

AHRQ-Funded Patient Safety Project Highlights

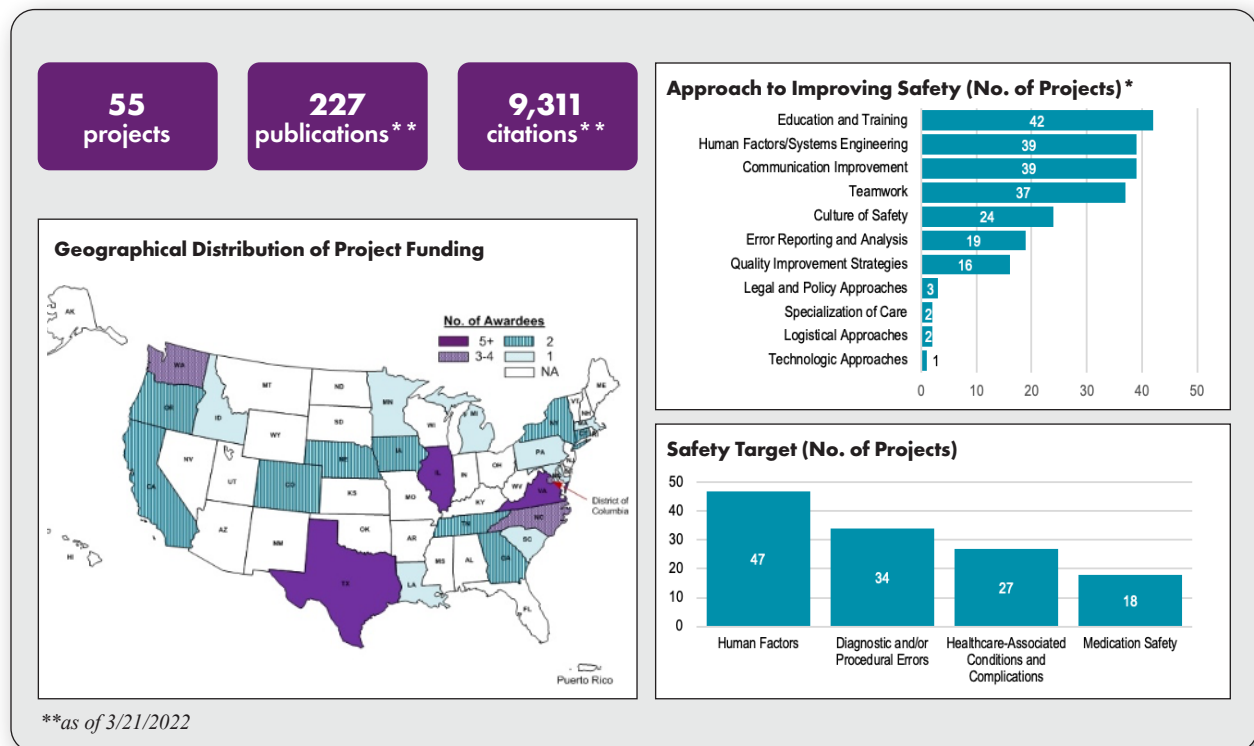
Improving Healthcare Safety by Enhancing Teamwork and Leadership

Overview

According to the Joint Commission, in 2022, failures in communication, teamwork, and consistent adherence to policies were the leading causes of sentinel events.¹ Research shows that improved teamwork reduces the number of medical errors and improves patient safety.² Since 2000, AHRQ has supported 55 patient safety projects to improve communication between healthcare providers and leadership skills among those in charge.

This publication summarizes AHRQ's investments in improving teamwork and leadership skills, from identifying communication breakdowns to using simulation training to enhancing communication skills. These projects provide tools that enhance skills for constructing a more effective and patient-centered healthcare delivery system. Details about each AHRQ-supported project are available in the [Appendix](#).

Scope of AHRQ Investments



¹ Sentinel Event Data 2022 Annual Review. The Joint Commission, 2023. [https://www.jointcommission.org/-/media/tjc/documents/resources/patient-safety-topics/sentinel-event/03162023_sentinel-event-annual-review_final-\(002\).pdf](https://www.jointcommission.org/-/media/tjc/documents/resources/patient-safety-topics/sentinel-event/03162023_sentinel-event-annual-review_final-(002).pdf). Accessed January 31, 2024.

² Baker JP, et al. Medical Teamwork and Patient Safety: The Evidence-Based Relation. Rockville, MD: AHRQ; July 2005. <http://archive.ahrq.gov/research/findings/final-reports/medteam/index.html>. Accessed January 31, 2024.

* The total number of projects on the graphics above is greater than 55 as some projects used more than one approach or addressed more than one safety target.



These 55 projects resulted in nearly 230 publications, which have been cited more than 9,000 times in other articles. The largest number of projects was awarded to institutions based in Virginia, followed by Illinois and Texas. Forty-four (80%) projects were applicable to all AHRQ priority populations. Forty-seven (85%) projects aimed to improve human factors, such as task, process, and/or workflow improvements; situation awareness; and mental mode (e.g., mindfulness). Education and training was the general approach to improving patient safety in 42 (76%) projects.

Examples of Project Findings

This collection of AHRQ-funded work produced education and training programs (including simulation) to foster teamwork skills, leadership competencies, and safety culture; teamwork performance measures and guidelines; and team-based error reporting and disclosure mechanisms. Examples of these projects and summaries of their results are provided below and organized by research themes identified in this collection of work.

Team Strategies and Tools To Enhance Performance and Patient Safety

TeamSTEPPS[®], an AHRQ flagship program developed in 2003 in collaboration with the Department of Defense, is a customizable teamwork training designed for healthcare professionals to improve communication and teamwork skills. The TeamSTEPPS curriculum was originally deployed in 2006 for hospitals. Subsequent updates to the program have helped to provide higher quality and safer care in additional healthcare settings (e.g., nursing homes, medical offices) in the United States and internationally. For example:

- A [pretraining intervention](#) that was developed to help small and rural hospitals implement and sustain TeamSTEPPS found that the more deliberate hospitals were in their attempt to launch TeamSTEPPS, the more likely they were to experience engagement, perceive efficacy, foresee and manage barriers, and achieve progress during implementation.
- A customized [2.5-hour version of the TeamSTEPPS training program](#) was implemented in a pediatric intensive care unit and a surgical intensive care unit, with both units showing improved teamwork behavior at 1 month and 12 months after implementation.
- Implementation of [TeamSTEPPS at five sites in Australia](#) showed the program's applicability, relevance, and adaptability in healthcare systems abroad.
- A [TeamSTEPPS curriculum modified for patients and their families](#) succeeded in increasing their knowledge about becoming an active participant of the healthcare team and reducing the gaps in communication that lead to error and, ultimately, liability claims.

Teamwork and Leadership Training via Simulation

Projects in this body of research focus on improving teamwork and leadership via simulation training. For example:

- The [Curricula for Simulated Obstetric Emergency Response Drills & Safety \(CORDS\)](#) program reduced medication errors and improved teamwork skills of experienced obstetric nursing and physician providers.
- [Trauma team leadership training](#) that used simulation-based scenarios, debriefing, and repeated simulation practice resulted in a roadmap for translational research in simulation and medical education. It could be adopted by national bodies and organizations.

Approaches to Team-Based Error Disclosure on Adverse Events and Medical Liability

Error disclosure is an important component of preventing errors in hospitals, which cause 250,000 deaths each year,³ according to the Institute of Medicine (since renamed the National Academy of Medicine) 1999 report, [To Err Is Human: Building a Safer Health System](#).⁴ AHRQ has supported team-based approaches to error disclosure. For example:

- The [Communication to Prevent and Respond to Medical Injuries](#) project resulted in the creation of the Collaborative for Accountability and Improvement. This collaborative has grown into an international network of healthcare leaders, attorneys, insurers, patient advocates, and researchers that seeks to create and implement model policies to support the communication and resolution process.
- A [simulation-based intervention](#) created to teach physicians and nurses about team-based error disclosure resulted in most participants enjoying the program, finding it educational, and supporting the concept of team disclosure.

