiyear qualitative study of a pediatric intensive care unit (PICU), Roberts and colleagues (2005; Madsen, Desai, Roberts, & Wong, 2006) found that introducing high-reliability practices led to a more integrated picture of operations in the moment and earlier detection of potential threats to safety. Staff members were constantly alert to the possibility that they had missed something (preoccupation with failure). Ongoing in-service training helped caregivers interpret and question data that appeared relevant to their working hypotheses (reluctance to simplify). Collaborative rounding by the entire patient care team created an up-to-date picture of potential threats to safety for each patient (sensitivity to operations). Frequent and inclusive postevent debriefings enlarged the repertoire of possible actions caregivers could take in the future to recover more quickly from unexpected events (commitment to resilience). Finally, decisions about patient care migrated to bedside caregivers who had more experience with a specific patient (deference to expertise). Together these ongoing enactments of mindful organizing were associated with infrequent patient deterioration on the unit, an exceptional achievement given the medical fragility of PICU patients (Madsen et al., 2006; Roberts et al., 2005). In a first quantitative study of mindful organizing, Vogus and Sutcliffe (2007a) found

that higher levels of mindful organizing were associated with fewer medication errors and patient falls over time. The detrimental effects of less mindful action are documented in an analysis of the cardiac unit of the Bristol Royal Infirmary, where shocking levels of excess deaths among infants forced a governmental inquiry (Weick & Sutcliffe, 2003).

Mobilize Resources to Resolve Threats

In addition to highlighting and accurately representing emerging threats to safety, people enact a safety culture by mobilizing the necessary problem-solving resources to address them. Effective problem-solving relies on a combination of preventive actions that avoid problems and adaptive actions that redress them. Problem-solving behaviors such as feedback-seeking and using a structured problem-solving process lead to the adoption of newer practices that improve safety and prevent future errors (Tucker, Nembhard, & Edmondson, 2007). For example, incorporation of problem-solving behaviors into standardized care protocols reduced threats to patient safety (Faraj & Xiao, 2006; Tucker, 2004). In the face of unexpected problems team members who reprioritize and shift tasks among team members to balance demands enact safer performance (Waller, 1999). Similarly, frontline caregivers who negotiate the uncertainty of their work through active help-seeking and joint problem-solving reduce negative consequences resulting from adverse events (Hofmann, Lei, & Grant, 2009). In treating trauma patients, quick mobilization of experts to assess reasonable approaches and relevant factors being missed resulted in more effective and safer care (Faraj & Xiao, 2006).

A safety culture needs to be enacted comprehensively across functions. Problem solving often occurs locally and within professional silos (e.g., nurses; see Hofmann et al., 2009), but care delivery is distributed and multifunctional (IOM, 2001). Errors and threats to safety often occur during handoffs between caregivers, caregiving units, or organizations (IOM, 2001). Therefore, enacting a safety culture requires that caregivers work to share information in a timely manner to align their understanding and coordinate action

across functions. Relational coordination is enacted when caregivers work smoothly across different functions under conditions of high interdependence, uncertainty, and time constraint (Crichton, Flin, & Rattray, 2000). Specifically, relational coordination entails action that promotes shared goals, shared knowledge, and mutual respect, which result in timely, problem-solving communication among team members (Gittell, 2006).⁴ In a series of studies conducted in orthopedics units (Gittell, 2002; Gittell et al., 2000; Gittell et al., 2010) and nursing homes (Gittell, Weinberg, Pfefferle, & Bishop, 2008), Gittell and colleagues found that relational coordination resulted in fewer missed signals among employees with different areas of functional expertise (Gittell et al., 2010). They also found that relational coordination produced more timely interventions in cases involving urinary tract infections, pressure sores, dehydration, and depression (Gittell et al., 2008). Gittell and colleagues (2000) also found that higher levels of relational coordination enhanced the perceived quality of care (also see Gittell et al., 2010), improved postoperative functioning, and reduced postoperative pain among orthopedic patients. Thus, units with high levels of relational coordination minimized postoperative complications. The positive effects were even stronger under conditions of high input uncertainty (i.e., the number patients with comorbid conditions and the number of comorbidities per patient) (Gittell, 2002).

