

Context in Quality of Care

Improving Teamwork and Resilience

Daniel S. Tawfik, MD^{a,b,*}, John Bryan Sexton, PhD^{c,d}, Kathryn C. Adair, PhD^{c,d}, Heather C. Kaplan, MD^e, Jochen Profit, MD, MPH^{b,f,g}

KEYWORDS

• Safety climate • Teamwork • Quality • Burnout • Resilience

KEY POINTS

- Wide variation in neonatal intensive care unit quality of care exists, with differences in part attributable to variation in care context.
- Teamwork is an important driver of health care quality, and can be improved with established team-training tools.
- Individual resilience is a key contextual factor that may affect health care quality directly and indirectly via teamwork, and it can be coached.
- Improvements in teamwork and resilience are expected to enhance health care quality improvement initiatives.

INTRODUCTION

Improving the quality of health care is a substantial and widespread effort throughout the United States and the world, but patients continue to experience preventable harm on a daily basis.¹ Despite the variability in estimates of preventable deaths (ranging

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^a Division of Pediatric Critical Care Medicine, Department of Pediatrics, Stanford University School of Medicine, 770 Welch Road, Suite 435, Stanford, CA 94304, USA; ^b Lucile Packard Children's Hospital, 725 Welch Road, Palo Alto, CA 94304, USA; ^c Department of Psychiatry, Duke University School of Medicine, Duke University Health System, 2213 Elba Street, Durham, NC 27705, USA; ^d Duke Patient Safety Center, Duke University Health System, 2213 Elba Street, Durham, NC 27705, USA; ^e Department of Pediatrics, Perinatal Institute, James M. Anderson Centre for Health Systems Excellence, Cincinnati Children's Hospital Medical Center, 3333 Burnet Avenue, MLC 7009, Cincinnati, OH 45229, USA; ^f Perinatal Epidemiology and Health Outcomes Research Unit, Neonatology, Division of Neonatal and Developmental Medicine, Department of Pediatrics, Stanford University School of Medicine, Stanford University, 1265 Welch Road, MSOB, MC: 5415, Stanford, CA 94305, USA; ^g California Perinatal Quality Care Collaborative, 1265 Welch Road, MSOB, MC: 5415, Stanford, CA 94305, USA

* Corresponding author. Division of Pediatric Critical Care Medicine, Department of Pediatrics, Stanford University School of Medicine, 770 Welch Road, Suite 435, Stanford, CA 94304.

E-mail address: dtawfik@stanford.edu

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from 25,000–250,000 per year in the United States alone), it is clear that mortality from medical error remains a serious problem.^{2–4} Furthermore, nonfatal medical errors have been found to occur millions of times yearly.¹ Adults and children receive recommended care only about half the time,^{5,6} with premature infants cared for in neonatal intensive care units (NICUs) experiencing similar variations in use, quality of health care, and in clinical outcomes.^{7–10} For example, health care–associated infection rates,^{11,12} growth velocity,¹³ and treatment of persistent pulmonary hypertension¹⁴ vary considerably. Up to 3-fold differences in mortality⁹ and up to 44-fold variation in antibiotic use have been observed among NICUs.¹⁵

This observed variation in care is not merely a function of discrete differences in patient risk factors and care process guidelines but is an expression of differences in care contexts, which includes the contribution of each individual as well as the team. High-quality health care delivery is inherently reliant on providers maintaining individual excellence and working together effectively as a team. Poor teamwork and communication have been implicated in up to 72% of perinatal deaths and injuries and up to 30% of voluntary error reports.¹⁶

CONTEXT-SENSITIVE QUALITY OF CARE

The current challenges inherent in health care need not serve as discouragement for achieving marked improvement in quality and safety, but emphasize the importance of thinking broadly about creating a context, or environment, that supports quality and safety at the sociopolitical, organizational, mesosystem, microsystem, and team levels as opposed to tackling 1 problem at a time.^{1,17,18} Numerous models and frameworks have been proposed to help policy makers, organizational leaders, and frontline staff create a context that supports quality and safety.