Leadership in Healthcare

Several AHRQ-funded projects focused on improving team leadership. For example:

- [Discourse analysis to identify and predict leadership performance](#) showed that leaders *seeking control* through verbalizations is not related to efficiency, but *sharing* power is related to efficiency.⁵
- A [randomized controlled trial](#) showed that any leadership training paired with a structured debrief improved leadership and teamwork skills during simulation compared with no intervention.

Tools and Measures To Evaluate Teamwork

For institutions to gauge the impact of their teamwork and leadership efforts and to gather baseline data, AHRQ-funded research has produced a number of tools and measures. For example:

- The [Clinical Teamwork Scale \(CTS\)](#), a scale to measure teamwork skills, is used worldwide and known as one of the most reliable measurement tools in obstetrics.
- The [Collaborative Clinical Culture and Quality of Care](#) project created and validated a reliable measure of collaborative clinical culture that can be used in future research.

Impacts

AHRQ-funded projects have aimed to improve teamwork and leadership in healthcare settings. The 55 projects in this collection of work have achieved their aims with varied degrees of success but have collectively produced:

- Adaptations of TeamSTEPPS 2.0 to address teamwork and leadership in multiple healthcare settings and through multiple formats.
- Simulation programs to educate and improve healthcare professionals' teamwork and leadership skills.
- Tools and measures to evaluate interdisciplinary teamwork at the point of care and in simulation settings.
- The [Collaborative for Accountability and Improvement](#) to provide a systematic approach for institutions responding to cases of patient harm.

³ Study Suggests Medical Errors Now Third Leading Cause of Death in the U.S.; John Hopkins Medicine; May 2016. https://www.hopkinsmedicine.org/news/media/releases/study_suggests_medical_errors_now_third_leading_cause_of_death_in_the_us. Accessed January 31, 2024.

⁴ Institute of Medicine Committee on Quality of Health Care in America, Kohn LT, Corrigan JM, Donaldson MS, eds. *To Err is Human: Building a Safer Health System*. Washington, DC: National Academies Press; 2000. <https://pubmed.ncbi.nlm.nih.gov/2507248/>. Accessed January 31, 2024.

⁵ Parker S, Foti R, Hauenstein N, et al. Final Report: Using Discourse Analysis To Identify and Predict Leadership Performance in Dynamic Healthcare Teams. Washington, DC: Virginia Tech, Children's National Medical Center; 2018; 1-17.

In addition, the products and resources developed through this body of AHRQ-funded work have:

- Improved teamwork, leadership, and collaboration among multidisciplinary professionals within the healthcare setting.
- Increased knowledge and confidence and improved attitudes and behaviors about teamwork and leadership.
- Brought together a community of research experts who attend conferences to create guidelines and recommendations to expand knowledge on teamwork and leadership.
- Created and validated reliable measures of collaborative clinical culture that can be used in future research.
- Disseminated findings, tools, and programs via conferences and meetings; published articles in peer-reviewed journals, websites, and online networks; and integrated findings into healthcare systems.

To learn more about each AHRQ-supported teamwork and leadership project, refer to the [Appendix](#) that follows.

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Appendix

Teamwork and Leadership Project Summary

This appendix briefly describes AHRQ-funded projects related to teamwork and leadership. Projects are organized first by state, then by original date of funding. In addition, the projects listed below are linked to the [NIH RePORTER](#)—an electronic tool that allows users to search a repository of federally funded research projects and access publications resulting from such funding.

Principal Investigator Organization City, State	Project Number [Type] Project Title Project Period Total Investment	Purpose and Key Findings/Impact Number of Publications (Products)
CALIFORNIA		
Jay Callahan Annenberg Center for Health Sciences Rancho Mirage, California National Patient Safety Foundation (NPSF) Boston, Massachusetts	R13 HS10955 [Grant] Conference on Communication and Patient Safety 2001 \$21,200	Purpose: To focus on the crucial role of communication research to reduce impaired and dysfunctional communication, a major contributor to medical error; improve patient safety; and propel this form of research into a central position of importance in the field of patient safety. Key Findings/Impact: This conference opened the door in 2001 to discussing error disclosure and team-based approaches at an international conference of nearly 700 participants. Although a final report was not available, a review (Robson, 2001) of the event noted that participants included physicians, nurses, and risk managers. Several patients who had been injured while receiving medical care gave presentations. The conference also included videotaped examples of how to discuss errors, as well as a simulated mediation case. Presenters pointed out that a team-based collaborative approach is needed to introduce the changes that can prevent errors, but existing systems usually rely on a punitive “blame-and-shame” approach that does not lead to effective learning or change. Publications: 1
Sheldon Greenfield University of California Irvine, California	R01 HS11991 [Grant] Collaborative Clinical Culture and Quality of Care 2001-2006 \$781,931 Final Report	Purpose: To assess the responses of primary care practices and their patients after a major quality-oriented system reorganization in terms of practice climate, job satisfaction, and quality of care. Key Findings/Impact: This project resulted in two major products: (1) a valid and reliable measure of collaborative clinical culture (CCC) and (2) the demonstration of a relationship between CCC and patient outcomes. Sixteen primary care practices, including patients and support staff, were surveyed at 3- and 5-years postimplementation. Quality of care data were compiled from computerized administrative data. The findings showed: <ul style="list-style-type: none">• Practitioners and support staff members reported higher job satisfaction in high CCC practices than in low CCC practices.• Diabetes patients treated in high CCC practices experienced improved clinical outcomes in terms of glycemic and lipid control compared with those treated in low CCC practices.• Job satisfaction among practitioners and support staff members in a practice did not predict clinical outcomes in its patients.• Patients treated in high CCC practices were more likely to be satisfied with their medical visit than patients treated in low CCC practices. This research is significant because identifying predictors of successful interventions may help shape future system design efforts. CCC may be one such predictor linking the introduction of systems change to measurable improvements in patient outcomes, including clinical outcomes and patient satisfaction. Publications (Products): 3 (1)

Principal Investigator Organization City, State	Project Number [Type] Project Title Project Period Total Investment	Purpose and Key Findings/Impact Number of Publications (Products)
Sandrin Van Schaik University of California, San Francisco	R03 HS27493 [Grant] A Novel Debriefing Strategy for Interprofessional Simulation-Based Team Training To Improve Patient Safety 2020-2022 \$99,999 Final Report	<p>Purpose: To create structured guidelines for debriefing interprofessional simulations to include learning about team dynamics and development of collaborative skills, thereby improving collaboration and decreasing patient safety events.</p> <p>Key Findings/Impact: The researchers developed and implemented guidelines for prebriefing and debriefing interprofessional simulation-based team training (ISBTT), using an interprofessional approach to facilitation that promotes discussions about teamwork, collaboration, hierarchy, and power, as well as perspective taking. Future work will explore how such an approach affects interprofessional collaboration in clinical practice and patient care.</p> <p>This study is the first to take an education research design approach to the development and implementation of guidelines for ISBTT and makes an important contribution to the existing literature. The guidelines can be adapted by others and provide a basis for additional research examining individual and contextual factors contributing to the success of ISBTT in optimizing interprofessional collaboration.</p> <p>This work reinforces previous observations that power dynamics and hierarchy are persistent factors that influence how interprofessional teams function in simulation and in actual patient care. It also indicates that culture change to shift such dynamics can happen but takes time, training, and reinforcement. It also requires close attention to any barriers and consideration of all stakeholder needs.</p> <p>Publications: 0</p>
COLORADO		
Kay Daugherty Denver Health and Hospital Authority, University HealthSystem Consortium Denver, Colorado	U18 HS15846 [Grant] Improving Patient Safety Through Provider Communication 2005-2007 \$599,081 Final Report	<p>Purpose: To develop, implement, and evaluate a safe practice intervention involving a comprehensive strategy for provider team communication, resulting in an implementation toolkit that can be generalized to other settings of care.</p> <p>Key Findings/Impact: Researchers designed, implemented, and evaluated a standardized communication technique called SBAR (Situation, Background, Assessment, Recommendation). SBAR was used as a situational briefing guide for staff and provider communication regarding changes in patient status or needs for nonemergent events, related issues, or events on the unit, in the lab, or within the healthcare team.</p> <p>To evaluate an SBAR toolkit, researchers conducted a pre-post study at a 477-bed medical center of Denver Health and Hospital Authority, an integrated urban safety net system. Baseline and postintervention data were collected on pilot units (i.e., medical intensive care unit, acute care unit, and inpatient behavioral health units). Implementation of the safe communication strategies involved extensive staff education using multiple strategies: presentations by a communication expert, unit-based “fast talks,” visual reminders, a structured communication tool (SBAR), and communication forms.</p> <p>Analysis of 495 communication events initiated by nursing staff revealed decreased time to treatment, increased nurse satisfaction with communication, and higher rates of resolution of patient issues postintervention. This project revealed that strategies to enhance teamwork and communication can be successfully implemented in the acute care setting and result in more efficient and effective communication.</p> <p>Publications (Products): 3 (1)</p>

