

## Improving Patient Safety With Team Coordination: Challenges and Strategies of Implementation

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■ The health care environment presents significant risk of errors leading to patient injury and harm. One method to promote patient safety involves improving team coordination. The MedTeams® training program, a nationally funded research project, provided the framework for team training in several labor and delivery units in the United States. Many challenges were confronted when team training was implemented. Based on these experiences, specific strategies to ensure the success of team training are discussed. *JOGNN*, 35, 557-566; 2006. DOI: 10.1111/J.1552-6909.2006.00073.x

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Patient safety has been a concern for centuries and was reinforced more recently with the Institutes of Medicine Report *To Err is Human* (Kohn, Corrigan, & Donaldson, 1999). Research suggests that errors result from system failures, and teamwork is one of the most important components in reducing errors and improving safety (Kohn et al., 1999; Reason, 1990). However, the health care system is extremely complex. Increasing patient acuity, technologic advances, complex procedures, new medications, a shortage of workers, and care provided in rotating shifts are challenges in a culture that is trying to promote teamwork (Kohn et al.).

Little has been written about how to implement teamwork initiatives to ensure success. In this article, the background of team training will be reviewed, and the MedTeams® (Dynamics Research Corporation, Andover, MA) training program will be described, but the primary purpose of this article is to discuss the challenges and strategies we encountered in imple-

menting this large multisite team-building project designed to improve patient safety in perinatal settings.

### Moving Teamwork Innovation From Other Industries Into Health Care

The aviation industry has long been a leader in safety and accident prevention (Miller, 2003; Spencer, 2000). A safety training approach known as crew resource management (CRM) resulted in a decrease in fatal crashes, a reduction in safety-related task errors, and an improvement in performance (Gayman, Gentner, & Canaras, 1996; Grubb, Simon, & Zeller, 2001). The CRM approach addresses management of distractions; changing coping mechanisms, behaviors, and attitudes; improving communication and teamwork; and evaluation of information related to operational dangers (Miller). Despite variation in knowledge and application of teamwork techniques among team members, CRM improved fatigue management, team building, communication, recognition of adverse events, team decision making, and performance feedback (Grogan et al., 2004).

It has been estimated that 15 lives and more than 30 million dollars could be saved annually with CRM (Gayman et al., 1996; Grubb et al., 2001), but its effects have yet to be confirmed. Salas, Burke, Bowers, and Wilson (2001) reviewed 58 studies on CRM and noted improved attitudes and behaviors as found by Grogan et al. (2004), but the true impact of CRM on safety could not be determined. Thomas, Sexton, and Helmreich (2003) also acknowledged the difficulty in linking teamwork attitudes to patient outcomes.

In many facilities, a hierarchy mentality, inadequate staffing, and lack of acceptance of protocols by staff can influence how teams work together (Thomas,

Sherwood, Mulhollem, Sexton, & Helmreich, 2004). Organizations in which communication flows effectively in both directions between top leaders and staff have been termed high reliability organizations (HRO), a concept first applied to perinatal units by Knox, Simpson, and Garite (1999). Characteristics of HROs include (a) safety as the hallmark of culture, (b) teamwork, (c) a focus on effective nonhierarchical communication, (d) preparedness for the unexpected, (e) interdisciplinary review of near misses and adverse outcomes, and (f) leadership support (Roberts, 1990). If these characteristics are applied to obstetrics, safer patient care should be the result (Knox, Simpson, & Townsend, 2003).

Decreasing the inherent risks associated with obstetric care requires cultivating a team climate to ensure positive outcomes, patient safety, and satisfaction (Barrett, Gifford, Morey, Risser, & Salisbury, 2001; Miller, 2003). However, formal teamwork training was almost nonexistent in obstetric care settings until the development of the MedTeams® training program (Miller).

