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PUSHING THE BOUNDARIES: MULTITEAM SYSTEMS IN RESEARCH AND PRACTICE

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IMPROVING PATIENT SAFETY AND CARE QUALITY: A MULTITEAM SYSTEM PERSPECTIVE

Sallie J. Weaver, Xin Xuan Che, Peter J. Pronovost, Christine A. Goeschel, Keith C. Kosel and Michael A. Rosen

ABSTRACT

Purpose – *Early writings about teamwork in healthcare emphasized that healthcare providers needed to evolve from a team of experts into an expert team. This is no longer enough. As patients, accreditation bodies, and regulators increasingly demand that care is coordinated, safe, of high quality, and efficient, it is clear that healthcare organizations increasingly must function and learn not only as expert teams but also as expert multiteam systems (MTSs).*

Approach – *In this chapter, we offer a portrait of the robust, and albeit complex, multiteam structures that many healthcare systems are developing in order to adapt to rapid changes in regulatory and financial*

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pressures while simultaneously improving patient safety, quality, and performance.

Findings and value – *The notion of continuous improvement rooted in continuous learning has been embraced as a battle cry from the boardroom to the bedside, and the MTS concept offers a meaningful lens through which we can begin to understand, study, and improve these complex organizational systems dedicated to tackling some of the most important goals of our time.*

Keywords: Health services administration; patient safety; quality improvement; leadership; coordination; role clarity

> ... they ran some lab work and came back right away, and said "Kidney problems." And before I knew it, I was involved and thrown into this six months of tests and trials and tribulations with six doctors across two hospitals in this clash of medical titans to figure out which one of them was right about what was wrong with me. And I'm sitting in a waiting room some time later for an ultrasound, and all six of these doctors actually show up in the room at once, and I'm like "uh oh, this is bad news." (Dishman, 2013)

The United States is undoubtedly entering a new age in which healthcare is no longer valued singularly on the quantity of care provided. Moving toward a model that embraces quality, safety, and patient outcomes on increasingly equal footing with quantity, however, requires embracing new identities, new processes, and new structures that connect often highly disparate care providers, care organizations, accreditation, and regulatory bodies. For example, the Centers for Medicare & Medicaid Services (CMS) Accountable Care Organization (ACO) model explicitly aligns payment structures with quality, safety, and other outcome metrics in an attempt to enhance care coordination among hospitals, groups of physicians, and other care providers for some of our nation's most chronically ill patients (Centers for Medicare & Medicaid Services, 2013). Additionally, payment structures for both acute care organizations (e.g., hospitals) and chronic care facilities (e.g., outpatient hemodialysis centers) increasingly include elements of care quality and safety. This means that many care organizations have significantly developed their efforts to learn from real or potential errors, near misses, glitches, or defects in order to effectively mitigate

and manage less than optimal patient outcomes. To do this, many organizations have developed robust, and albeit complex, structures or systems for improving patient safety, quality, and performance. To this end, the notion of continuous learning has been embraced as a battle cry from the boardroom to the bedside, without a great deal of reflection on how such learning can occur effectively in complex team environments. Early writings about teamwork in healthcare emphasized that healthcare needed to move from a team of experts to an expert team (Burke, Salas, Wilson-Donnelly, & Priest, 2004). This is no longer enough. As patients, accreditation bodies, and regulators increasingly demand that care is coordinated, safe, of high quality, and efficient, it is clear that healthcare organizations increasingly must function and continuously learn not only as expert teams but also as expert multiteam systems (MTSs).

In this chapter, we draw on the notion and definition of an MTS as a hybrid organizational form designed to enable complex and highly specialized teams (and we posit to more effectively incorporate more loosely organized groups as well) to coordinate, communicate, and cooperate in the name of shared superordinate goals (Davison, Hollenbeck, Barnes, Sleesman, & Ilgen, 2012). Under the shared superordinate goals of reducing preventable patient harm and optimizing care quality, both acute and non-acute care organizations have attempted to adapt their committee and governance structures to simultaneously facilitate informal learning and a just, relatively nonpunitive response to glitches, errors, and system defects (Rosen, Weaver, & Goeschel, 2013). In this way, efforts to improve care processes and patient outcomes are increasingly the work of MTSs in healthcare. In this chapter, we offer an example of such an MTS working to reduce the risk of preventable patient harm. The MTS we describe integrates elements observed across a cadre of suburban and rural U.S. acute care facilities participating in the CMS Partnership for Patients, a national public–private partnership aiming to decrease preventable hospital-acquired conditions by 40% and readmissions by 20%, as well as our own health system and other national leading organizations who have achieved significant gains in patient safety and care quality. We want to emphasize that the example which we offer below is not designed to reflect an "ideal" system or to describe configurations and processes as they "should be." Rather we offer descriptive examples of MTSs "in the wild." These examples have been culled from observations, interviews, and focus groups in various organizations and detail how healthcare organizations are increasingly moving toward MTS models in order to provide safer, more effective, and more efficient care for all.