Principal Investigator Organization City, State	Project Number [Type] Project Title Project Period Total Investment	Purpose and Key Findings/Impact Number of Publications (Products)
Marisha Burden University of Colorado Denver, Colorado	R03 HS27231 [Grant] Inpatient Provider Rounding Prioritization of Patients Ready for Discharge 2020-2022 \$100,000 Final Report	<p>Purpose: To test the effects of inpatient physicians rounding on patients ready for discharge first compared with usual practice. The goal was to determine whether a decrease in time to discharge would occur and if prioritizing discharges would cause delays with other patients (e.g., sickest patients, decompensating patients, new patients).</p> <p>Key Findings/Impact: A prospective randomized controlled trial was conducted at three large academic medical centers for 6 months. Thirty physicians were randomized to rounding on discharging patients first, or as care allowed, and 31 were assigned to rounding as usual (the control). Patients were discharged about 50 minutes earlier in the day, on average (12:37 p.m. vs. 1:28 p.m.) with the intervention. Length of stay was not significantly reduced. Despite the findings, researchers found the tactic of rounding on discharging patients first while balancing other patients can disrupt workflows. They found it “does not appear to improve throughput.”</p> <p>Publications: 1</p>
CONNECTICUT		
Beverly Belton Yale New Haven Health Services Corporation New Haven, Connecticut	290-06-00015-1 [Contract] TeamSTEPPS Adoption in ACTION 2007-2009 NA	<p>Purpose: To stimulate the adoption and documentation of the use of TeamSTEPPS® and teamwork training within ACTION partner healthcare delivery systems.</p> <p>Key Findings/Impact: A final report was not available and articles for this project were not found.</p> <p>Publications: 0</p>
Ingrid Nembhard Yale University New Haven, Connecticut	K01 HS18987 [Grant] Understanding the Implementation of New Practices in Health Care Organizations 2010-2015 \$488,402 Final Report	<p>Purpose: To increase implementation of evidence-based practices by advancing knowledge on contributors to implementation success.</p> <p>Key Findings/Impact: Researchers implemented practices focused on improving treatment time for patients with a common type of heart attack (i.e., ST-segment elevation myocardial infarction [STEMI]). At the time of this study, fewer than half of U.S. hospitals had median treatment times that complied with national guidelines. In addition, most hospitals had not implemented recommended practices.</p> <p>The researchers studied a sample of hospitals that joined a campaign (i.e., D2B Alliance) to improve door-to-balloon time for STEMI. They used mixed methods, using qualitative data from interviews of staff at 12 hospitals; quantitative survey data from more than 500 hospitals; and treatment times from Hospital Compare, a website operated by the Centers for Medicare & Medicaid Services that publishes performance data.</p> <p>The findings showed that implementation leaders’ behavior focused mostly on addressing implementation challenges. The four most common challenges were (1) interprofessional tensions, (2) lack of staff engagement, (3) competing demands, and (4) dwindling momentum. In the hospitals that experienced significant performance improvement, leaders used multiple strategies to address each challenge, such as relational and structural strategies. Whether staff voiced their improvement ideas was influenced by characteristics of individuals, work, organizational context, data, and the external environment. These factors shaped staff’s sense of safety, efficacy, opportunity, and legitimacy, all of which affected their willingness to share ideas.</p> <p>The benefit of accessing different organizational groups for implementing practices depended on whether the practice was role changing or time changing for staff. Implementing imported practices helped hospitals achieve initial phase improvement but not later phase improvement. Once hospitals entered the later phase, significant improvement required creative problem solving.</p> <p>Publications: 14</p>

Principal Investigator Organization City, State	Project Number [Type] Project Title Project Period Total Investment	Purpose and Key Findings/Impact Number of Publications (Products)
GEORGIA		
Tracy Scott Emory University Atlanta, Georgia	R03 HS14442 [Grant] The Hospitalist-Nurse Relationship and Patient Safety 2004-2005 \$94,184	Purpose: To better understand how hospitalists interact with nurses, particularly as this interaction affects perceptions of teamwork and the frequency of medical errors, and develop the most appropriate interventions to address weaknesses in teamwork within the hospital. Key Findings/Impact: A final report was not available, and publications for this project were not found. Publications: 0
ILLINOIS		
Kevin O'Leary Northwestern University Chicago, Illinois	R18 HS19630 [Grant] INTERdisciplinary Approaches to Communication and Teamwork (INTERACT) 2010-2012 \$498,366	Purpose: To evaluate and characterize teamwork during interdisciplinary rounds. Key Findings/Impact: Researchers conducted a cross-sectional observational study in six medical units that had implemented structured interdisciplinary rounds (SIDR). Researchers adapted the Observational Teamwork Assessment for Surgery (OTAS) tool, a behaviorally anchored rating scale shown to be reliable and valid in surgical settings. OTAS provides scores ranging from 0 to 6 (0=problematic behavior; 6=exemplary behavior) across five domains (communication, coordination, cooperation/backup behavior, leadership, and monitoring/situational awareness) and for prespecified subteams. Two researchers conducted direct observations using the adapted OTAS tool. Results showed that the adapted OTAS instrument demonstrated acceptable reliability for assessing teamwork during SIDR across units, domains, and most subteams. Although teamwork scores during SIDR were generally high, the researchers found variation in performance across units, domains, and subteams. Variation in performance is notable in light of their efforts to implement a consistent format for SIDR across units. Specifically, all units have similar timing, duration, frequency, and location of SIDR, use a structured communication tool for new patients, expect the same professions to be represented, and use coleaders to facilitate discussion. Researchers believe teamwork within IDR likely varies across units in other hospitals. This study fills an important gap in the literature because little if any research has evaluated teamwork during IDR, which is commonly used in hospitals. Publications: 4
Steve Hines Health Research and Educational Trust (HRET) Chicago, Illinois	290-10-00025i-2 [Contract] The Continuation and Expansion of the National Implementation of TeamSTEPPS 2011-2014 \$3,383,782	Purpose: To continue to deploy and implement a program for the support of the adoption and use of TeamSTEPPS by health systems, healthcare provider institutions, and health profession educational institutions nationwide. Key Findings/Impact: A final report was not available and articles for this project were not found. Publications: 0
Steve Hines Health Research and Educational Trust (HRET) Chicago, Illinois	290-10-00025i-6 [Contract] Implementation of TeamSTEPPS in Primary Care Settings (ITS-PC) 2012-2015 \$1,755,060	Purpose: To create a primary care TeamSTEPPS training kit that will serve as the underpinning for the national implementation of TeamSTEPPS in primary care. Key Findings/Impact: A final report was not available and articles for this project were not found. Publications: 0