Elaborating Safety Culture

To elaborate a safety culture is to enlarge and refine practices that were initially enabled and enacted in a cruder, narrowly defined, more tentative manner. To elaborate a safety culture is to evolve, expand, and enlarge the initial set of safer practices that were extracted from safety climates. Elaborating is often swept into the catchall activity of learning. We too talk about learning, but elaborating in a safety culture covers

more than learning. The nature of this “more than” is evident in the following description. The verb *elaborate* “distinctively stresses attention to detail and increasing complication by means of which the latent possibilities of a thing are more fully or completely developed” (Webster’s New Dictionary of Synonyms, 1984, p. 843).

Elaborating is a continuing effort to pinpoint subtle details, uncover capabilities that had gone unrecognized, develop these revealed capabilities, and increase tolerance for the complications that often accompany elaborating. When elaborating is focused on patient safety, two themes emerge: the centrality of reflection and the centrality of feedback.

Rigorously Reflect on Safety Outcomes

Ostensibly, reflection in health care organizations occurs in the context of the mortality and morbidity (M&M) conference. Unfortunately, M&M conferences have been ineffective vehicles for elaborating a safety culture and sometimes prevent learning (Bosk, 1979). In their study of teaching hospitals, Pierluissi and colleagues (2003) found that errors were mentioned in at most 34% of M&M conferences (with some hospitals as low as 10%) and even more rarely were discussed in detail. When errors were discussed the result was “shaming and blaming” of an individual for the error (Pierluissi, Fischer, Campbell, & Landefeld, 2003). M&M conferences reinforce not only the tendency to “shame and blame” but also individual accountability and individualized workarounds, both of which make it harder to sustain a safety culture. Fortunately, management research in health care settings has identified how to elaborate a safety culture through other structured learning practices such as after-event reviews (AERs).

AERs are collective guided investigations of past experience that direct learners to understand the specific causes of their failures and successes and derive performance-enhancing lessons from them (Ellis, Mendel, & Nir, 2006; Popper & Lipshitz, 1998). In other words, when people engage in AERs they elaborate experiential data, taking special note of unexpected failure, disruption, or significant differences between expectations and

⁴ Relational coordination differs from mindful organizing in two ways: 1) it is exclusively focused on cross-functional coordination, and 2) it focuses on normal coordinating processes with less explicit attention to coordination regarding errors and unexpected events.

reality (Ellis & Davidi, 2005). AERs have been studied in management research in such settings as the Israeli Air Force. The AER is most informative when it occurs immediately after the performance and includes all who took part in the (military) operation. Its structured format guides participants to construct jointly a comprehensive representation that integrates their individual interpretations (Ron, Lipshitz, & Popper, 2006). Elaborating is most fruitful when feedback is exchanged without defensiveness and when the review is continued until a shared understanding is achieved (Popper & Lipshitz, 1998; Ron et al., 2006).

Recent research has indicated that AERs can also be powerful vehicles for elaborating success, especially when success may be a “near failure” in disguise (Ellis & Davidi, 2005). When success is elaborated AERs probe the internal logic of the mental model of task performance in order to identify potential misfits between specific actions and the conditions under which the behaviors were executed (Ellis et al., 2006).

Hospitals have begun using the structure and process of AERs to elaborate safety practices (Vashdi, Bamberger, Erez, & Weiss-Meilik, 2007). For example, one surgical unit immediately follows every surgery with a debriefing session that analyzes whether the procedure met all its requirements and objectives and if there are lessons for subsequent operations (Vashdi et al., 2007). The elaborating questions include “what happened?,” “why did it happen?,” and “what can we learn from this so we can do it better next time?” Pisano, Bohmer, and Edmondson (2001) found that surgical teams who performed minimally invasive cardiac surgery (MICS) were more successful when they used team debriefing activities similar to AERs (i.e., explicit reflection).