## The MedTeams® Training Program

### Background of Team Training

Safety is a compelling reason to transfer successful teamwork behaviors and initiatives from other industries to the labor and delivery (L&D) setting. Dynamics Research Corporation (DRC), supported by the U.S. Army Research Laboratory, set out to determine the impact of teamwork on health care (Morey et al., 2002). In a closed case review of military and civilian emergency department (ED) risk management cases, DRC suggested that 43% of errors were due to a lack of team behaviors. Primary factors contributing to errors included failure to (a) cross-monitor the actions of team members, (b) identify an established protocol to be used, (c) develop the plan of care, and (d) prioritize tasks for a patient (Risser, Simon, Rice, & Salisbury, 1999).

Based on this analysis, the MedTeams® training program was designed as a way of bringing CRM concepts into health care. In a prospective multicenter evaluation of EDs (1998-1999), team training was found to enhance performance (Morey et al., 2002). The basic principles of CRM teamwork appeared to be relevant and applicable to health care, particularly in areas where care required rapid integrated actions of many caregivers in the proper sequence to prevent serious harm.

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Based on this finding in the emergency care setting, MedTeams® research expanded to L&D units to determine whether teamwork would have a similar impact. A retrospective review of closed claim L&D files by two separate pairs of physician-nurse experts suggested that 40% or more of L&D malpractice events could have been prevented by a formal team approach (Risser et al., 1999). Similarly, a separate review performed by Joint Commission on Accreditation of Healthcare Organizations (JCAHO, 2000) established that team communication problems were the number one root cause in all sentinel events occurring between 1995 and 2002. More recently JCAHO's (2004) Sentinel Event Alert No. 30 *Preventing Infant Death During Delivery* identified miscommunication as a primary contributor to error.

### Training Intervention in L&D

*Site and Instructor Preparation.* Using the MedTeams® train-the-trainer format, physicians and nurses from seven intervention hospitals attended a 2-day instructor session. Participants were educated on the principles of teamwork (Table 1) as well as the processes necessary to implement, coach, and sustain teams as they exercised newly learned behaviors. Trainers were responsible for communicating the training plan, gaining the commitment of staff to the initiative, conducting the training and implementation, coaching teams, and solving ongoing problems encountered during behavior change.

*Team Training Curriculum.* The Labor & Delivery Team Coordination Course, developed by DRC, Beth Israel Deaconess Medical Center, and members of the L&D Team Training Consortium, preserved the key concepts contained in the parent Emergency Team Coordination Course (Dynamics Research Corporation, Andover, MA) with minor revisions (Locke et al., 2001). The course consisted of didactic sessions and interactive training on the MedTeams® program dimensions and their associated teamwork behaviors (Table 1). Four-hour training sessions were conducted for all staff members from obstetrics, anesthesiology, nursing, and patient care services.

Physicians, nurses, and technicians providing direct care to patients formed the core teams. Ad hoc teams, termed contingency teams, are formed to manage urgent or emergent events, such as an unplanned cesarean birth. A coordinating team consisted of on-shift leaders who managed resources and patient flow. The team membership and number of teams operating on each shift varied in the nine hospitals.

The intent of teamwork skill training is to enhance coordination of patient care, to provide opportunities for the recognition of near misses before they unfold into serious errors causing harm, and to improve communication between providers. Participants learned the concepts and behaviors necessary to (a) establish and maintain team structure and climate, (b) plan and problem solve, (c) communicate,

**TABLE 1**  
*Teamwork Behavior Matrix*

<i>Dimensions</i>	<i>Components</i>	<i>Teamwork Actions</i>
Maintain team structure and climate	Organize the team	Establish the leader Assemble the team Designate roles and responsibilities Communicate essential team information
	Cultivate team climate	Acknowledge the contributions of team members to team performance Demonstrate mutual respect in all communication Hold each other accountable for team outcomes
	Resolve conflicts	Address professional concerns directly Resolve conflicts constructively
Plan and problem solve	Conduct situational planning	Engage team members in planning process Identify established protocol to be used or develop a plan Communicate the plan to teammates
	Apply decision-making methods	Engage team members in decision-making process
	Engage in error management actions	Alert team to potential biases and errors Report slips, lapses, and mistakes to team Cross-monitor actions of team members Advocate and assert a position or corrective action
Communicate with the team	Maintain SA	Invoke the Two-Challenge Rule when necessary Request SA updates Provide SA updates
	Use standards of effective communication	Use common terminology in all communications Call out critical information during emergent events Use check-backs to verify information transfer Systematically handoff responsibilities during team transitions
	Offer information to team	Offer information to support planning and decision making Communicate decisions and actions to team members
Manage workload	Request information from team	Seek information for planning and decision making
	Conduct secondary triage	Integrate individual assessments of patient needs Reprioritize patients in response to overall caseload of team Prioritize tasks for individual patients
	Manage team resources	Execute team-established plan Balance workload within the team Request assistance for task overload Offer assistance for task overload Constructively use periods of low workload