BACKGROUND

Despite growing public awareness that care safety and quality could stand to improve, large Federal and local organizational investments in improving health services delivery, and employing a workforce that is proportionally among the most highly educated across a range of industries, patients continue to be harmed in a system whose ultimate goal is to improve their health. Recent findings based on studies published between 2008 and 2011 estimate that nearly 210,000 deaths per year in the United States are associated with hospital-acquired conditions or harm (James, 2013). Furthermore, best available estimates based upon reviews of acute care patient records suggest that 14–21% of records contained evidence of at least one serious adverse event (i.e., an event or unintended effect that contributed to a prolonged hospital stay, serious harm, or death) (Classen et al., 2011; Landrigan et al., 2010). Understanding how this type of harm can be mitigated and managed has thus been increasingly integrated into the strategic work of healthcare organizations and the daily work of healthcare providers over the past 15 years. Changes to regulatory and financial reimbursement structures since 2008 (and continuing into 2015 and beyond) continue to further reinforce motivation to reduce preventable harm and improve care integration. For example, Medicare and Medicaid, the two largest U.S. payers, have continued to reduce reimbursement for hospital-acquired conditions and many private insurers have instituted similar policies. Contextually, this is also in an industry where approximately 28% of organizations had a negative operating margin in 2011 (American Hospital Association, 2013). As such, healthcare organizations, the clinicians, and the staff that comprise them are ethically and, increasingly, strategically motivated to optimize care safety and quality.

For many this has meant developing or reconfiguring aspects of their organizational structure and processes in order to (1) quickly surface glitches, defects, or potential risks that have resulted in unintended consequences or which could potentially lead to patient harm; (2) to develop and enforce a system that holds leaders, clinicians, and staff from highly diverse professional backgrounds accountable for improving care processes and outcomes; and (3) build capacity or expertise in doing patient safety and quality improvement (QI) work. While many clinicians and organizational leaders demonstrate incredible enthusiasm to embrace rapid advances in clinical science and treatment advances, healthcare organizations have not historically been characterized by agility or rapid innovation when it comes

to organizational structures or decision-making processes. External changes to financial payment structures, increasing patient choice and empowerment coupled with increasing transparency, however, require innovative approaches to aligning the work of multiple teams in order to efficiently respond to such continuously evolving environmental contingencies and accomplish overarching collective goals, two hallmarks of MTSs (Mathieu, Marks, & Zaccaro, 2001). This means uniting the efforts, goals, and tempo of teams with their own proximal goals from the bedside to the boardroom under the often effusive goal of "continuous improvement."

Furthermore, this also means empowering, motivating, and co-leading teams of highly educated, experienced, and historically fiercely autonomous individuals. Improving safety and quality depends upon implementation and sustainment of leading evidence-based practices, as well as effective teamwork at the bedside, and effective communication, cooperation, and coordination among teams across the organization. The extensive social science literature on teams, organizational development, and leadership, as well a nearly two decades of work examining performance improvement methods in healthcare, undoubtedly demonstrate that technical interventions to improve care, such as checklists, are only effective to the extent to which they are perceived as valuable, used reliably, and reinforced by colleagues, peers, and leaders. Change efforts demonstrate effectiveness only when motivated clinicians own them, invite and appreciate contributions of other team members, and commit to holding their peers and fellow team members accountable for reliably demonstrating new behaviors through social norms and modeling (Nembhard & Edmondson, 2006; Pronovost, 2011). Additionally, theory and empirical evidence underscore that management support, an organizational climate that promotes creativity, and investment of time and resources are crucial for effective organizational innovation or change (Alexander, Weiner, Shortell, Baker, & Becker, 2006; Klein & Sorra, 1996). To this end, an MTS whose overarching goal is to improve the safety and quality of care delivery must include component teams of different types across multiple organizational levels (Buzachero, 2013). While unit-based teams of front-line care providers can implement local changes (e.g., utilize a new checklist or algorithm for catheter insertion, maintenance, and removal) and effect outcomes in their work area (e.g., improve their local central-line associated bloodstream infection rate), they must be supported by and work collaboratively with organizational-level teams responsible for understanding patterns of risk or similarities in improvement efforts across different work areas in order to move organizational-level

outcomes. Organizational-level improvement teams must stay abreast of often rapidly fluctuating contextual factors, including financial risks and changes to both private and national payment structures, regulatory risks, market share considerations, and consumer trends. Organizational-level improvement teams must also use information garnered from the efforts of individual units to guide broader improvement efforts, as well as negotiate with governance committees. Increasingly, these organizational-level teams must also collaborate with others at a health system level in order to align system resources and foster cross-organizational learning.

A "FRACTAL" MULTITEAM SYSTEM EXAMPLE

Given this complexity, one type of MTS structure adopted to address patient safety and QI draws on the notion of a fractal (Pronovost et al., 2013). Mathematician Benoit Mandelbrot coined the term "fractal" to describe geometric patterns of organization observed in nature in which a larger pattern or shape is comprised of relatively identical patterns or shapes of increasingly smaller sizes (Mandelbrot, 1983). Ferns are a common example of a fractal in that each fern leaf is smaller in size, but similar in shape to the larger fern frond. Fractals are represented in many structures including snowflakes, the rings that comprise tree trunks, the vessels in the heart, and the branches of the lungs, in which relatively simple structures are recursive, that is, they are replicated again and again at multiple levels to form the complex array that is the entire object (Barnsley, 2013). Interestingly, fractals are thought to be the product of continuous iteration, meaning that they are produced by feedback loops in which the output of previous or smaller iterations is fed back into the overall system continuously (Barnsley, 2013; Mandelbrot, 1983). As such, "fractal" organization models have been proposed as one strategy for building resilience and the capacity for quick adaptation to changing environmental contingencies (Hoverstadt, 2008; Morel & Ramanujam, 1999). In healthcare, such models have been implemented in the form of teams-of-teams working together toward shared goals of optimizing the quality and safety of care delivered. Accomplishing this requires multiple teams to work interdependently, as well as effective boundary spanning, integration, shared leadership, and effective entrainment. In organizations that operate as part of a larger health system this also means that teams interact with and share with other teams that are

external to their home organization. We subsequently offer a descriptive, integrative example of one such MTS.