The recurring point is that elaborating furthers patient safety when frontline employees reflect on small but important problems (e.g., having to correct someone else’s mistake, missing materials, inadequate staff, etc.). These reflections strengthen enabling and enacting when the resulting recommendations are communicated upward to managers and other people in positions to fix the systems (Tucker, 2007). In the IHI’s inter-

organizational collaborative, participating organizations use a structured learning practice called “Plan-Do-Study-Act.” The “study” step in this process entails reflectively elaborating results from small-scale enacted tests of safety modifications (Nembhard, 2009). In sum, AERs and related structured learning practices elaborate past performance in ways that refine that performance.

Use Feedback to Modify Enabling Practices and Enacting Processes

Structured learning practices also help to elaborate a safety culture by altering practices that enable and enact a safety culture. AERs reinforce behaviors such as voice and mindful organizing. AERs focus on failures and in doing so reinforce a preoccupation with failure. When people volunteer detailed accounts of what happened, this ensures a reluctance to simplify interpretations. Elaborating during an AER by definition is sensitive to operations, while it also makes for a more resilient response repertoire and greater clarity about the importance of expertise. Frontline system elaborations such as practices based on the five processes of mindful organizing reinforce voice and collective efficacy (Tucker, 2007). Finally, research on AERs has shown that elaborating lessons learned often diffuses throughout the organization (Ron et al., 2006).

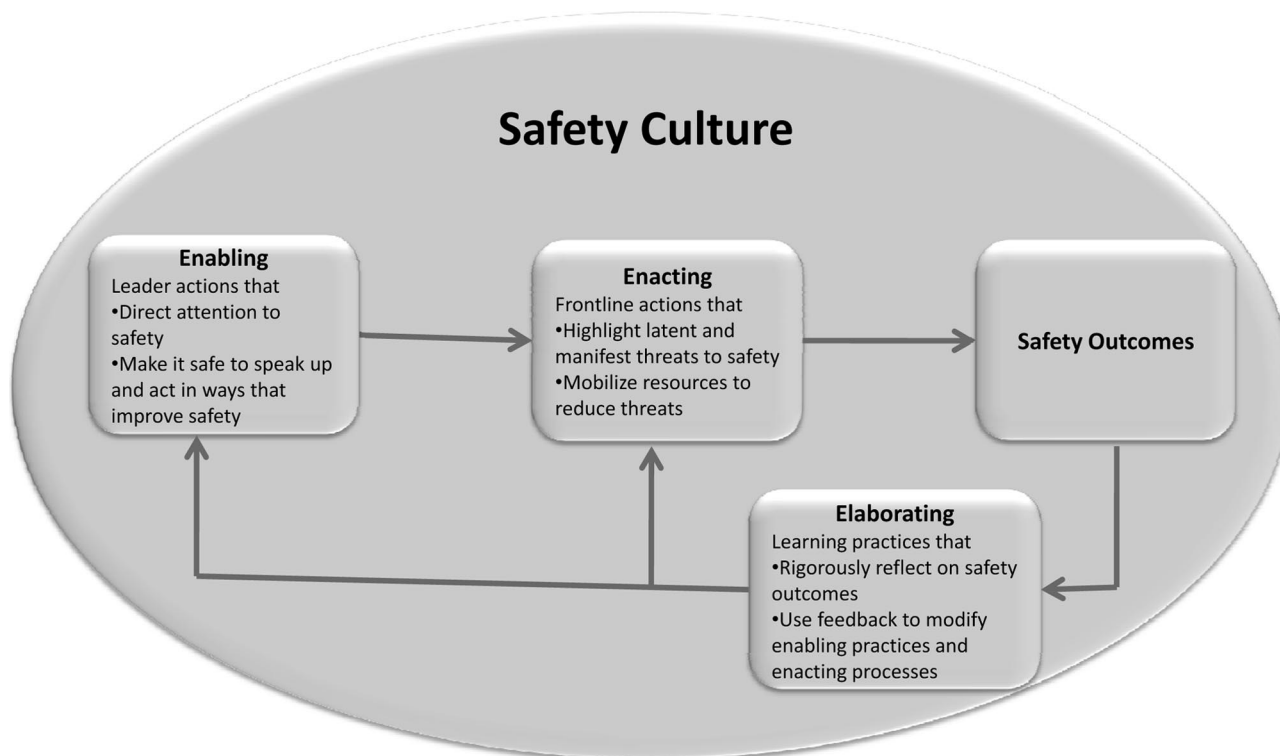
Elaborating by means of structured learning practices changes enactment through other mechanisms, too. For example, surgical AERs revealed and rectified behaviors that undermine safety culture such as failing to repeat and confirm orders as given and the head surgeon not providing team feedback (Vashdi et al., 2007). When MICS teams initiated the practice of structured debriefings, voice behavior increased, as did cross-functional communication during surgical procedures (Edmondson, 2003). Elaborating through structured learning also solved problems such as failing to start a procedure on time and allowing unsterilized materials into the operating room (Vashdi et al., 2007). Debriefing practices in MICS teams led to changes in how procedures and teams were structured (i.e., staffed), which then led to more success implementing MICS technology and improved safety (Pisano et al., 2001). The “doing”