Principal Investigator Organization City, State	Project Number [Type] Project Title Project Period Total Investment	Purpose and Key Findings/Impact Number of Publications (Products)
Steve Hines Health Research and Educational Trust (HRET) Chicago, Illinois	290-10-00025i-9 [Contract] Phase II of the Continued National Implementation of TeamSTEPPS 2014-2016 \$3,000,000	Purpose: To continue to deploy and implement a program for the support of the adoption and use of TeamSTEPPS by health systems, healthcare provider institutions, and health profession educational institutions nationwide. Key Findings/Impact: A final report was not available and articles for this project were not found. Publications: 0
Shanelle Jackson Health Research and Educational Trust Chicago, Illinois	HHSP233201500016i- HHSP23337005T [Contract] TeamSTEPPS for Office-Based Care Online CE/CME 2016-2021 \$1,373,276	Purpose: To accredit the existing TeamSTEPPS for Office-Based Care course as an accredited online training program paired with technical assistance. For the purposes of the task order, the type of technical assistance provided was mentoring. Key Findings/Impact: A final report was not available and articles for this project were not found. Publications: 0
Kevin O'Leary Northwestern University Chicago, Illinois	R18 HS25649 [Grant] Redesigning Systems To Improve Quality for Hospitalized Patients 2017-2023 \$1,974,465 Final Report	Purpose: To implement a set of evidence-based complementary interventions across a range of clinical microsystems, identify factors and strategies associated with successful implementation, and evaluate the impact on quality. Key Findings/Impact: According to O'Leary, et al., 2020 , researchers conducted a cross-sectional study, finding significant differences in perceptions of teamwork climate across sites and in collaboration across professional categories on general medical services. The quality of collaboration ratings differed significantly based on professional category. For example, 63.3 percent (50/79) of hospitalists rated the quality of collaboration with nurses as high or very high, whereas 48.7 percent (94/193) of nurses rated the quality of collaboration with hospitalists as high or very high. Researchers concluded that because of the difference in perceptions, leaders should conduct similar evaluations on general medical services within their own hospitals to provide high-quality care. Publications: 5
IOWA		
Kelli Vellinga University of Iowa Des Moines, Iowa	290-06-0021-1 [Contract] TeamSTEPPS Adoption in ACTION 2007-2009 \$249,994	Purpose: To stimulate the adoption and documentation of the use of TeamSTEPPS® and teamwork training within ACTION partner healthcare delivery systems. Key Findings/Impact: A final report was not available and articles for this project were not found. Publications: 0

Principal Investigator Organization City, State	Project Number [Type] Project Title Project Period Total Investment	Purpose and Key Findings/Impact Number of Publications (Products)
Xi Zhu University of Iowa Iowa City, Iowa	R03 HS24112 [Grant] Pre-Training Intervention for Expedited TeamSTEPPS Implementation in Critical Access Hospitals 2015-2017 \$98,369	<p>Purpose: To develop a pretraining intervention specifically designed to assist critical access hospitals to prepare for TeamSTEPPS.</p> <p>Key Findings/Impact: Small and rural hospitals face special challenges to implement and sustain organizationwide quality improvement (QI) initiatives due to limited resources and infrastructures. Drawing on QI and organizational development theories, five strategic preparation steps for TeamSTEPPS were proposed: assess needs, reflect on the context, set goals, develop a shared understanding, and select change agents.</p> <p>Exploring how hospitals' practices correspond to suggested best practices by analyzing qualitative data collected through quarterly interviews with key informants, researchers found that the level of deliberation was a key factor that differentiated hospitals' practices. Hospitals that were more deliberate in preparing for the five strategic steps were more likely to experience engagement, perceive efficacy, foresee and manage barriers, and achieve progress during implementation.</p> <p>Publications (Products): 4 (1)</p>
LOUISIANA		
Sheila Chauvin Louisiana State University Health Sciences Center New Orleans, Louisiana	U18 HS16680 [Grant] Evaluation of the System for Teamwork Effectiveness and Patient Safety (STEPS) 2006-2008 \$533,549	<p>Purpose: To implement, evaluate, and refine an innovative and interdisciplinary simulation-based training model designed to improve teamwork and patient safety in operating room (OR) environments.</p> <p>Key Findings/Impact: A final report was not available, but a related article (Paige, et al., 2009) details the creation of a portable simulation platform, the mobile mock OR (MMOR) in the System for Teamwork Effectiveness and Patient Safety (STEPS) program. The MMOR allows team training to be brought over long distances to the point of care.</p> <p>Researchers examined the effectiveness of this simulation-based interdisciplinary OR team training model on 38 OR personnel. Participants completed pre- and postsession surveys. The average pre- to postsession gain based on the total scale score was 0.4 units on the 6-point Likert-type scale. Net gains in the percentages of valid responses for the "completely confident" rating of 6 were noteworthy: 24 percent for the role clarity item, 33 percent for the anticipatory response item, 34 percent for the cross-monitoring item, and 40 percent for the overall team cohesion and interaction item.</p> <p>Researchers also developed a department-level questionnaire and 360-item self- and peer-assessment tool targeting teamwork competencies that is supplemented by periodic focus groups, interviews, and direct observations. This work built on prior research on nontechnical skills performance in the OR, both team and discipline based. Researchers found that initial results offered encouraging evidence that high-fidelity, simulation-based interdisciplinary OR team training conducted at the point of care is feasible and can positively affect participants' self-efficacy for performing teamwork competencies in the real-life OR setting.</p> <p>Publications (Products): 5 (3)</p>

Principal Investigator Organization City, State	Project Number [Type] Project Title Project Period Total Investment	Purpose and Key Findings/Impact Number of Publications (Products)
MARYLAND		
Michael Rosen Johns Hopkins University Baltimore, Maryland	R03 HS24591 [Grant] Developing Peer to Peer Learning Tools for Critical Care Physicians: Peer- and Competency-based Ongoing Approach for Critical Healthcare Evaluation of Skills (P-COACHES) 2016-2018 \$99,616	<p>Purpose: To develop a peer-to-peer assessment system that is theory driven, context appropriate, and psychometrically sound to evaluate teamwork-related skills and patient-centered performance and to develop mechanisms to facilitate adoption and use for peer coaching and feedback.</p> <p>Key Findings/Impact: Researchers found 53 studies that had used peer assessment systems to investigate technical and nontechnical competencies in physicians. The most common area in which assessments were conducted was internal medicine and family medicine. Although a handful of studies developed tools to conduct assessments, the psychometric properties of these tools were not clearly established.</p> <p>Researchers developed a 38-item tool to assess physician competencies in four dimensions: plan of care, team management and norms, teaching and feedback, and patient/family interactions. G study analysis indicated a fair level of measure dependability (G coefficient of 0.6) and guidance on improving future iterations of peer assessment tools, including appropriate numbers of raters and rating items to include in measurement systems. Researchers concluded the literature review highlighted the lack of tools available to structure peer-to-peer feedback on teamwork behaviors. This project provides a practical tool and robust psychometric evaluation of generalizability and dependability of ratings generated using the tool.</p> <p>Publications (Products): 0 (1)</p>
Abt Associates Rockville, Maryland	75Q80120D00010 [Contract] R31. TeamSTEPPS Curriculum Updates 2021-2022 \$699,144	<p>Purpose: To (1) update the different versions of AHRQ's existing online TeamSTEPPS curriculum and create a single comprehensive curriculum aligned with current medical standards and practices in healthcare delivery that depend on teamwork; and (2) provide regular communications on progress and lessons learned with AHRQ in accomplishing the primary objective.</p> <p>Key Findings/Results: New research related to teams, team performance, communication, and adult learning led to the creation of TeamSTEPPS 3.0. Emphasizing patient engagement, it received input from healthcare professionals in hospitals, long-term care facilities, and outpatient practices. This new version of the training provides a modular course design, using active learning strategies.</p> <p>Publications: 0</p>
MICHIGAN		
Milisa Manojlovich University of Michigan Ann Arbor, Michigan	R03 HS24760 [Grant] Videotaping Communication Between Physicians and Nurses: A Methods Study 2016-2017 \$100,000 Final Report	<p>Purpose: To determine if video reflexive ethnography (VRE), which allows observation of social and relational interactions, could capture communication events between physicians and nurses and help define mutual understanding.</p> <p>Key Findings/Impact: Researchers recruited 14 physicians and followed them during their rounding process on a given day. They then recruited 56 nurses in person before a scheduled video recording session. Conversations between a physician/nurse dyad ranged from 48 seconds to almost 5 minutes in length.</p> <p>The next phase of this project was educating physicians and nurses about their communication behaviors. The intervention potential of VRE and capacity for building mutual understanding was demonstrated during the final phase because the dyads discussed their unique perspectives; at least one dyad appeared to come to a mutual understanding regarding a clinical situation.</p> <p>Each member of another physician/nurse dyad described how participating in the study would change their communication practices going forward. By establishing the feasibility of using the VRE methodology for this significant problem, researchers can now focus on testing the efficacy of a VRE intervention to improve communication.</p> <p>Current approaches to improving communication between physicians and nurses have primarily concentrated on strategies for developing and supporting interdisciplinary teams and checklists. The lack of progress in preventing communication-related adverse events suggests that alternative approaches with more potential to identify and improve communication problems, such as VRE, are needed.</p> <p>Publications (Products): 6 (1)</p>