One framework designed to address the role of context in quality and safety is the Model for Understanding Success in Quality (MUSIQ), which describes 25 contextual factors across all levels of the health care system that are likely to influence the success of quality improvement (QI) endeavors, as shown in [Fig. 1](#).¹⁹ Although they are interconnected, most of the factors described are in the realm of microsystem (team members), macrosystem (organizational), or environment (community and society). MUSIQ suggests that the ability to achieve improvements in quality and safety is a result of the supporting context, including such factors as organizational and microsystem leadership, data infrastructure, QI culture, resource availability, workforce development, staff capability for QI, and team composition and effectiveness (both the QI team and microsystem team).

Another framework that highlights the important role of context in safety is the idea of the high-reliability organization (HRO) developed by Weick and Sutcliffe.¹⁸ The HRO concept was originally applied to highly complex and high-risk industries, including aviation and nuclear power, but the principles are insensitive to the specific field in which they are applied, including in health care. HROs share 5 core characteristics: sensitivity to operations, reluctance to simplify, preoccupation with failure, deference to expertise, and resilience, as shown in [Fig. 2](#).²⁰ Key contextual factors must be in place for an organization to develop as an HRO, including strong organizational leadership, a culture of safety and teamwork, and resilience.

Both of these models identify engagement of team members as a key aspect of context supporting quality and safety and the engagement of team members has been described as one of the significant factors predicting success in QI endeavors.²¹ Common to both models is an emphasis on seemingly intangible features of organizational life: the relentless pursuit of better care undergirded by a culture that prizes

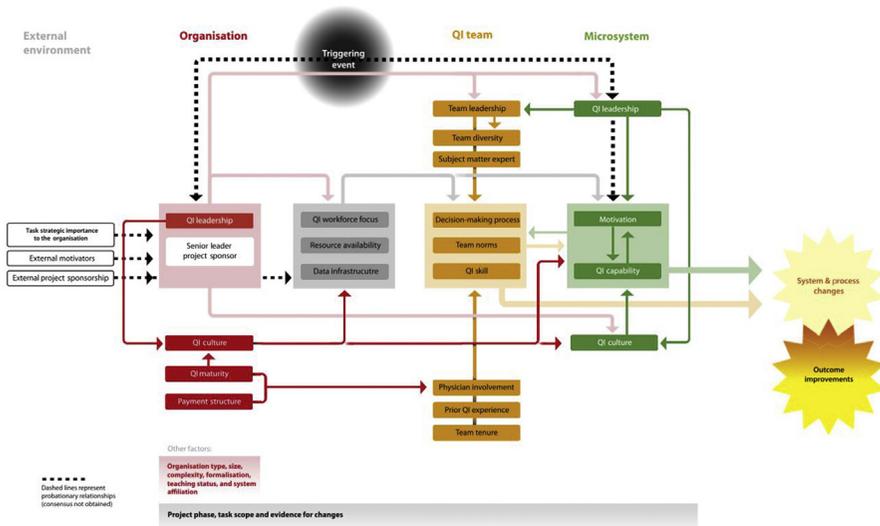


Fig. 1. MUSIQ, showing the contributions of organizational (red), macrosystem (orange), and microsystem (green) factors. (From Kaplan HC, Provost LP, Froehle CM, et al. The model for understanding success in quality (MUSIQ): building a theory of context in healthcare quality improvement. *BMJ Qual Saf* 2012;21(1):17; with permission.)

patient safety. The shared perceptions of leadership and the organizational attitudes toward patient safety and QI reflect the prevailing culture. The culture of safety construct is primarily measured based on health worker perceptions via surveys. The measured domains are called climates (ie, teamwork climate or safety climate). Climate reflects that perceptions are shared among health workers, meaning that they cluster more strongly within a work unit (eg, the NICU) than between work units