stage of the IHI Plan-Do-Study-Act learning cycle has been elaborated into changes that helped reduce infections and adverse drug events (Nembhard, 2009).

Lastly, AERs can simultaneously reinforce and alter the practices enabling a safety culture. For example, AERs reinforce psychological safety by treating errors and near misses as legitimate inputs to learning (Lipshitz, Popper, & Friedman, 2002). At the same time AERs also produce a better understanding of acts that cannot be tolerated. Leaders accomplish this by implementing specific “red rules” that must be followed at all times. Deviation from these rules brings work to an immediate halt until compliance is achieved (Dekker, 2007). Not only do AERs clarify “never” acts formalized by “red rules,” they also create a context of greater accountability for leaders and peers. However, additional accountability does not mean additional “blaming and shaming,” but rather that repeatedly making the same mistake is not tolerated (Popper & Lipshitz, 1998). Figure 1 depicts the model outlined in the previous three sections.

It is important to note that the empirical research that provided the foundation for our review and model is derived from studies of inpatient hospital settings and, to a lesser extent, nursing homes (e.g., Gittell et al., 2008). This is an important boundary condition on our work in two ways. Neither our review nor the extant empirical literature on safety culture and patient safety captures the full spectrum of venues in which care is delivered. Casalino and colleagues (2003) found that the majority of medical care (70% to 80%) is provided by small groups of primary care providers. This omission is potentially important because it is unclear whether safety culture operates in the manner outlined above in small groups of primary care providers. In fact, there is insufficient empirical evidence to determine whether a safety culture, as such, is necessary in these practices, or whether the challenges to its development are similar to those in inpatient settings. To develop a more comprehensive theory of safety culture in health care, future work should examine small groups of primary care providers.

Figure 1
Enabling, Enacting, and Elaborating a Safety Culture



Emerging Issues for Safety Culture in Health Care: Where Do We Go From Here?

To expand beyond the traditional narrow approach to patient safety we have suggested an integrative framework based on management research to show how a more comprehensive safety culture can be enabled, enacted, and elaborated. We now discuss the implications of our proposal for future research on key issues such as efficiency-safety trade-offs, interactions among components of the framework, and feedback loops. In doing so, we reference additional strands of management research that can inform the study of safety culture in health care.