(continued)

**TABLE 1**  
(Continued)

<i>Dimensions</i>	<i>Components</i>	<i>Teamwork Actions</i>
Improve team skills	Engage in informal team improvement strategies	Engage in situational learning and teaching with the team Engage in coaching with team members Conduct event reviews Conduct shift reviews
	Engage in formal team improvement strategies	Participate in educational forums addressing teamwork Participate in performance appraisals addressing individual's contributions to teamwork

*Note.* SA = situation awareness.

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(d) manage workload, (e) coach team skills, and (f) plan the implementation to ensure ongoing utilization (Figure 1). The sessions included practice sessions, in which simulations of team scenarios such as a response to shoulder dystocia were used for roleplay. Vignettes, case studies, and interactive coaching exercises were used to practice new skills.

In the MedTeams® training program, core team members learned to (a) establish and communicate a plan of care, (b) monitor behaviors against the established plan, (c) brief/debrief as needed to maintain situation awareness (SA), and (d) balance the workload for all members of the team. Critical to core team functioning is maintaining an up-to-the-minute SA. Core team members must know the status of all patients assigned to the core team and the workload demands on their teammates. To maintain SA and enable effective teamwork behaviors, teams must hold frequent debriefing sessions for communication, coordination of efforts, and coaching. The coordinating team must maintain a global awareness of these conditions among the core teams.

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### *Implementation and Assessment of Unit Performance*

Teamwork is a complex skill, and the implementation phase of the MedTeams® training program presented a