Principal Investigator Organization City, State	Project Number [Type] Project Title Project Period Total Investment	Purpose and Key Findings/Impact Number of Publications (Products)
MINNESOTA		
University of St. Thomas Saint Paul, Minnesota	290-10-00013C [Contract] Development of an Execution Curriculum for Health Care Physician Leaders and Managers 2010-2012 \$199,873	Purpose: To develop, evaluate, and further refine an educational curriculum and delivery methodology designed to help physician leaders and managers significantly improve the execution of strategies by their healthcare delivery organizations. Key Findings/Impact: A final report was not available and articles for this project were not found. Publications: 0
NEBRASKA		
Katherine Jones University of Nebraska Medical Center Omaha, Nebraska	R18 HS21429 [Grant] CAPTURE Falls: Collaboration and Proactive Teamwork Used To Reduce Falls 2012-2014 \$599,990	Purpose: To implement the safe practice of inpatient fall risk reduction using interprofessional coordinating teams in small rural hospitals. Key Findings/Impact: Researchers first conducted a baseline risk assessment. They found that fall risk was significantly greater in Nebraska's rural hospitals than in non-critical access hospitals (CAHs) due to a lack of structure of accountability and coordination of fall risk reduction processes at the organizational level. Researchers collaborated with 17 small rural hospitals to implement the Collaboration and Proactive Teamwork Used to Reduce (CAPTURE) Falls intervention to improve safety. They conducted a pre-post observational study that used AHRQ Common Formats to standardize fall event reporting and develop valid benchmarks for CAHs. Results showed that the more effective the coordinating team was, the fewer total and injurious fall incidents. Effective coordinating teams included engaged members from quality improvement, nursing, rehabilitation therapies, and pharmacy. They standardized the structure and process of fall risk reduction at the organizational level. They selected a fall risk assessment tool, educated staff to choose appropriate interventions linked to risk factors, conducted audits to ensure accountability, and communicated with staff regarding actions taken as a result of reported falls. Publications (Products): 21 (1)

Principal Investigator Organization City, State	Project Number [Type] Project Title Project Period Total Investment	Purpose and Key Findings/Impact Number of Publications (Products)
Katherine Jones University of Nebraska Medical Center Omaha, Nebraska	R03 HS24630 [Grant] Producing Evidence: Coordination Within a Multiteam System Makes Healthcare Safer 2016-2017 \$99,994 Final Report	<p>Purpose: To analyze existing data collected using AHRQ tools to produce evidence that effective coordination within a multiteam system (MTS) makes healthcare safer.</p> <p>Key Findings/Impact: Researchers used a one-group pre-post design embedded in a participatory research framework. Depending on the level and correlated nature of the data, they used descriptive statistics, logistic regression, multilevel modeling, Poisson rate models, and nonparametric regression. Multiple findings were found:</p> <ul style="list-style-type: none"> • The greater the reflexivity of the fall-risk-reduction coordinating team, the better the team could fully implement their desired interventions and the lower were the total and unassisted fall rates. • The MTS structure and coordination processes improved the capacity of hospitals to manage the complexity of the multiple factors that cause falls. Thus, MTS processes predicted fall-related outcomes. • The repeat fall rate within a hospital was negatively associated with the percentage of falls that were followed by a postfall huddle (Spearman's rho = - 0.47, p=0.07). Compared with hospital staff who did not participate in huddles, those who participated in at least one huddle had significantly more positive perceptions of how aspects of team structure, team leadership, and situation monitoring supported fall risk reduction. They also had more positive perceptions of aspects of organizational learning, nonpunitive response to error, teamwork across hospital departments, and hospital handoffs and transitions. • Over a 2-year period, 353 falls were reported; 32 percent of the falls were injurious and 75 percent were unassisted. Pearson Chi-Square Test or Exact Pearson Chi-Square Test was used to determine the bivariate association between patient and system factors and fall type and fall outcome. Statistical significance was set at ≤ 0.05. Many factors that increased the odds of a fall being unassisted or injurious in rural hospitals were consistent with research conducted in larger facilities. A key finding is the impact of gait belt usage. Identifying a gait belt as an intervention decreases the odds of patients falling unassisted. Using a gait belt during an assisted fall decreases the odds of injury. <p>Publications: 7</p>
NEW YORK		
Weill Medical College of Cornell University New York, New York	290-00-0013-5 [Contract] An Examination of the Role of Leadership in Enhancing Patient Safety 2002-2003 \$294,323	<p>Purpose: To better understand the role of leadership within healthcare organizations and the role of leaders in promoting a "culture" for workplace safety by conducting the following activities: (1) convene a national conference on patient safety and the role of organizational leadership; (2) produce dissemination materials to document the national conference proceedings and the results from two literature reviews; (3) conduct a detailed literature review on workplace safety among nonhealthcare organizations; and (4) conduct a detailed literature review of methods to promote patient safety and sustainable organizational change in healthcare.</p> <p>Key Findings/Impact: A final report was not available and articles for this project were not found.</p> <p>Publications: 0</p>