Structure, Roles, and Processes

Table 1 outlines examples of the different component teams or groups which may comprise such an MTS. The system as a whole shares three overarching goals: (1) to optimize patient outcomes, (2) to optimize patient care experience, and (3) to eliminate preventable harm. In this example, 13 types of component teams are listed; however, it is important to realize that there may actually be several different teams of each type in a given organization. For example, Johns Hopkins Hospital alone has over 40 active Comprehensive Unit-Based Safety teams (CUSP teams); multidisciplinary teams of care providers and administrators that jointly work to identify local opportunities for continuous improvement and eliminate preventable hospital-acquired harms such as central-line associated bloodstream infections (CLABSI) (Pronovost et al., 2006; Timmel et al., 2010).

Such unit-based or work area-based teams tend to be more internally focused (i.e., focused proportionally more on their own proximal component team goals relative to other teams that make up such an MTS); however, they form the foundation for improvement-oriented work given that they are comprised of practicing clinicians who carry out daily care. They monitor their own unit's performance on metrics related to the three overarching goals of the MTS and use this information to help guide and evaluate their improvement efforts. These unit-based teams work in concert with departmental or divisional teams to share their work and creative ideas with other units in their department. Their members may also participate in hospital-wide teams focused on a particular patient outcome or potential harm areas (e.g., a hospital-wide team dedicated to reducing and preventing patient falls).

At the organizational level, separate teams may exist which explicitly focus on developing policy and processes related to each of the overarching goals of the MTS, as well as measuring and monitoring performance on quality and safety metrics across all areas of the organization. For example, a clinical QI committee may focus primarily on hospital-wide performance on clinically oriented patient outcome measures (e.g., 30-day mortality and readmission rates and percentage of patients who receive timely, evidence-based treatments or preventative practices such as deep vein thrombosis prophylaxis). Such teams may also be responsible for identifying and

Table 1. Example Component Teams, Their Goals, and Responsibilities in a Quality and Safety Improvement Multiteam System.

	Example Component Teams	Component Team Goal(s) and Responsibilities	Overarching Multiteam System Goal(s)
Health system level	Health System Quality & Safety Committee	Sets strategic system priorities and specific goals related to quality and safety performance; pools and directs resources to support achievement of these goals	• Optimize patient outcomes • Optimize patient care experience • Eliminate preventable harm
	Armstrong Institute for Patient Safety & Quality	Coordinates identification, support, testing, and dissemination of innovative ideas that enhance the quality, safety, and value of patient care	
	Clinical Communities	Self-organizing communities of clinical care providers from different organizations within the system who come together to establish safety and quality priorities; set specific performance goals; implement and test new processes or improvement interventions; and monitor and achieve results	
Organizational level	Hospital Board of Trustees Quality Improvement Committee	Monitors hospital quality and performance measures, reviews, and supports development of policies and processes related to continuous quality and safety improvement	
	Hospital Quality Improvement (QI) Council	Reviews, aligns, and integrates quality-, service-, and safety-related policies and procedures in the hospital; integrates and shares external regulatory or measurement changes	
	Clinical QI Committee	Monitors hospital quality and performance measures; develops and implements policies and processes related to clinical QI, risk-management, or utilization in the hospital; allocates resources to support achievement of these goals	
	Service QI Committee	Develops and implements policies and processes related to patient-centered service in the hospital; reviews hospital activities related to service integration; creates service-oriented education programs; allocates resources to support achievement of these goals	
	Patient Safety Committee	Develops and implements policies and processes related to patient safety in the hospital; reviews hospital risk-reduction activities; creates patient-safety education programs; allocates resources to support achievement of these goals	
	Hospital Falls Team	Identifies common root causes and improvement strategies related to a particular type of event or quality/safety measure; brings together unit or department representatives to share experiences and align improvement efforts related to a particular outcome	
Department or division level	Department or Divisional Safety Committee	Brings together divisional leaders to share information about common quality or safety improvement efforts; aligns priorities	
	Department Quality Improvement Committee	Monitors departmental quality and performance measures; develops and implements policies and processes related to clinical QI, risk-management, or utilization in the department in alignment with goals articulated by hospital- and system-level bodies; allocates resources to support achievement of these goals	
	Ad-hoc Department Performance Improvement Teams	Formed when problems or opportunities for new or improved services or processes are identified; studies and gains rich understanding of issue(s) in question; creates recommendations for policies, procedures, and interventions to improve targeted processes or outcomes	
Unit or work area level	Comprehensive Unit-based Safety Teams (CUSP Teams)	Identifies local defects, good catches, and own local process improvement activities	

helping particular work areas that may be struggling on these clinical metrics, as well as integrate practices that highly performing unit-based or departmental teams have utilized into organizational policy. The service QI committee and patient safety committee hold similar goals at a conceptual level (i.e., monitor performance and develop policy and processes), however, each team's area of content focus differs. Thus, a central organizational QI council may serve as an integrator for these three organizational-level component teams. The organizational QI council's explicit role is to review, align, and integrate quality-, safety-, and service-related policies, procedures, and measures. Additionally, members of this council are expected to monitor external environmental factors, such as changes in regulatory, accreditation, and payment standards, and share this information (and its implications for each level of the organization) widely with component teams across the MTS.