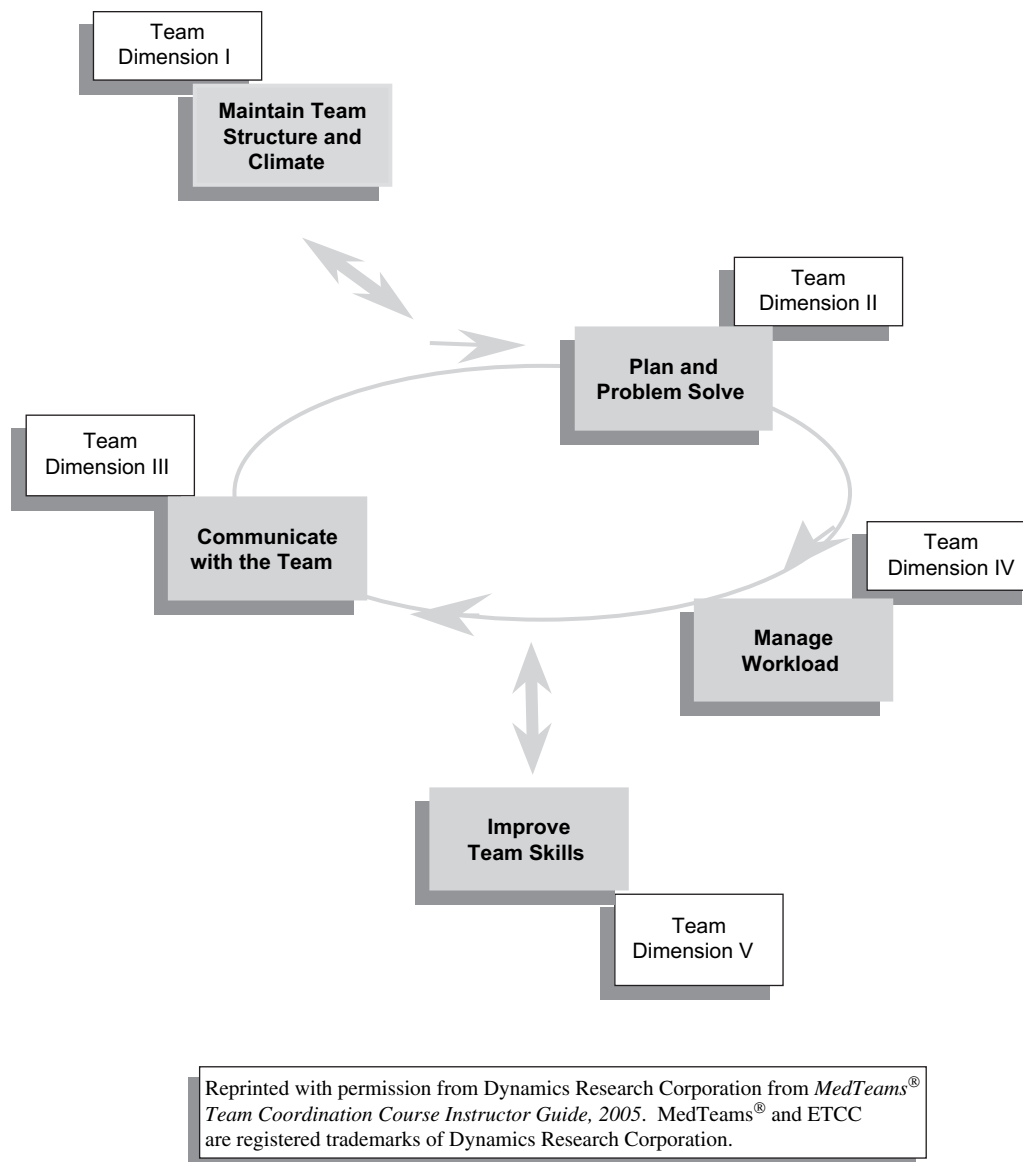
number of challenges. Formation of teams was not enough to produce the desired teamwork behaviors. Although programs to strengthen teamwork are recommended by accrediting and professional organizations, plans for successful integration of these programs have not been standardized. Institutions and individual units have their own cultures, climates, management, and staff, and implementation of a new care delivery approach must take this individuality into account. The challenges discussed below are a compilation of experiences from the institutions involved in the study.

## **Challenges and Strategies of Implementation**

### *Steps of Organizational Transformation*

Kotter (1996) described the critical steps necessary to transform an organization as (a) establishing a sense of urgency, (b) forming a guiding coalition, (c) creating and communicating a vision, (d) empowering others to act on the vision, (e) creating short-term wins, (f) consolidating improvements, and (g) institutionalizing new approaches. These steps provide a useful framework to understand the challenges encountered during the implementation of team training. Table 2 provides a summary of Kotter's steps to transform an organization, how they were applied in the MedTeams® training program, and suggested strategies for implementation based on the experiences in the hospitals participating in this project.

Similar concepts have been applied to other venues. Brown, Ohlinger, Rusk, Delmore, and Ittmann (2003) discussed the need in neonatal intensive care unit (NICU) settings for a clear, shared purpose, goals, and values; effective communication; leading by example with participatory decision making; an environment of trust and



**FIGURE 1**  
Team formation, structure, and processes.

respect; competent and committed team members and a commitment to conflict resolution. To measure the cultural change or success of integration that occurs, attitudinal surveys, turnover, and absenteeism rates could be evaluated.

The MedTeams® training program challenged staff and leaders in many ways. First, the program required a shift in the culture. Staff believed they already functioned as teams, but the MedTeams® training program required a newly defined skill set that needed to be learned and practiced. Other challenges were encountered in staff perception of the project and project roles, the volume of paperwork, the time pressures and

confusing messages created by the research project, changes in team formation, need to strengthen the “handoff” process, and establishing and maintaining ongoing momentum.