Principal Investigator Organization City, State	Project Number [Type] Project Title Project Period Total Investment	Purpose and Key Findings/Impact Number of Publications (Products)
Sondra Ruth Zabar New York University Medical Center New York, New York	R18 HS24669 [Grant] Safe Delivery of Primary Care to Vulnerable Populations: Using Simulation (Unannounced Standardized Patients) To Assess Team Performance in Responding to Behavioral and Social Determinants of Health 2016-2019 \$748,621 Final Report	<p>Purpose: Social determinants of health (SDOH) have significant impact on disease onset and treatment adherence. This project used unannounced standardized patients (USPs) to describe how care teams respond to SDOH and assess the impact of cycles of audit/feedback reports on their response.</p> <p>Key Findings/Impact: USPs are trained actors sent into clinical environments to provide an incognito assessment of provider skills. Six USP cases, each presenting with SDOH (i.e., financial hardship, housing insecurity, social isolation) were sent into clinics. USPs volunteered financial hardship while only sharing housing/social concerns when elicited. USPs recorded provider responses to volunteered and elicited/not-elicited SDOH.</p> <p>Results were distributed via quarterly reports that also included targeted educational content. Surveys of team members assessed attitudes toward SDOH. Results showed 417 USP visits were delivered along with five cycles of audit/feedback reports to five primary care teams. Baseline rates of acknowledging SDOH were greater than 66 percent; however, referrals to resources were made in fewer than one-third of visits. Providers were more likely to elicit and follow up on SDOH related to housing than social isolation.</p> <p>Team members endorsed the importance of asking about and acting on patients' SDOH. Baseline rates of SDOH response did not differ by team. Preliminary results suggest the audit/feedback reports may have led to short-term improvements in SDOH response.</p> <p>Publications: 21</p>
NORTH CAROLINA		
Jeffrey Taekman Duke University Medical Center Durham, North Carolina	U18 HS16653 [Grant] Virtual Health Care Environments Versus Traditional Interactive Team Training 2006-2009 \$291,253 Final Report	<p>Purpose: To determine if a difference occurred in knowledge, skills, and attitudes resulting from different teamwork training interventions, such as videotaped lectures (as control), mannequin-based simulation (MBS), or virtual environment (VE) simulation training.</p> <p>Key Findings/Impact: Thirty-eight nonanesthesiology senior residents and nurse practitioners in training and practice were selected and randomized to MBS, VE, or videotaped lectures. They were evaluated on knowledge, skills, and attitudes pre-, post-, and 3-months-post training intervention. Researchers used SAFE-Teams—a method of assessing individual team skills using standardized actors—to measure skills, and then SAFE-Team scores were converted to Z scores.</p> <p>The mean SAFE-Teams pretest score across all participants in the three training conditions was 4.33 (or a Z-score of -0.33). On average, individuals increased their score by 0.97 (Z-score of 0.50) immediately after training and by 1.11 (Z-score of 0.59) 3 months after training.</p> <p>Comparisons within training condition using Wilcoxon Non-Parametric Matched Pairs analyses of pre- and posttest scores revealed that control and VE conditions significantly improved SAFE-Team scores immediately after training. There was a trend toward improvement in the MBS condition (p=0.11). Long term, participants in the MBS and VE training conditions improved their performance. There was a trend toward improvement in the control condition (p=0.11). The Wilcoxon Sum of Ranks tests revealed no significant differences.</p> <p>Publications (Products): 6 (2)</p>

Principal Investigator Organization City, State	Project Number [Type] Project Title Project Period Total Investment	Purpose and Key Findings/Impact Number of Publications (Products)
Jackie Amoozegar Research Triangle Institute Research Triangle Park, North Carolina	290-06-00001-4 [Contract] TeamSTEPPS Adoption in ACTION 2007-2009 \$248,236	<p>Purpose: To document and evaluate the adoption and implementation of TeamSTEPPS and determine the impact of this training on teamwork and the process of care in two clinical microsystems (i.e., pediatric and surgical intensive care units [PICU and SICU]) within the University of North Carolina (UNC) at Chapel Hill Health Care System.</p> <p>Key Findings/Impact: A final report was not provided, but an article about the project (Mayer, et al., 2011) describes methods used when TeamSTEPPS was implemented in UNC's PICU and SICU. Researchers found a 2.5-hour streamlined approach consisting of action planning steps and educational materials showed effectiveness in implementing TeamSTEPPS in the PICU and SICU. Interview data analysis indicated that implementation was perceived positively.</p> <p>After implementation, significant improvements were found postimplementation at 1 month and 12 months for teamwork behavior via observations of a variety of teamwork events. In addition, the time it took to place patients on extracorporeal membrane oxygenation (used as a team process measure) decreased significantly postimplementation compared with preimplementation.</p> <p>Publications (Products): 1 (1)</p>
Tina Schade-Willis University of North Carolina Chapel Hill, North Carolina	R13 HS21791 [Grant] Regional Patient Safety Officer Conference - Learning Together Today and Tomorrow 2012-2013 \$38,502 Final Report	<p>Purpose: To build social capital, disseminate social science research, and connect graduate-level students with patient safety officers (PSOs) as potential research partners.</p> <p>Key Findings/Impact: A 1-day conference was held October 19, 2012, at North Carolina Quality Center in Cary. The Regional Patient Safety Officer Conference was the first of its kind to purposefully create time and space for PSOs and students to develop social capital that can contribute to individual organizations, the region, and beyond. The design for the conference was based on adult learning theory.</p> <p>The impact of the conference was evaluated using Kirkpatrick's Taxonomy of Training Criteria. Researchers learned that even the largest healthcare organizations typically have only one person in the PSO role for the prevention of patient harm. But it is one of the most important operational and consultative roles in healthcare. There is no professional organization for PSOs, and the tacit sense of competition between organizations further hampers building relationships.</p> <p>Future research contributing to the understanding of preventing patient harm and addressing the issues PSOs see everyday will require student researchers to have access to the living laboratories—the hospital environment.</p> <p>Publications: 0</p>

Principal Investigator Organization City, State	Project Number [Type] Project Title Project Period Total Investment	Purpose and Key Findings/Impact Number of Publications (Products)
OREGON		
Jeanne-Marie Guise Oregon Health and Science University Portland, Oregon	U18 HS15800 [Grant] Using Military & Aviation Simulation Experience To Improve Patient Safety 2005-2009 \$479,967 Final Report	<p>Purpose: To improve the process of obstetric care and promote safety in rural communities through simulation and team training.</p> <p>Key Findings/Impact: This project:</p> <ul style="list-style-type: none"> • Created the Curricula for Simulated Obstetric emergency Response Drills & Safety (CORDS) program that is being used across the country to improve the process of care and promote safety. • Created and validated the Clinical Teamwork Scale (CTS) tool that measures key factors in teamwork in simulated and clinical settings. • Demonstrated how to use information technology and simulated education to support a statewide safety culture. • Modeled how to use and evaluate the effectiveness of simulations to learn new teamwork skills and enhance the process of care and safety in rural healthcare systems. <p>Overall, researchers found the CORDS program improved teamwork skills of experienced nursing and physician providers. Furthermore, these skills were retained and applied to new situations up to 1 year after initial training.</p> <p>In scenario-specific simulation, there was a trend toward improved response times at baseline among teams who received team training prior to the shoulder dystocia. A 30 percent improvement in time was achieved from delivery of head to delivery of body after team training and initial simulation ($p < 0.05$, one sample t test) during shoulder dystocia simulation. In addition, management of postpartum hemorrhage improved significantly after team training across all measures, including recognition and time to deliver each medication. Finally, teamwork and safety behaviors were applied to a new scenario that was conducted in followup visits.</p> <p>More than 94 percent of participants reported the program was useful and likely to improve teamwork, communication, and safety. Simulation of obstetric emergencies and teamwork training are highly valuable measures to improve safety and quality across maternity provider types and practice settings.</p> <p>Since its validation, the CTS tool has been used by researchers around the world. In van Tetering, et al. (2021), Netherland researchers used the CTS tool in a randomized control trial conducted in Uganda to evaluate the instructional design of a technology-enhanced simulation-based training in obstetrics. In Weingart, et al. (2018), researchers at Tufts University in Boston examined the CTS tool and eight others in its examination of existing instruments used to assess medical teams' performance.</p> <p>Publications (Products): 10 (2)</p>