Organizational-level QI teams or committees may also be supported by and integrated with organizational governance structures, in the form of board subcommittees specifically focused on quality and safety improvement. Though the processes of such board-level committees may superficially appear highly similar to those activities and responsibilities carried out by other component teams (e.g., monitoring performance metrics), component teams or groups at this level additionally serve important roles in (1) ensuring that specific quality and safety goals are integrated as part of an overall organizational strategy; (2) holding organizational leaders accountable for making progress toward such goals; and (3) serving to integrate and facilitate communication among medical staff, senior leaders, and board members (Goeschel, Wachter, & Pronovost, 2010; Millar, Mannion, Freeman, & Davies, 2013; Pronovost et al., 2013; Prybil, Bardach, & Fardo, 2014). In some organizations, teams or groups at this level also serve strong direction setting roles in terms of attitudes and organizational culture (e.g., viewing safety as a property and responsibility of the organizational system rather than a liability-oriented attitude focused uniformly on seeking out and blaming individuals). Additionally, the composition of board-level teams or groups varies markedly from other component teams; usually including a significantly larger proportion of individuals external to the organization itself with greater diversity in clinical and nonclinical backgrounds. To this end, board-level teams may also serve a critical function in integrating community (e.g., public health) and patient voices as part of strategic direction setting (Goeschel et al., 2010).

Finally, for organizations that participate as part of a broader health system their MTS may also include component teams at the health system

level of analysis. A health system is a collection of organizations that provide healthcare and may be comprised of a collection of different hospitals, long-term care facilities, home care groups, primary care and/or specialty care physician groups, mental health facilities, community clinics, and urgent care facilities. Such diversity greatly increases the complexity in both MTS structure and processes (see Fig. 1 for an example from the Memorial Hermann Health System). For example, a health system-level quality and safety committee or team may exist to bring together representatives from participating organizations to share insight regarding changing external environmental forces (e.g., regulatory, accreditation, and reimbursement changes), to discuss and come to consensus regarding overarching system goals, and to consider resource allocation issues. Organizational-level performance metrics are also monitored. At this level, processes of alignment, communication, and negotiation emerge to the forefront. Though perceived ingroup/outgroup issues may emerge among teams at any level previously discussed, such differences are likely highly salient among system-level team members, particularly if they simultaneously retain clear identity and remain part of their "home" organization or team (Hinsz & Betts, 2012).

While these types of system-level committees serve to integrate and align functions across diverse organizations, they may also be complemented by teams or entities designed to support implementation of quality, safety, and service improvement efforts across participating organizations and component teams. For example, the role of the Johns Hopkins Armstrong Institute for Patient Safety and Quality (http://www.hopkinsmedicine.org/armstrong_institute/) is to coordinate and support identification, testing, and dissemination of innovative ideas that enhance the quality, safety, and value of patient care across the Johns Hopkins Health System. Core members of the Institute include academic faculty and operational leaders with experience and expertise leading organizational improvement and change who are collectively charged with this support and integration mission. The Institute also serves to develop system capacity to effectively engage in improvement efforts. Through workshops and other learning and development activities the Institute's role is to help clinicians and staff develop the knowledge, attitudes, and skills necessary for implementing and leading change efforts.

Clinical communities are another type of system-level entity that contributes to system-level integration and alignment functions. Clinical communities are based on the notion of communities of practice and learning communities, and are loosely defined as "groups of people who share a