Managing Efficiency-Safety Trade-offs

A hallmark of a well-developed safety culture is that safety is given a higher priority than other organizational objectives (Schulman, 2004; Zohar, 2008). Safety in medicine, however, is complicated because medical harm tends to be individualized, distributed, and insidious (Schulman, 2004). Consequently, other values such as efficiency and cost control typically receive higher priority than they might otherwise (Schulman, 2004). In recent years efficiency and cost control have been elevated even further and in some organizations consistently draw attention away from quality and safety (Weinberg, 2003). Balancing the efficiency imperative and safety is a significant challenge, but one for which there is a solution embedded in our framework. Put simply, a crucial thread in a safety culture is that it facilitates learning. It is this thread of learning that holds the potential to address efficiency and safety simultaneously. For example, practices that enable a context where it is safe to speak up and act enhance teamwork, which produces both greater safety and greater efficiency. Leaders who carefully select their team members based on prior experience working together, have strong interpersonal skills, and keep their teams intact are able to implement new technologies more quickly, safely, and successfully (Edmondson, Bohmer, & Pisano, 2001; Pisano et al., 2001). In one noteworthy surgical team the surgeon leader conducted pre-surgery briefings during which the team discussed

the proposed procedure, a process that resulted in increased efficiency among team members (Edmondson et al., 2001). Similarly, organizational human resource practices that increase team stability and improve teamwork among frontline employees have been found to reduce the average length of patient stay (Gittell et al., 2010) and shorten procedure completion times (Reagans, Argote, & Brooks, 2005).

The processes associated with enacting a safety culture also produce efficiency gains by rectifying operational failures such as basic housekeeping activities. Operational failures impair efficient performance because they waste expensive resources (Tucker & Spear, 2006; Tucker, 2004). Voice provides timely information that facilitates detection and correction of impending operational failures (Stern et al., 2008) and the implementation of new technology (Edmondson, 2003). At the organizational level, relational coordination enhances efficiency by eliminating missing and erroneous information through frequent, timely, and accurate cross-functional communication (Gittell et al., 2000). Relational coordination allows care providers to jointly reprioritize their tasks in the face of operational failures. A series of studies in hospitals doing joint replacement surgeries demonstrated that relational coordination results in shorter lengths of stay and fewer readmissions (Gittell, 2002; Gittell et al., 2000; Gittell et al., 2010).

The structured learning practices that elaborate safety culture also improve efficiency by eliminating the underlying causes of operational failures. AERs generate representations of safety outcomes and then motivate the enactment of appropriate structures and processes (Vashdi et al., 2007). For example, this process can enhance efficiency by ensuring that surgeries begin at the scheduled time (Vashdi et al., 2007) or that new technology is adopted more quickly (Edmondson et al., 2001; Pisano et al., 2001).

Our review suggests that some practices and processes enhance both safety and efficiency, but pressures to trade off safety for efficiency persist. As a result we need research examining how leaders signal priorities, how employees perceive these signals, and how employees make sense of poten-

tially competing priorities in real time (e.g., Zohar, 2002). In health care an increasing emphasis on costs and revenue potentially jeopardize safety (Weinberg, 2003), as do narrow definitions of safety (Cook, 2005; Wears et al., 2005). The literature on process management suggests that ambidexterity—the ability to simultaneously explore and exploit—may reduce the need for trade-offs (O'Reilly & Tushman, 2008). Emerging evidence suggests that ambidexterity partially inheres in the paradoxical cognitions—embracing and balancing contradictory forces—of the senior leader or top management team (Smith & Tushman, 2005). This raises several questions for safety culture in health care: What type of visions integrate efficiency and safety concerns? How do top leaders go about reinforcing the integrated message? Is it possible for health care organizations to alter their design, processes, or incentives to effectively balance efficiency and safety?

Extending the Safety Culture Framework

Our framework posits that enabling and enacting a safety culture has both direct and indirect effects on safety outcomes. Emerging evidence suggests that enabling and enacting a safety culture may also operate interactively. For example, in a study of 73 hospital nursing units, Vogus and Sutcliffe (2007b) found that there were fewer medication errors over the subsequent six months in units where RNs reported high levels of trust in their nurse managers (i.e., these managers had created a sense of psychological safety) and high levels of mindful organizing. In addition, they found that extensive use of standardized care protocols paired with high levels of mindful organizing also resulted in fewer medication errors over time. In other research, when leaders created a strong situational learning orientation—an emphasis on improvement and actively searching for knowledge—paired with increasing employee autonomy or voice, treatment errors decreased at an increasing rate (Stern et al., 2008). These effects of learning behavior on treatment errors tend to be amplified when coupled with a moderate level of priority of safety (Katz-Navon, Naveh, & Stern, 2009).