Principal Investigator Organization City, State	Project Number [Type] Project Title Project Period Total Investment	Purpose and Key Findings/Impact Number of Publications (Products)
Jeanne-Marie Guise Oregon Health and Science University Portland, Oregon	R18 HS23457 [Grant] Simulation To Address Gender-Based Differences in Leadership, Teamwork, and Safety 2013-2018 \$741,266 Final Report	<p>Purpose: To characterize residents' experiences and educational needs regarding leadership by developing and testing gender-sensitive training.</p> <p>Key Findings/Impact: Researchers surveyed residents across the United States; assembled the country's leaders in simulation, leadership, safety, and resident training to develop two curricula (concise TeamSTEPPS, and individualized LEADS [Leadership Education Advanced During Simulation]); and conducted a multicenter randomized control trial (RCT). Researchers received 2,549 resident responses from 326 programs nationwide.</p> <p>The National Leadership Survey showed a multitude of biases reported by residents, impacting the effectiveness of their leadership, regardless of specialty. One hundred thirty residents participated in the RCT. Results showed that any leadership training paired with a structured debrief improved leadership and teamwork skills during simulations compared with no intervention.</p> <p>The mean leadership composite score was significantly higher for participants of the LEADS curriculum compared with the control group ($p < 0.05$). This finding was not true for TeamSTEPPS. Females showed significant improvement in leadership performance postintervention for both curricula, but males only showed significant improvement after LEADS.</p> <p>Publications (Products): 2 (2)</p>
PENNSYLVANIA		
Courtney L. Wolk University of Pennsylvania	R18 HS26862 [Grant] Adapting and Implementing TEAMSTEPPS in School Mental Health 2020-2025 \$1,592,872	<p>Purpose: To improve the understanding of complex problems that may occur when mental health services are colocated in schools and examine possible solutions. Intervention and implementation strategies to support this type of work will be important going forward given that school districts are increasingly relying on contracted mental health providers and colocation is a common model in other settings (e.g., primary care).</p> <p>Key Findings/Impact: This project is ongoing until April 30, 2025. An article about this project (Kuriyan, et al., 2021) describes a study currently being conducted to improve communication and collaboration strategies among mental health and school staff by adapting an evidence-based team science intervention for school settings. It is using team science to improve interprofessional collaboration among school and mental health staff and contributes broadly to the team science literature by developing and specifying implementation strategies to promote sustainability.</p> <p>Publications: 2</p>
SOUTH CAROLINA		
Ken Catchpole Medical University of South Carolina Charleston, South Carolina	R01 HS26491 [Grant] Human Factors and Systems Integration in High Technology Surgery (HF-SigHTS) 2018-2023 \$1,999,997	<p>Purpose: To evaluate multiple interventions to address specific challenges in robotic-assisted surgery (RAS), studying whether and how they work and can be spread.</p> <p>Key Findings/Impact: Six articles to date have been published, two of which are described below.</p> <p>Schreyer, et al. (2021): Researchers developed and validated a tool (i.e., RAS-NOTECHS) to assess multidisciplinary non-technical skills (NTS) in RAS. RAS-NOTECHS is the first observational tool for multidisciplinary NTS in RAS. In preliminary application, it has been shown to be reliable.</p> <p>Kanji, et al. (2021): Researchers conducted a systematic review to identify the gap between identified RAS work-system barriers and interventions developed to address those barriers. They found 30 articles, of which only 7 (23%) implemented and evaluated interventions, while the remaining 23 articles (77%) provided suggested interventions for issues in RAS. Major barriers identified included disruptions, ergonomic issues, safety and efficiency, communication, and non-technical skills. Common solutions involved team training, checklist development, and workspace redesign.</p> <p>Publications (Products): 12 (1+)</p>

Principal Investigator Organization City, State	Project Number [Type] Project Title Project Period Total Investment	Purpose and Key Findings/Impact Number of Publications (Products)
TENNESSEE		
Matthew Weinger Vanderbilt University Nashville, Tennessee	U18 HS16651 [Grant] STRAIT: Simulation Training for Rapid Assessment and Improved Teamwork 2006-2009 \$588,780 Final Report	<p>Purpose: To use simulation learning to evaluate and improve communication and coordination between anesthesia providers and nurses as care is transitioned from the operating room to the post-anesthesia care unit (PACU).</p> <p>Key Findings/Impact: Researchers developed, implemented, and evaluated Simulation Training for Rapid Assessment and Improved Teamwork (STRAIT), a comprehensive intervention to improve patient handovers between anesthesia providers and PACU nurses (RNs) at an adult Vanderbilt University hospital and a pediatric Vanderbilt children’s hospital PACU. A prospective cohort design study was conducted with multiple baselines and staggered entry with repeated measures. Baseline (pretraining) data were stable.</p> <p>After training, handover quality improved significantly, with more than 70 percent of handovers rated as “effective” in both PACUs (p<0.001). The training status of the handover giver was the critical determinant of handover effectiveness. After full implementation, new (untrained) clinicians also performed effective handovers, suggesting culturization or implicit training. PACU culture of communication improved on some but not all elements.</p> <p>Publications (Products): 10 (1+)</p>
Daniel France Vanderbilt University Medical Center Nashville, Tennessee	R03 HS26069 [Grant] The Role of Collective Mindfulness in Delivering Reliable and Safe Perioperative Care to Neonates 2018-2021 \$99,959 Final Report	<p>Purpose: To conduct a 2-year, two-site prospective observational pilot study to measure the prevalence of collective mindfulness (CM) [safety organizing] in neonatal intensive care unit (NICU) and operating room (OR) teams and its impact on non-routine events (NREs)—defined as any event that is perceived by care providers or skilled observers as a deviation from optimal care based on the clinical situation—during neonatal perioperative care.</p> <p>Key Findings/Impact: CM self-reports were collected in 370 surgical cases at Vanderbilt University Medical Center (VUMC, n=310) and Utah’s Primary Children’s Hospital (PCH, n=60). Across observed cases, CM scores were nearly equivalent (p=0.6) at VUMC (median 5.8, IQR 5.5-6.2) and PCH (median 5.8, IQR 5.5-6.3). Clinicians reported NREs in 256 (83%) and 59 (98%) cases at VUMC and PCH, respectively.</p> <p>Significantly more NREs were reported per case at PCH (p<0.001) but NREs were more severe at VUMC (p=0.005). The number of NREs was negatively associated with CM at PCH. The concordance analysis did not find agreement between CM global scores or the five high-reliability organizations principal scores. Researchers found CM to be worthy of additional research due to its complexity. For example, their findings may lend weight to the argument that highly reliable, safe perioperative teams report more NREs but experience few severe NREs that result in adverse patient outcomes.</p> <p>VUMC and PCH were characterized by high NRE case rates and high safety organizing scores. Subsequent research at VUMC has demonstrated that high NRE case rates were not associated with adverse 30-day postoperative outcomes as measured by the National Surgical Quality Improvement Program—Pediatric (NSQIP-P). Finally, they found a need to understand the factors that determine how clinicians perceive and rate their own clinical teams.</p> <p>Publications: 0</p>

Principal Investigator Organization City, State	Project Number [Type] Project Title Project Period Total Investment	Purpose and Key Findings/Impact Number of Publications (Products)
TEXAS		
Eric Thomas University of Texas Health Science Center Houston, Texas	U18 HS11164 [Grant] Teamwork and Error in Neonatal Intensive Care 2000-2003 \$677,795 Final Report	<p>Purpose: To determine the relationships between teamwork and error during neonatal resuscitation.</p> <p>Key Findings/Impact: Researchers conducted focus groups of providers in neonatal intensive care units (NICUs) to better understand their perspectives on working together. They then used those results, plus survey data, and preliminary viewing of videos of neonatal resuscitations to define 10 behavioral markers of teamwork for neonatal resuscitation. They then analyzed videos of 132 resuscitations. Each tape was independently reviewed for “errors” (deviations from Neonatal Resuscitation Program [NRP] guidelines) and behavioral markers. They also directly observed 75 resuscitations and the admissions associated with those resuscitations (if admitted to the NICU).</p> <p>Providers in a NICU reported three broad themes that affect the way they work together: Provider Characteristics, Workplace Factors, and Group Influences. An overall error rate of 17 percent was observed during resuscitations. Independently observed errors and behaviors were correlated with each other. Inquiry, workload management, vigilance, and overall teamwork were negatively correlated with errors during the preparation and initial steps of resuscitations.</p> <p>In conclusion, these behaviors can be systematically observed and quantifiably related to process of care measures. This work led researchers to continue their research by evaluating team training interventions to improve teamwork and higher quality resuscitations, such as with the NRP. In Thomas, et al. (2010), a controlled trial showed teams that received high-fidelity training with NRP completed resuscitation an average of 2.6 minutes faster than control subjects, a time reduction of 24 percent (95% confidence interval: 12%-37%).</p> <p>Publications: 7</p>
Jose Pliego Scott and White Memorial Hospital Temple, Texas	U18 HS16634 [Grant] Improving Resuscitation Team Response to Inpatient Critical Events by Simulation 2006-2009 \$600,000 Final Report	<p>Purpose: To implement a teamwork training curriculum using high-fidelity simulations, based on naval research on high-performance teams under stress, to train all multidisciplinary resuscitation teams (Rapid Response Teams and Code Blue Teams) in a tertiary care hospital that serves a large rural patient population.</p> <p>Key Findings/Impact: In a study funded by this project (Wehbe-Janek, et al., 2012), researchers found that after the simulation training, unit nurses perceived they increased their knowledge, skills, awareness of process, and preparedness for emergency team events. As a result, simulation-based training was found to have successfully addressed learners’ concerns about their performance and understanding of rapid response and resuscitation events. This study provides support for the implementation and continued use of simulation interprofessional programs in hospital settings.</p> <p>Publications (Products): 3 (1)</p>