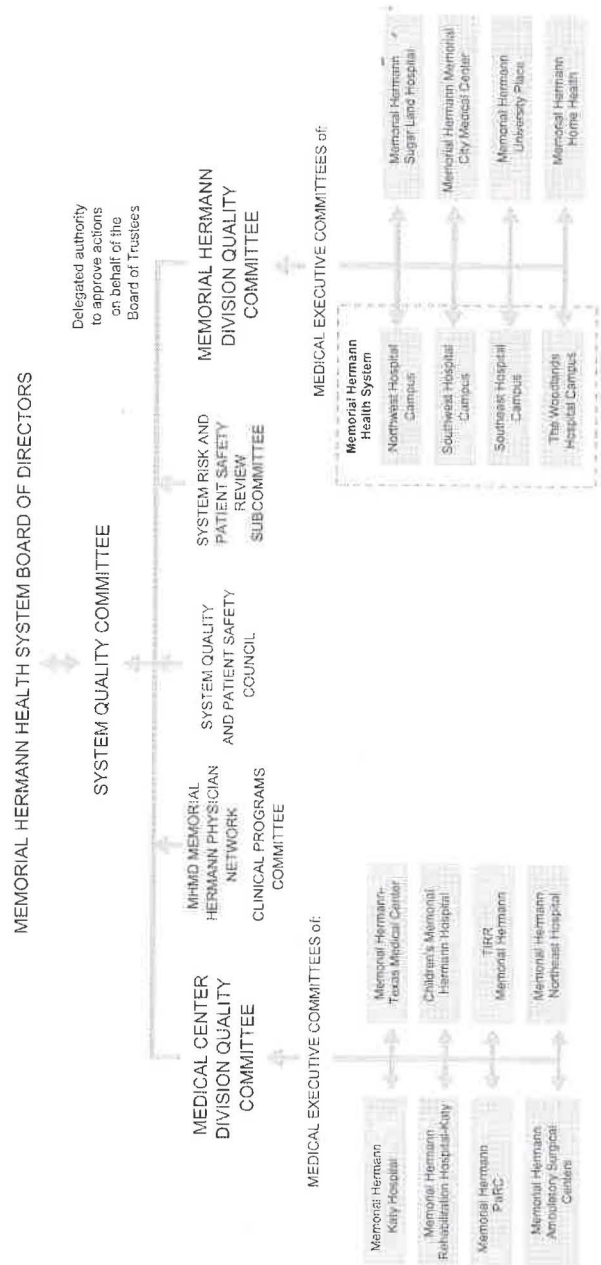

Fig. 1. Example of the Memorial Hermann Health System's Performance Improvement, Quality, and Safety Communication and Reporting Structure (Memorial Hermann Health System, 2013).

concern, a set of problems, or a passion about a topic, and who deepen their knowledge and expertise in this area by interacting on an ongoing basis" (Wenger, McDermott, & Snyder, 2002). These voluntary communities bring together individual clinical care providers across a health system around a common area of interest or issue (e.g., a Critical Care Clinical Community, a Joint and Orthopedic Surgery Clinical Community). Each community is responsible for setting its own goals, choosing relevant performance measures, and deciding issues related to longevity, pace, and work rhythms. Administrative participation is often proportionally less in such groups with the focus on engaging frontline care providers across the system to interface directly and colead quality and safety improvement initiatives that affect multiple organizations. The communities may receive administrative support from other system-level entities (e.g., the Armstrong Institute provides support to clinical communities across the Hopkins system). Though such communities may retain fewer of the common hallmarks of a clearly defined team, their members are carrying out much of the critical boundary spanning work required for effective MTSs. These types of communities also play an important role in building trust and cohesion among system members who still retain primary affiliation with a specific given component organization and component team.

Formation and Development

The genesis of many MTSs dedicated to improving quality and safety follow an arc described by Zaccaro, Marks, and DeChurch (2011) in that they often "emerged informally ... in response to a national crisis (though in this instance this was paired with national trends in policy change) ... and have become more formalized" with time (p. 20). For example, prior to 2000, when two seminal Institute of Medicine reports placed a national spotlight on the imperative to improve the quality and safety of care in the United States (Institute of Medicine, 2001; Kohn, Corrigan, & Donaldson, 2000), many acute care organizations already had committee or team structures in place that were tasked with monitoring areas of risk and indices related to care quality and safety; however, they likely did not exist as they currently do today. Prior to that time, risk was often defined almost solely in terms of legal liability. The zeitgeist was only starting to understand the scope of preventable patient harm and need for continuous improvement (Emanuel et al., 2008; Ilan & Fowler, 2005). Furthermore, these committees

or councils often functioned as independent, relatively self-contained groups or "pseudo-teams," rather than multidisciplinary teams with shared goals. Even among groups that fell under a unified health system in name or ownership, most connections existed at the managerial, governance, or "back-office" level (e.g., a somewhat shared records system), and groups differed widely in their processes, structures, information systems, norms, decision-making habits, and tempo (Lucian Leape Institute Roundtable on Care Integration, 2012). Additionally, although groups or teams focused on monitoring and improving care quality and safety may have existed, their incentives and accountability structures were often loosely, if at all, coupled.

As national policy and reimbursement algorithms change, however, many organizations are responding by rethinking and restructuring their approach to continuous improvement. This means that MTSs tasked with continuous improvement often evolve from linking, aligning, and/or merging existing groups or teams in new ways, as well as creating new teams dedicated to integration. As such, these systems may encounter issues early in their development due to unclear interdependencies among the different component teams that make up the system. This may be a particularly tough hurdle for MTSs that integrate existing teams – with established cultures, norms, and habits – and newly formed teams. The old and new teams that come together to form an MTS may struggle until each learns and accepts that they are more tightly coupled than they may have been historically. This can also lead to identity struggles throughout the course of an MTS's existence, including role confusion, or unnecessary duplication as groups or teams who existed previously formulate new identities as part of a larger system. Additionally, such systems may struggle initially with a lack of adequate expertise in change management and QI methodology.