### *Establishing a Sense of Urgency*

Because this was a research project, participants did not have input into the planning and were not informed of the techniques ahead of time to avoid skewing the data. Leaders (managers, directors, clinical nurse specialists, chiefs of obstetrics and anesthesiology) attended several days of training. Staff did not attend. As a result, they perceived that their input did not matter and that

**TABLE 2**  
**Challenges and Strategies for Organizational Transformation**

<i>Kotter's Steps to Transform an Organization<sup>a</sup></i>	<i>Challenges Encountered in MedTeams®</i>	<i>Strategies</i>
Sense of urgency	Staff believed they already functioned as a team Lack of staff input due to research component Staff had negative perception of project	Define skill set Staff involvement in all planning and implementation phases
Forming guiding coalition	Coaching role not clearly understood Volume of paperwork increased	Role modeling by staff and leaders Streamline and automate paperwork
Creating/communicating vision	Work flow processes, that is stocking Timing of team meetings Communication systems	Staff input to best methods Display case Phone system Writing articles/stories
Empowering others to act on vision	Restricted timeline for implementation Part time and 12 hr shifts, leading to delayed integration of concepts Inadequate establishment and maintenance of momentum	Brainstorming sessions with staff Regular planning meetings with staff leaders Allow sufficient time for integration
Creating short-term wins	Staff had erroneous perception of recognition ceremony	Appropriate timing of celebration Clear communication of what is being celebrated Staff and leaders determine what and when to celebrate
Consolidating improvements and institutionalizing new approaches	Inadequate handoff process Inconsistent check-backs	Monitor progress and reevaluate approaches if necessary Regular meetings to communicate expectations Site visits to successful units Train new leaders and staff to embrace teamwork

<sup>a</sup>Titles from Kotter (1996).

the project was simply another change they did not control. At the start of the project, staff members were asked to complete forms to track data. Thus, their primary vision of the project was simply more work. Because they had not been exposed to the concepts, they did not see the benefits of the project for patient outcomes. The staff's response echoed findings of Ohlinger, Brown, Lauder, Swanson, and Fofah (2003) in four neonatal intensive care units. Staff believed they had little influence in decision making and desired more involvement. Leadership was perceived as being inaccessible and out of touch with staff. The staff did not formulate a

sense of urgency or motivation for the project and had difficulty envisioning the integration of MedTeams® teamwork behaviors.

Informing staff of the potential benefits of the project, such as better outcomes and increased patient and employee satisfaction, was insufficient to create urgency to change. This was a research project, so the positive outcomes were not yet proven. Evidence from other studies, such as Yeager's (2005) summary of benefits of collaboration, was not convincing to them. Staff needed to determine the structure and climate to enhance teamwork.



Improving teamwork and lessening the likelihood of error can reduce feelings of anguish and self-blame (Heffner, Ellis, & Zeno, 2005). The key point in this statement is teamwork. Staff ownership must be established early on, minimizing the division between leadership and staff, as one of the 1st steps in creating a culture of safety.

### *Forming a Guiding Coalition*

When forming a guiding coalition, it is important to role model the desired behaviors, in this case the MedTeams® teamwork behavior, but staff had a difficult time understanding its limits. Coaches were expected to monitor, teach, and role model teamwork behaviors. Staff perceived the coaches as able-bodied workers who should have helped with the tasks at hand instead of suggesting teamwork concepts to improve workflow. Those situations proved difficult for the instructors as well. Demonstrating desired behaviors was a useful coaching strategy, but if the instructors became too involved in care activities, they were less likely to conduct formal coaching and assist the staff to integrate the desired behaviors.

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One strategy to overcome this challenge with coaching was to develop more staff for leadership roles in the initiative. By enhancing their knowledge of the MedTeams® concepts and placing them in charge, they could promote teamwork behaviors and role model the concepts for other staff, promoting peer accountability.

Another challenge that affected the formation of a guiding coalition was paperwork. Staff was not happy with the addition of another form to complete. Streamlining the paperwork by collection of data via electronic means was a tremendous participant satisfier. At some institutions, the components of data needed to track change over time were taken from already charted items, thus avoiding duplication.