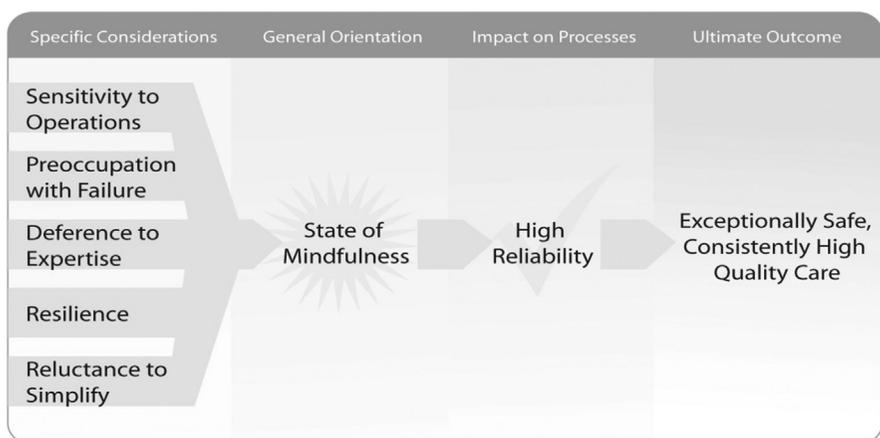


Fig. 2. The 5 specific concepts that help create the state of mindfulness needed for a high-reliability organization. (From AHRQ Publication No. 08-0022. Agency for Healthcare Research and Quality. 2008. Available at: <https://archive.ahrq.gov/professionals/quality-patient-safety/quality-resources/tools/hroadvice/hroadvice.pdf>. Accessed December 27, 2016.)

either in the same institution (NICU vs PICU) or work units in other institutions (NICU in hospital A vs NICU in hospital B).²² Two key subfactors of safety culture that affect health worker and patient well-being are teamwork and resilience, which are reviewed in detail here.

TEAMWORK IN THE NEONATAL INTENSIVE CARE UNIT

Across health care, improving teamwork has been recognized as an ongoing challenge. Moving from a team of experts to expert teams requires skills and training not often provided through traditional education. Paul Schyve,²³ MD, Senior Vice President of the Joint Commission stated, “Our challenge ... is not *whether* we will deliver care in teams but rather *how well* we will deliver care in teams.” Although continually under development and refinement, teamwork measurement and intervention tools have been growing in concert with an increased emphasis on teamwork’s role in health care delivery.

Salas and colleagues²⁵ identified 7 principal components relevant to teamwork: (1) cooperation, which depends on mutual trust and team-oriented mindset; (2) coordination, which requires shared performance monitoring, adaptability, and support; (3) communication, which must be clear, precise, and timely; (4) cognition, which refers to a shared understanding of roles and abilities of teammates; (5) coaching, which refers to team leadership, recognizing the importance of clear expectations; (6) conflict, the resolution of which is highly dependent on interpersonal skills and a climate of psychological safety; (7) conditions, which refers to the requisite supportive context for teams, because teamwork must be perceived as important to the leadership, and with positive reinforcement for good performance.^{24,25}

Within a health care delivery unit, these factors interplay to create a composite climate of teamwork, which can vary widely across settings. Several tools exist to estimate the teamwork climate of a unit, including the Safety Attitudes Questionnaire (SAQ), Team Emergency Assessment Measure, Fundamental Interpersonal Relations Orientation–Behavior, Hospital Survey on Patient Safety Culture, and Team Climate Inventory.^{26,27} Common to each of these measurement tools is an emphasis on the interpersonal interactions and adaptability of the team members. For example, the teamwork climate scale of the SAQ represents a composite measure of the extent to which caregivers report that they think they are supported, can speak up comfortably, can ask questions, think that input is heeded, think that conflicts are resolved, and think that team members collaborate.²⁸