The initial evidence for safety-enhancing in-

teractions between enabling practices and enacting processes suggests that this is a fruitful area for future research on safety culture. Research in strategic human resource (HR) management provides a useful model that shows how “bundles” of HR practices integrated with organizational policies (e.g., low inventory) and a complementary “organizational logic” (e.g., flexible production system) perform better (MacDuffie, 1995). Equivalent “bundling” might help to bridge traditional approaches to patient safety and the organizational approach advanced in this paper. One could, for example, explore the effects of interactions between the elements of enabling, enacting, or elaborating and the implementation of electronic medical records (Parente & MacCullough, 2009) or computerized physician order entry (Koppel et al., 2005) on safety.

More work is also needed to better understand how structured learning practices feed back to reinforce or change enabling practices and enacting processes. System dynamics research provides a methodology whereby such complex feedback processes can be modeled. For example, Repenning and Sterman (2002) illustrated how erroneous and inconsistent managerial and employee beliefs lead to increasing control and undermine performance improvement efforts. At the individual level, Rudolph, Morrison, and Carroll (2009) found that changing a course of action (i.e., enacting a safety culture) occurs through the serial consideration of plausible diagnoses that are accepted or rejected on the basis of the plausibility of new cues. Exploring these microdynamics in AERs or other structured learning practices is an important step for refining the proposed framework.

Management research on leader-member exchange (LMX), attributions, and safety in other industries provides directions for future research on safety culture in health care. Future work should consider how leaders can enable a safety culture through high-quality LMX relationships. In high-quality LMX relationships the leader and subordinate engage in collaborative sensemaking that produces a richer and more elaborate set of role behaviors to enact (Hofmann, Morgeson, & Gerras, 2003). High-quality LMX relationships

make it more likely that participants can expand role definitions to include additional safety tasks (Hofmann et al., 2003), increase commitment to safety, and foster open and constructive communication about safety and errors (Hofmann & Morgeson, 1999). Of special interest would be an answer to the question of whether high-quality LMX would expand role definitions sufficiently to ensure *system* safety as well as individual safety. An intriguing opening for further research on enabling is the finding that leaders who are personally committed to safety and give it a high priority have employees who are more likely to make internal attributions for safety incidents (i.e., incidents are seen as being more correctable) (Hofmann & Stetzer, 1998). But in contrast to other industries, internal attributions for safety incidents in health care settings may generate local workarounds or individual change when more systemic interventions are required. Further study of the attribution process for errors, near misses, and other threats to safety would deepen our understanding of the ways in which actionable representations of safety outcomes are produced.

Finally, in addition to LMX, future research should also consider the influence of the related, but distinct, concept of transformational leadership on role definitions and attributions. Transformational leadership is important to consider because prior research has found a strong effect for it on employee (e.g., satisfaction and commitment) and organizational (unit performance) outcomes in health care (Gilmartin & D'Aunno, 2007). Perhaps more important, Zohar and Luria (2004) found that the higher commitment to employee welfare characteristic of transformational leadership compensated for variability in managerial safety practices. It would be worthwhile to examine how transformational leadership works through or independently of LMX to enable safety culture.

Conclusion

Threats to patient safety persist despite the redefinition of some of these threats into a smaller set of problems that can be handled by available technology. Redefining problems so that they are solved by practices already in hand leaves

many threats unaddressed. Our conclusion is that these threats continue to exist because safer practices to manage them are not embedded in a binding safety culture. To embed safer practice is to enable, enact, and elaborate a coherent culture that sustains the salience and further development of these practices. Evidence suggests that these three processes solidify a safety infrastructure, incorporate triggers for improvement, and provide direction for how to balance efficiency and safety, bundle safety practices, create effective feedback loops, and incorporate additional safety research. They hold the promise of actions that do less harm.

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