Outcomes and Continuous Interaction

MTSs tasked with continuously improving care quality, safety, and service have demonstrated evidence of success. In one recent example, the Johns Hopkins Hospital worked as part of the MTS that comprises the Johns Hopkins Health System to improve and sustain high levels of performance on a battery of patient safety and quality indicators. While specific details of the approach and component teams involved are described in detail elsewhere (see Pronovost et al., 2013), a cross-organization MTS structure that

included teams from five acute care hospitals across Johns Hopkins Medicine (JHM) collaborated with health system-level teams to clarify accountability structures and processes, set clear system-wide performance goals, provide access to team members with expertise in QI and change management, and align improvement processes across participating teams and organizations. Fig. 2 outlines four key steps that the system utilized as part of their integrated improvement process.

This system and processes resulted in meaningful, sustained improvements in nine measures of care quality and safety that are part of a set of acute care performance measures known as *core measures*, which are designed to evaluate the reliable use of evidence-based treatments or processes and form the foundation for high quality care, accreditation, and reimbursement (Centers for Medicare & Medicaid Services and The Joint Commission, 2014). Specifically, in the year following implementation of these processes within the MTS, the percentage of core measures meeting or exceeding a 96% compliance goal improved by 13% (82% of measures met the performance goal in 2011 and 95% of measures met the goal in 2012) (Pronovost et al., 2013). Additionally, several of the organizations within the health system were awarded both national and state awards in quality and safety performance.

ADVANTAGES

Improving care quality and patient safety requires coordination and integration of many moving parts that are driven by a diverse cadre of multidisciplinary care providers, staff, and administrators often nested across multiple organizations. As such, many of the benefits associated with an MTS in this context line up with those documented in the organizational behavior and teams literature. Perhaps the most important is the advantage that MTSs offer as organizational structures particularly well suited to address complex problems induced by large size, task specialization, and geographic dispersion (Davison et al., 2012; Mathieu et al., 2001). Small pockets of improvement can be achieved by individual teams for short periods of time, however, sustained improvement in care processes and outcomes at scale requires an integrated system of teams with a shared understanding of mutual goals, communication, information sharing, and informal learning mechanisms to share progress and lessons learned, and leadership who are explicitly focused on alignment and

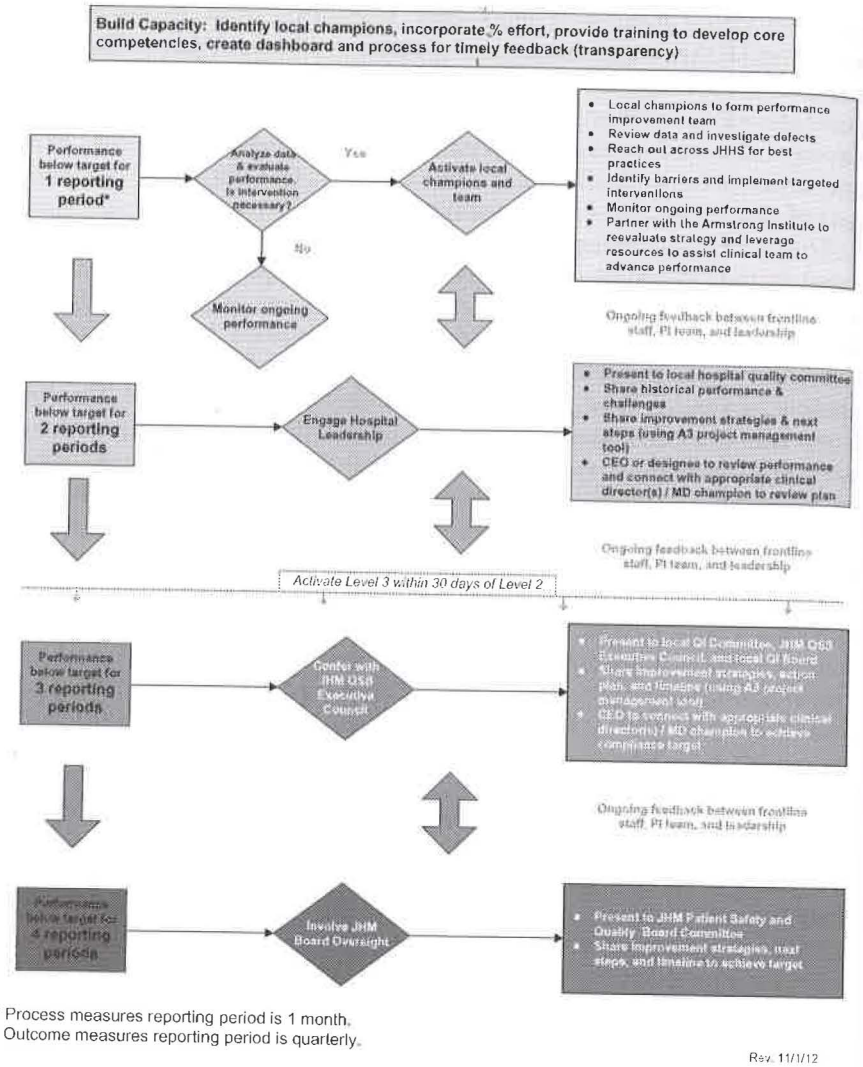

Fig. 2. The Formal Johns Hopkins Health System Process for Creating Accountability for Improving a Clearly Identified Battery of Nine Care Quality and Safety Measures. The Four Steps Outlined in the Figure Demonstrate Linkages Between Component Teams in the Overall MTS Dedicated to Continuous Quality and Safety Improvement. *Source*: Reprinted from Pronovost et al. (2013).

integration of parallel efforts (Flin & Yule, 2004; Keroack et al., 2007; Millar et al., 2013). MTSs are designed to meet an overall goal that is beyond the capacity of an individual team, goals that can only be achieved through the coordinated effort from all component teams (Zaccaro, Marks, & DeChurch, 2011). Given this, there are many mechanisms through which the MTS examples described above enable a network of teams to achieve beyond what individual component teams could in singularity. Such systems are well suited for tackling the so-called "big, hairy, audacious goals" such as eliminating patient harm, continuously improving the quality of care, and optimizing access to care.