### *Creating and Communicating Vision*

*Creating a Vision of Teamwork.* A thorough evaluation of workflow processes and resources is essential to create a vision of a climate that supports teamwork and enhances patient safety. At one facility, problems with workflow processes related to stocking of supplies proved to be a significant challenge that affected the implementa-

tion of the teamwork concepts. When staff members did not have the necessary tools to perform their job, they used shortcuts and “work arounds,” and problem solving did not occur. Stock was frequently missing, so staff members followed old patterns of going to the next room to take what they needed, which affected other team members who were trying to provide care to their patients. This vicious cycle met the needs of some individual staff but was not conducive to a climate of teamwork.

Unlike historic expectations of individual responsibility, mutual accountability builds a safety net (Barrett et al., 2001). Addressing workflow processes and resources prior to and during team training established a system of accountability and promoted SA. Refocusing on unit needs rather than individual needs established an environment for successful teamwork actions.

*Creating Communication Pathways to Reach All Team Members.* Establishing effective flow of communication to all members of the teams also presented significant challenges. For example, each experimental site could determine its own core team configuration, based on physician group, unit geography, or other criteria. One facility formed core teams by physician groups, but the nursing staff had difficulty assigning staff team members to their team physicians’ patients because a physician group’s patients were sometimes admitted to unit areas that were far apart. After a few weeks, the core team configuration changed, basing team assignments on geographic location. Staff from team 1 covered rooms 1 to 6, team 2 took rooms 7 to 14, and team 3 was assigned to rooms 15 to 21. Although this provided a better workflow for the nursing staff, physicians were no longer working with a single team of staff and felt less involved in the MedTeams® project. When team meetings were called, physicians who did not feel a strong alliance with their assigned team did not feel they needed to attend. Some sites had difficulty finding team meeting times that would include physicians.

Communication was a critical component to ensure the success of the program and increase quality of care as well as team productivity. Vigilance over communication patterns increased. Project messages were directed to all levels and work shifts and included the rationales for changes. Multiple methods, including newsletters, postings, staff meetings, informal discussions, meetings, and mailings, increased the likelihood of successful transfer of information to all staff.

Other activities to assist with change included holding weekly leader meetings with the team to review clinical data and progress, and featuring stories about the team’s extraordinary efforts in internal publications, such as the hospital nursing publication or unit newsletter. Other performance improvement projects have used similar strategies. Pronovost and Goeschel (2005) reported positive

effects of similar efforts in their initiative to improve patient care.

One institution was considering implementing a phone system that directly linked nurses to patients or nurses to other health care team members. The rationale for purchasing this type of system was the potential impact on maternal and neonatal outcomes as well as patient satisfaction, by minimizing time delays and expediting care.

*Communicating Essential Patient Care Information.* Effective handoffs, the action of transferring information and responsibility from one health care team member to another, are essential to patient safety. Written documentation of break relief was one step toward safe transfer of responsibility. Another strategy was increasing the use of “check-backs” to verify information exchange by repeating the message verbatim. For example, when a verbal order is taken, it is repeated back. Another example might occur in the obstetric area during an emergency. When the team leader calls for an action, such as “type and cross 2 units of blood,” the nurse would repeat back, “I am getting the type and cross for 2 units of blood.”

Despite these improvements, handoffs presented continuing challenges in project implementation, and staff meetings were held to discuss additional strategies. For example, it was determined that when someone answered a patient call light and used the overhead pager system to call for assistance, in addition to calling for “nurse to room 9,” the person responding needed to confirm that he or she attended to the patient. Institutionalizing handoffs was one means of consolidating improvements and producing still more change.

### ***Empowering Others to Act on Vision***

Empowering staff was another challenge of integrating the formalized team approach within a predetermined time frame. Small groups of approximately six participants were one strategy to overcome this obstacle. The small groups held brainstorming sessions, discussing the problems, potential solutions, and plan for further implementation. The process not only gave participants ownership of the project but also enhanced communication and shared vision. The staff responded extremely positively to this strategy, and a turning point in the initiative occurred after the brainstorming sessions. The staff felt empowered and took the lead with the project. To keep teams moving through the hard work of transformational change, valued relationships must be continuously nurtured (Pronovost & Goeschel, 2005).