Profit and colleagues²⁹ and Sexton and colleagues³⁰ reported the SAQ to be valid and useful for assessing individual team work in addition to the overall teamwork climate in the NICU setting. Similar to other critical care settings,³¹ physicians in the NICU have been found to have higher perceptions of teamwork than nurses, nurse practitioners, and respiratory care providers.³² Physicians may be in leadership roles more frequently, resulting in the potential to elevate the physician’s own perspective of adequate teamwork, even though the teamwork climate is weak in a given setting. It is unclear whether this difference is secondary to personal characteristics, professional responsibilities, or other unmeasured factors, but it has implications for the overall functioning of the NICU. Personal attributes, reputation, expertise, and seniority have been found to affect the ability of critical care providers to work together effectively.³¹

However, neither individual teamwork perception nor teamwork climate are static. Interventions focused on improving the teamwork of a health care unit include generalized training courses, such as crew resource management^{33,34}; task-specific

training^{35,36}; or the implementation of process checklists.³⁷ A meta-analysis of 93 team training interventions showed consistent moderate improvements in teamwork measures, with more pronounced benefits seen following training programs combining generalized and task-specific approaches.³⁸ Within pediatric residency training, Thomas and colleagues³⁵ reported that randomization to a teamwork-based neonatal resuscitation curriculum results in up to 3-fold higher use of teamwork behaviors among interns compared with standard training, and that benefits can persist for at least 6 months.³⁶

Across NICUs, teamwork climate has been found to vary widely.³² Providing excellent care consistently throughout the clinical spectrum, from routine rounds to high-intensity resuscitations, relies on the adaptability of team members. NICUs with low teamwork climate may struggle to anticipate or adapt to changing clinical needs. However, teamwork is a malleable construct and interventions to improve teamwork are available. Although many of the teamwork interventions with measurable benefits reported in the published literature have focused on task-specific training for particular situations, such as surgical procedures or neonatal resuscitation, the same teamwork principles have relevance for all forms of neonatal health care delivery. Although the benefits are more challenging to quantify, system-wide generalized training may support teamwork within NICUs to a greater extent than task-specific training.³³

To target system-wide benefit, The Agency for Healthcare Research and Quality has developed a teamwork tool kit in conjunction with the US Department of Defense. Named Team Strategies and Tools to Enhance Performance and Patient Safety (TeamSTEPPS), the intervention includes assessment, training, and sustainment phases focused on 4 core competencies: (1) team leadership, (2) situation monitoring, (3) mutual support, and (4) communication.³⁹ This approach has been used in multiple health care settings,^{40,41} including one reported intervention that included NICU providers and showed an improvement in perceptions of teamwork.⁴² Despite the heterogeneity of personal contributions, individual teamwork perception and teamwork climate are inextricably linked. The growing body of evidence regarding the ability to improve teamwork climate lends support for improved teamwork as a critical target of QI initiatives.

BURNOUT AND RESILIENCE IN THE NEONATAL INTENSIVE CARE UNIT

Another key contextual factor that may influence quality of care is provider burnout. Burnout describes a condition of fatigue, detachment, and cynicism resulting from prolonged high levels of stress.⁴³ In the critical care setting, burnout rates are likely driven predominantly by high workload, frequent changes in technology and guidelines, endeavors for high-quality care, and emotional challenges of dealing with critically ill patients and their families.^{44–47} Burnout affects 27% to 86% of health care workers,^{48–51} with more than half of physicians reporting moderate burnout⁵² and around one-third of nurses and physicians meeting criteria for severe burnout.^{48,53} The most commonly used instrument to measure burnout is the Maslach Burnout Inventory,⁵⁴ portions of which have been validated in multiple settings, including labor and delivery units and the NICU.^{30,55} The emotional exhaustion subset has been used in isolation to provide a rapid assessment of an individual's burnout, consisting of 4 prompts: (1) I feel fatigued when I get up in the morning and have to face another day on the job, (2) I feel burned out from my work, (3) I feel frustrated by my job, and (4) I think I am working too hard on my job.⁵¹ Responses to these questions, which cluster in the neutral or affirmative range, have been used as a marker for burnout.⁴³