Despite Potentially Introducing Increased Process Complexity Initially, An MTS Approach May Actually Enhance the Efficiency of Strategic Problem Solving and Improvement Efforts Over Time

MTSs are often formed in response to a "unique organizational need best accomplished by a specialized network of teams working in close alignment" (Mathieu et al., 2001, p. 293). However, unlike task forces or other team-like structures, an MTS such as the one described above often remains intact after a specific system objective has been met. In this context, continuous improvement is a core MTS goal, thus implying the very nature of such a system is iterative. Though membership is obviously not fully maintained over time, this does enable a degree of stability in both intrateam and interteam membership that can serve as a foundation for trust, cohesion, and entrainment that can enhance efficiency over time. Additionally, an MTS structure can enable teams within the system to essentially multitask, addressing multiple overall system goals simultaneously which are too broad for any individual team to address in-depth alone (Zaccaro et al., 2011). For example, creating separate teams specifically focused on clinical improvement, service improvement, and patient safety allows each team the time and concentrated effort necessary to understand the numerous nuanced details of measurement, oversight, regulatory reporting, and financial reimbursement requirements related to their respective focal area. Other organizational- and system-level teams are, in turn, specifically responsible for integrating and aligning the work of these component teams.

Diversity of Disciplines, Mindsets, and Ideas May Enhance Overall System Creativity and Efficient Use of Specialized Knowledge or Skill

Component teams bring together members with varied expertise. Organizing teams into an MTS that facilitates boundary spanning and transparency can facilitate effective use of the range of expertise that each component team brings to the table. Additionally, an MTS structure enables specialized skills and expertise to be efficiently leveraged (e.g., support and access to experts in various improvement methodologies provided by system-level institutes or members of other component teams) (Millikin, Hom, & Manz, 2010). Additionally, MTSs in this context bring together teams (and individuals) from diverse professional backgrounds, functions, and organizational cultures. While this can be a source of conflict, it can also facilitate creativity, new ways of thinking, and innovative problem solving that could not have come from any of the individual teams or organizations working alone.

An MTS Structure May Enable Health Systems and the Organizations That Comprise Them to Be Highly Responsive in Turbulent Environments

The format of an MTS also provides the ability to respond to dynamic environments (Mathieu et al., 2001; Zaccaro et al., 2011). Undoubtedly, the healthcare environment in the United States, and globally, is dynamic, novel, and uncertain. Leveraging an MTS structure enables a health system or organization to identify changes (or hints of potential changes) in national policy, public opinion, and payment reforms early when these are clearly articulated responsibilities of particular teams or team members. This can also enable the MTS to adapt more efficiently, allowing it to reconfigure and align with new environmental demands quickly and effectively.

An MTS Can Facilitate Transparency and Informal Learning Across Traditional Organizational Boundaries and Levels

Unlike traditional organizational structures, MTSs can (and often do) cross-organizational boundaries in order to achieve shared goals. This usually happens when interdependency of input, process, and outcome

exists among teams from several organizations. An MTS structure enables members of different organizations to recognize and articulate interteam interdependencies as well as intraorganizational interdependencies that exist among teams nested within a respective organization (Davison et al., 2012). Doing so effectively can facilitate timely coordination of effort, resources, and information both within and across organizations. This can also open lines of communication and informal learning that doesn't often happen in other circumstances (e.g., different hospitals sharing how they have approached different areas of risk).

CHALLENGES

In many ways, the challenges of managing MTSs in healthcare are similar to those of managing traditional teams. Role clarity, shared situation awareness, effective leadership, trust, and communication all appear to matter, and many times are difficult to maintain. Physical and temporal distribution of diverse team members working with a complex set of multiple, competing, and sometimes conflicting goals are challenges that plague even a classical team structure in healthcare (e.g., a surgical team working on a complex double arm transplant procedure). The same is true of MTSs. In the following section, we highlight a few of the descriptive themes emerging from our analysis of safety and quality MTS structures in healthcare.

Ownership and Empowerment

Component teams in these types of systems often represent multiple levels of organizational power. As such, decision-making authority as well as the availability of resources and power to allocate them may be confounded with organizational hierarchy. Additionally, teams or groups at the department, organization, and system levels play important integration and boundary spanning roles; however, role clarity and ownership issues as well as territoriality can emerge. For example, our qualitative examination of accountability processes around patient safety and quality in a sample of medium to large size U.S. hospitals found that frontline clinicians and staff may be more hesitant to participate in improvement activities when those external to the unit are viewed as "owners" of patient safety and QI work (Rosen et al., 2013).