### ***Creating Short-Term Wins***

Short-term wins need to be celebrated, but in some cases, celebrations can be misinterpreted. When a recognition ceremony was held to signify the end of the research data collection and congratulate staff on the successful

implementation of the MedTeams® training program concepts, participants perceived this as an end-of-project celebration. The end of data collection was interpreted as the end of the experimental team techniques.

It was found that staff members need to participate in decisions on what and when to celebrate. When project leadership made the determination, the purpose of the event was not clear. Staff involvement in this as in other aspects of project implementation supports a collegial climate where respect and teamwork are valued.

### ***Consolidating Improvements & Institutionalizing New Approaches***

As demonstrated in the examples above, institutionalizing new approaches and maintaining momentum for the project was challenging. Formalizing measurement of teamwork behaviors may be important. Adding teamwork behaviors to the annual performance evaluation was discussed by one institution to ensure ongoing momentum. Self-learning modules with the teamwork behavior concepts were also discussed as a method to promote and sustain momentum.

One institution sustained momentum by sending observers to a unit that was utilizing the MedTeams® teamwork behaviors. Observing role models as they applied team concepts during patient care had an impact on the staff during the site visit. The staff witnessed the benefits of the teamwork behaviors, which helped them in planning to apply the concepts in their own unit. Observation served as a motivating factor and increased enthusiasm among the staff. When staff determined their own goals, objectives, timeline, and plan for implementation, ongoing momentum and integration occurred more easily.

Maintaining individual and institutional vigilance and a global perspective on the importance of teamwork are essential. To anchor the teamwork concepts in the unit's culture, conscious efforts must be made to ensure that incoming staff and leadership are prepared to embrace the teamwork approach (Kotter, 1995). When solving patient care problems, staff must consider the unit as a whole to ensure success.

### ***Conclusion***

Changing a culture and integrating team training skills takes significant commitment and patience. The time frame for transforming an organization may take 1 to 2 years, if not longer. Staff must be intimately involved along with leaders in the decision making, timeline development, and action plan to ensure integration of teamwork behaviors.

Although the research component had an impact on the MedTeams® project, these challenges in the implementation of team coordination could occur in other practice settings. Team training alone will not ensure avoidance



of all adverse events. Ongoing vigilance and establishment of a teamwork culture promotes an environment of safety. Although the benefits of teamwork have been demonstrated, the blueprint for integration into care settings is less clearly delineated. Institutions considering implementation of a team training initiative should conduct a thorough self-evaluation to identify potential barriers and challenges and develop strategies to ensure successful progress and should include staff in all steps of the process.