In contrast with burnout, resilience has been defined as a combination of characteristics that interact dynamically to allow an individual to bounce back, cope successfully, and function better than the norm in spite of significant stress or adversity.^{43,56} Resilience has primarily been measured in the context of burnout avoidance. However, several key characteristics have been identified as directly contributing to resilience in qualitative research. These characteristics include optimism, adaptability, initiative, tolerance, organizational skills, being a team worker, keeping within professional boundaries, assertiveness, humor, and a sense of self-worth.⁵⁶

Although often expressed as separate entities, the interpersonal aspects of resilience and teamwork are closely linked. Many of the characteristics identified as contributory to personal resilience are conceptually linked to those promoting a positive teamwork climate. Profit and colleagues⁴³ reported a negative association between burnout and teamwork climate among a large cohort of NICU providers, with the strongest association seen among providers reporting high levels of job frustration. In the same study, the proportion of NICU providers reporting low or very low burnout symptoms, calculated as the resilient proportion, was significantly associated with several domains relevant to quality. Strong correlation coefficients with teamwork climate (0.60), job satisfaction (0.65), safety climate (0.51), perceptions of management (0.61), and working conditions (0.53) were all highly significant.⁴³ A similar association has been observed in the pediatric ICU, with Lee and colleagues⁵⁷ describing a 7% increase in teamwork climate perception among providers with moderately high or high resilience scores.

The specific individual characteristics expected to drive these associations include adaptability, organizational skills, and a team-focused mindset, because these each carry profound implications for team functioning. Each individual's daily experience is an amalgamation of interactions that can each have positive or negative effects, creating a cumulative tide that may become substantial when taken in sum. Compared with smooth and coordinated interactions, effortful and inefficient interactions have been found to reduce self-regulation and performance on subsequent tasks.⁵⁸ As shown in Fig. 3, burned out individuals may be more prone to isolation, because they may have negative experiences with teamwork secondary to challenging interpersonal interactions. These negative interactions then drive further isolation and result in a positive feedback loop, resulting in escalating levels of burnout. Downward spirals in teamwork can have serious consequences; for example, nurses who

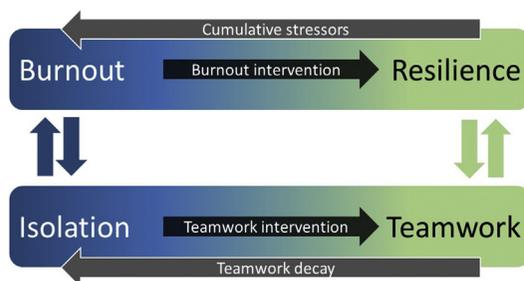


Fig. 3. Relationship of the burnout-resilience continuum to the isolation-teamwork continuum. Burnout requires active intervention to achieve resilience, but can regress as the result of cumulative stressors. Similarly, isolation can be transformed to teamwork with interventions, but is prone to decay over time. Burned out individuals show reciprocity with isolated climates, but a positive teamwork climate can show positive feedback with resilience through affirmative interactions.

reported a serious lack of good teamwork had a 5-fold risk for intending to leave the profession.⁵⁹

However, the converse also follows, with individuals showing higher resilience being more prone to positive teamwork interactions, which in turn feeds back to further improved resilience.⁶⁰ A qualitative study found that newly graduated nurses highlighted the importance of having nourishing interactions and good teamwork as integral to building workplace belongingness and staff empowerment.⁶¹ The effects of better teamwork for resilience are just part of a large, overarching body of evidence that social connectedness significantly predicts better mental and physical well-being, and even lower rates of mortality.⁶²