Boundaries and Bandwidth

Table 1 begs the question: Where does an MTS end and an organization begin? While MTS structures enable team members to share and learn from different teams within and outside of their home organization, this can be a complicated process. This is particularly true around issues of patient safety and quality given the sensitivity of these topics, the need to protect patient confidentiality, and valid concerns or fears regarding discoverability or litigation. Within the U.S. healthcare context, legal entities known at Patient Safety Organizations (PSOs) have been developed as one method to help ensure protection from discoverability, enhance transparency, and facilitate learning among organizations that make up a health system or an ACO. Working as part of a PSO or under the protections of a PSO can introduce an additional layer of complexity, however, and can initially complicate issues related to team member identity, data ownership, and accountability.

Bandwidth and finite resources is another challenge faced by MTS members. Balancing workload and regulating effort in pursuit of individual, team (DeShon, Kozlowski, Schmidt, Milner, & Wiechmann, 2004), and MTS goals is an important performance process, while participating in teams (and MTSs) comes at a cost – communication or process overhead (Macmillan, Entin, & Serfaty, 2004). As described above, MTSs in healthcare can become quite complex, frequently involve vertical and horizontal linkages within the organization spanning multiple work domains and climates. How do people manage the work of multiple team membership (and still manage their taskwork)? Middle managers, in particular, frequently serve a critical role on multiple component teams that make up such MTSs and seem overwhelmed with the associated workload and time commitments. There currently is little research to guide practice in structuring these systems. How many teams can one individual contribute to effectively? Is there a saturation point? How well does existing evidence regarding team composition and size generalize to the MTS context? What practical guidance can we offer (1) middle managers responsible for developing and leading component teams that are part of MTSs, and (2) team members who are juggling work for multiple teams? Currently, we do not have systematic answers to these questions, but these areas are ripe for future research.

Common Ground and Climates

Culture is local. Safety climate scores – indicators of shared norms, habits, and attitudes among members of a given work area – often vary more

within a hospital than they do across hospitals (Huang et al., 2007; Sorra & Dyer, 2010). For example, the Neonatal Intensive Care Unit (NICU) in a given hospital may have a much different safety climate compared to the Adult Intensive Care Unit (ICU) in the same hospital, even though both deal in critical care. Differences in administrative norms between services (e.g., surgical services vs. floor services) often also exist. This means that managing an MTS that spans multiple levels or units within an organization will undoubtedly include component teams or team members with varying norms related to leadership, teamwork, or safety and quality. Additionally, education and professional socialization forces can be powerful in shaping subgroup cultures and climates among multidisciplinary component teams. This variation in expectations can cause friction and dysfunction.

Communication and Context

One of the challenges for MTSs in patient safety is the sheer volume of data to be communicated. Beyond bandwidth issues discussed above, this problem is complicated in that the data relevant for improvement efforts and evaluation takes many forms – from risk-adjusted infection rates, to stories of patient safety success and failures, to new best practices in complex work processes. As this data moves from one component team to another, the context vital for meaningful understanding is easily stripped away. Also, the use of formal and informal communication channels can greatly impact the spread of information throughout an MTS. Some important conversations about symptomatic issues (e.g., minority opinions or disagreements) can come up "offline" in nonformal venues meaning that it is possible that conflicts might be less likely to be adequately managed (Chen & Kanfer, 2006; Kanfer & Kerry, 2011).

Conflict Resolution (and Resource Allocation)

Furthermore, without strong leadership, clear goals for the MTS, clear processes for resource allocation across the system, and identity as a "system," the tendency is to turn efforts and allocation of resources inward (Hinsz & Betts, 2012). For example, a unit or a department that has been able to secure .5FTE for one of their team member's time for a given task might fear losing this person or the resources committed to this person to other teams (e.g., to a system- or organizational-level performance improvement committee), and therefore try to protect that resource.

DISCUSSION

Overall, an MTS approach to improve patient safety and care quality can offer strengths as well as new challenges. The MTS structure offers more than a new label for an organizational format that has emerged from necessity in healthcare. It offers meaningful theoretical grounding for work forms that have emerged from efforts to solve real, practical problems. Additionally, MTSs offer a mechanism to transform the healthcare mindset from parts-care back to whole person-care. Medicine has historically been moving toward greater and greater degrees of specialization. Prior to 1970, there were only 10 specialties recognized by the American Board of Medical Specialties; however, today there are over 145 recognized medical specialties or subspecialties (American Board of Medical Specialties, 2012). To address this trend toward specialization, evolving delivery models, such as the ACO model and patient-centered medical home, encourage MTS structures that integrate and align efforts to improve care coordination both within and across provider organizations.

From an applied research perspective much remains to be learned about MTSs as they exist in the wild and team members working in these structures are hungry for evidence-based recommendations rooted in good science. Examining efforts to improve patient safety also offers an opportunity for expanding our scientific understanding of how MTSs form, develop, and perform over time. Additionally, studying these types of teams offers an opportunity to utilize innovative methods and heed calls for examining organizational configurations and patterns rather than continuing a reductionist path bent on examining singular teams, processes, or variables in isolation (Fiss, 2007; Meyer, Tsui, & Hinings, 1993; Schulte, Ostroff, Shmulyian, & Kinicki, 2009). Overall, MTSs in healthcare offer a symbiotic opportunity for research to inform practice and for practice to inform meaningful research.

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