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## REFERENCES

- Barrett, J., Gifford, C., Morey, J., Risser, D., & Salisbury, M. (2001). Enhancing patient safety through teamwork training. *Journal of Healthcare Risk Management*, 21, 57-65.
- Brown, M. S., Ohlinger, J., Rusk, C., Delmore, P., & Ittmann, P. (2003). Implementing potentially better practices for multidisciplinary team building: Creating a neonatal intensive care unit culture of collaboration. *Pediatrics*, 111, 482-488.
- Gayman, A., Gentner, G. C., & Canaras, S. A. (1996, December). *Implications of crew resource management training for tank crews*. Paper presented at the Interservice/Industry Training System and Education Conference, Orlando, FL.
- Grogan, E. L., Stiles, R. A., France, D. J., Speroff, T., Morris, J. A., Nixon, B., et al. (2004). The impact of aviation-based teamwork training on the attitudes of health-care professionals. *Journal of American College of Surgeons*, 199, 843-848.
- Grubb, G., Simon, R., & Zeller, J. L. (2001). *Effects of crew coordination training and evaluation methods on AH-64 attack helicopter battalion crew performance* (ARI CR 2002-10, DTIC No. ADA398770-E-DOC). Alexandria, VA: U.S. Army Research Institute for the Behavioral and Social Sciences.
- Heffner, J. E., Ellis, R., & Zeno, B. (2005). Safety in training and learning in the intensive care unit. *Critical Care Clinics*, 21, 129-146.
- Joint Commission on Accreditation of Healthcare Organizations. (2000). *Operative and post-operative complications: Lessons for the future* (Sentinel Event Alert. No. 12). Oak Brook, IL: Author.
- Joint Commission on Accreditation of Healthcare Organizations. (2004). *Preventing infant death during delivery* (Sentinel Event Alert No. 30). Oak Brook, IL: Author.
- Knox, G. E., Simpson, K. R., & Garite, T. J. (1999). High reliability perinatal units: An approach to the prevention of patient injury and medical malpractice claims. *Journal of Healthcare Risk Management*, 19, 24-32.
- Knox, G. E., Simpson, K. R., & Townsend, K. E. (2003). High reliability perinatal units: Further observations and a suggested plan for action. *Journal of Healthcare Risk Management*, 23, 17-21.
- Kohn, L. T., Corrigan, J. M., & Donaldson, M. S. (1999). *To err is human: Building a safer health system*. Washington, DC: National Academy Press.
- Kotter, J. P. (1995). Leading change: Why transformation efforts fail. *Harvard Business Review* [Product Number 4231], March-April, 59-67.
- Kotter, J. P. (1996). *Leading change*. Boston: Harvard Business School Press.
- Locke, A., Evangelista, J., Langford, V., Morey, J., Risser, D., Simon, R., et al. (2001). *MedTeams® Emergency Team Coordination Course®*. North Andover, MA: Dynamics Research Corporation.
- Miller, L. (2003). Safety promotion and error reduction in perinatal care: Lessons from industry. *Journal of Perinatal & Neonatal Nursing*, 17, 128-138.
- Morey, J. C., Simon, R., Jay, G., Wears, R., Salisbury, M., Dukes, K., et al. (2002). Error reduction and performance improvement in the emergency department through formal teamwork training: Evaluation results of the MedTeams® project. *Health Services Research*, 37, 1553-1581.
- Ohlinger, J., Brown, M. S., Lauder, S., Swanson, S., & Fofah, O. (2003). Development of potentially better practices for the neonatal intensive care unit as a culture of collaboration: Communication, accountability, respect, and empowerment. *Pediatrics*, 111, 471-481.
- Pronovost, P., & Goeschel, C. (2005). Improving ICU care: It takes a team. *Healthcare Executive*, 20, 14-16.
- Reason, J. (1990). *Human error*. New York: Cambridge University Press.
- Risser, D. T., Simon, R., Rice, M. M., & Salisbury, M. (1999). A structured teamwork system to reduce clinical errors. In P. L. Spath (Ed.), *Error reduction in health care: A systems approach to improving patient safety* (pp. 230-240). San Francisco: Jossey-Bass.
- Roberts, K. H. (1990). Some characteristics of high reliability organizations. *Organizational Science*, 1, 160-177.
- Salas, E., Burke, C., Bowers, C., & Wilson, K. (2001). Team training in the skies: Does crew resource management (CRM) training work? *Human Factors*, 43, 641-674.
- Spencer, F. (2000). Human error in hospitals and industrial accidents: Current concepts. *Journal of the American College of Surgeons*, 191, 410-418.
- Thomas, E. J., Sexton, J. B., & Helmreich, R. L. (2003). Discrepant attitudes about teamwork among critical care nurses and physicians. *Critical Care Medicine*, 31, 956-959.
- Thomas, E. J., Sherwood, G. D., Mulhollem, J. L., Sexton, J. B., & Helmreich, R. L. (2004). Working together in the

neonatal intensive care unit: Provider perspectives. *Journal of Perinatology*, 24, 552-559.

Yeager, S. (2005). Interdisciplinary collaboration: The heart and soul of health care. *Critical Care Nursing Clinics of North America*, 17, 143-148.

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