Burnout is a reversible condition, and resilience can be coached. Several strategies relevant to the health care setting have been developed to combat burnout and promote resilience. However, these strategies, such as mindfulness practice, are often time consuming and pragmatically challenging to administer.^{63–66} Brief, widely distributable burnout interventions based on mindfulness strategies are currently being prospectively evaluated in multiple settings, including the NICU, with good benefit seen in pilot studies. The interventions focus on expressing thankfulness (gratitude), dwelling on positive events (3 good things), structured cultivation of awe and wonder (awe), random acts of kindness, identifying personal gifts (signature strengths), and relationship resilience. Profit and Sexton⁶⁷ have combined these interventions into a short resilience program called Web-based Implementation of the Science for Enhancing Resilience, which is funded by the National Institutes of Health for testing.

TEAMWORK-DRIVEN AND RESILIENCE-DRIVEN QUALITY IMPROVEMENT

Conceptually, improvements in teamwork climate and individual resilience can be expected to significantly contribute to improved quality of care. A single-center study by Rahn⁶⁸ reported a negative association between nursing teamwork and unassisted patient falls on a medical/surgical unit. Within the NICU setting, teamwork has been negatively associated with health care–associated infections among a diverse cohort of California NICUs, such that the odds of an infant contracting an infection decreased by 18% with each 10% increase in NICU survey respondents reporting good teamwork.⁶⁹

In contrast, improvements in teamwork have been associated with reduced medication errors, decreased health care–associated infections,^{70,71} and higher-quality newborn resuscitation.³⁵ Neily and colleagues⁷² reported an 18% reduction in surgical mortality following implementation of team-based surgical checklists at Veterans' Affairs hospitals. In Michigan ICUs, Pronovost and colleagues^{70,71} reported an 80% reduction in catheter-related bloodstream infections with the simultaneous introduction of a teamwork/unit safety intervention and an infection prevention intervention.

The association between provider resilience and quality of care has been largely unreported, but there is an increasing body of literature regarding burnout in relation to quality measures. A meta-analysis by Salyers and colleagues⁷³ evaluated 82 studies and reported a small to moderate negative association between provider burnout and quality of care measures, with 7% of quality measure variance and 5% of safety measure variance attributed to provider burnout. Notably, Aiken and colleagues⁷⁴ reported an observed 7% increase in patient mortality and 23% increase in the odds of nurse burnout for each additional patient added to a nurse's workload. Expounding on this work in multivariable analyses, Cimmiotti and colleagues⁷⁵ reported that burnout carries a stronger association with health care–associated infections than does nurse staffing, with each 10% increase in burnout prevalence corresponding with 0.8 urinary tract

infections and 1.6 surgical site infections per 1000 patients. Specific to neonatology, Tawfik and colleagues⁵¹ reported a moderate correlation ($r = 0.34$) between health care worker burnout and increased rates of health care-associated infections among very-low-birthweight infants in high-volume NICUs in California, which was most pronounced among providers reporting feeling fatigued or overworked.

It remains to be proved that longitudinal increases in resilience can result in observable improvements in quality of care. However, the strength of associations repeatedly observed between high burnout and adverse events suggests that this domain of the quality microclimate is an appropriate target for QI endeavors.

SUMMARY

With the continued increasing recognition of the need for QI in health care, consideration of the context of the health care delivery system is of paramount importance. Aspects of context, including teamwork climate and personal resilience, are important factors in achieving optimal quality and safety outcomes and efforts to modify these aspects of context (eg, improve teamwork climate, build staff resilience) are a key QI strategy. Well-established tools, such as TeamSTEPPS, are available to improve teamwork for specific tasks or global applications. Similarly, burnout and, by extension, resilience, can be modified with specific interventions, such as cultivating gratitude, positivity, and awe. A growing body of literature has shown that teamwork and burnout relate to quality of care, with improved teamwork and decreased burnout expected to produce improved patient quality and safety metrics.

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