Principal Investigator Organization City, State	Project Number [Type] Project Title Project Period Total Investment	Purpose and Key Findings/Impact Number of Publications (Products)
Daniel Scott University of Texas Austin, Texas	U18 HS16667 [Grant] Evaluating the Impact of Simulated Team Training on Patient Safety 2006-2008 \$599,298 Final Report	<p>Purpose: To evaluate the role of team training using previously validated bench model simulations and real-life simulations in a virtual operating room (OR) environment and to determine the effect of training on patient safety.</p> <p>Key Findings/Impact: This study involved OR teams composed of surgeons, gynecologists, anesthesiologists, nurses, and scrub techs. Performance was measured during laparoscopic cholecystectomies and tubal ligations. Training outside of the OR involved proficiency-based curricula using bench model simulations for team members.</p> <p>Over a 4-week period, teams were randomized to undergo virtual OR training focusing on patient safety, best practices, and communication skills, or to a control group, which did not receive team training. Both controls and trained teams were observed during designated actual operations, and performance was measured using a variety of instruments. Trainees successfully completed the bench training components, as expected.</p> <p>Researchers successfully enrolled 41 teams in the real OR assessments (pre- and posttests), with 22 teams randomized to the virtual OR simulated team training exercises. An additional 25 individual participants underwent assessment in the virtual OR environment as part of a construct validity trial.</p> <p>Preliminary data were very encouraging that both the bench and the team training simulations were effective. Analyses were underway examining interrater reliability of various rating tools, overall patient safety and compliance with best practices data, and between-group differences.</p> <p>Publications (Products): 8 (1)</p>
Charles Macias Baylor College of Medicine Houston, Texas	R13 HS18619 [Grant] Training Leaders To Improve Healthcare Quality in Emergency Settings for Children 2009-2010 \$49,683 Final Report	<p>Purpose: To host a conference to maximize knowledge and skills of the pediatric emergency medicine (PEM) workforce to deliver the highest quality emergency care to children.</p> <p>Key Findings/Impact: The conference in San Antonio, Texas, in April 2010 had 194 participants. Quality improvement (QI) themes were specifically addressed within the domains of quality and safety, translation of research into practice and policy, and PEM workforce development and administration. Abstracts were encouraged (in competition) for moderated workshops in the following categories: ED throughput, H1N1 throughput, respiratory illnesses, safety and medication errors, and pain and sedation.</p> <p>Pre- and postconference evaluations measured knowledge, attitudes, intentions, and behaviors. Twenty-eight abstracts were presented. The course received high evaluation scores (mean satisfaction score=4.4, 1-5 scale). Participants demonstrated improvements in knowledge and in several domains rating attitudes and confidence. No difference in intentions was seen, primarily due to an already high rate of intent among participants. Behaviors improved, with an increase in participation in QI initiatives among subgroups of participants 3 months postconference.</p> <p>Dissemination/products include web-based associated materials, QI issues/articles for PEM journals, and a permanent infrastructure change in the American Academy of Pediatrics (Committee for Quality Transformation).</p> <p>Publications: 0</p>

Principal Investigator Organization City, State	Project Number [Type] Project Title Project Period Total Investment	Purpose and Key Findings/Impact Number of Publications (Products)
Therese Conner Texas Hospital Association Foundation Austin, Texas	R13 HS21049 [Grant] Symposium to Rural Hospitals Combining TeamSTEPPS and Project RED 2011-2012 \$50,000	<p>Purpose: To provide education and training on TeamSTEPPS and to incorporate components of the Project RED program to improve communication, team building, and mutual support while reducing preventable hospital readmissions, especially in rural hospitals.</p> <p>Key Findings/Impact: A final report was not available, but six articles were produced from this project. Summaries of three follow.</p> <ul style="list-style-type: none"> • Fernandez, et al. (2021): In this book chapter, the authors state that simulation is a potentially powerful educational strategy that can address challenges associated with training and assessing emergency medicine learners. However, to be effective, simulations should be rigorously designed, well matched to the learning or research objective, and carefully implemented. This chapter gives simulation-based educators and researchers a set of assessment and evaluation principles that reflect best practice recommendations to support. • Fernandez, et al. (2017): In this article, researchers “synthesize research from the broader team science literature to provide foundational knowledge regarding team cognition and highlight best practices for using simulation to target team cognition.” • Gittinger, et al. (2017): In this pilot study, researchers used an automated chest compression device to improve team communication and patient management. <p>Publications: 6</p>
VIRGINIA		
Department of Defense, TRICARE Falls Church, Virginia	02-288R-02 [Interagency Agreement] Medical Team Management 2002 \$400,000	<p>Purpose: Data not available.</p> <p>Key Findings/Impact: A final report was not available, and articles for this project were not found.</p> <p>Publications: 0</p>
Department of Defense, TRICARE Falls Church, Virginia	05-336R-03 [Interagency Agreement] Team Training Curriculum (TeamSTEPPS) and Just Culture Tool Kit Production 2005 \$200,000	<p>Purpose: To prepare a final version of the Team Training Curriculum (TeamSTEPPS) and Just Culture toolkits. The materials enhanced and supported ongoing DoD and high-reliability organization knowledge transfer activities in team training and safety culture.</p> <p>Key Findings/Impact: A final report was not available, and articles for this project were not found.</p> <p>Publications: 0</p>
Department of Defense, TRICARE Falls Church, Virginia	06-336R-03 [Interagency Agreement] Team Training Curriculum (TeamSTEPPS) and Just Culture Tool Kit Production 2006 \$70,000	<p>Purpose: To prepare a final version of the Team Training Curriculum (TeamSTEPPS) and Just Culture toolkits. The materials enhanced and supported ongoing DoD and high-reliability organization knowledge transfer activities in team training and safety culture.</p> <p>Key Findings/Impact: A final report was not available, and articles for this project were not found.</p> <p>Publications: 0</p>

Principal Investigator Organization City, State	Project Number [Type] Project Title Project Period Total Investment	Purpose and Key Findings/Impact Number of Publications (Products)
J.R. Reingold & Associates Alexandria, Virginia	HHSA2902010000251 [Contract] The National Implementation of TeamSTEPPS 2006-2009 \$291,253	Purpose: To continue the deployment and implementation of the TeamSTEPPS program to support its adoption and use by health systems, healthcare provider institutions, health professionals, and educational institutions nationwide. Key Findings/Impact: A final report was not available, and articles for this project were not found. Publications: 12
David Baker Carilion Medical Center Roanoke, Virginia and Saint Barnabas Health Care System Livingston, New Jersey	R21 HS19512 [Grant] Modeling Risk and Reducing Liability Through Better Communication and Teamwork 2010-2012 \$280,924 Final Report	Purpose: To pilot test the impact of a shorter version of the AHRQ TeamSTEPPS programs for patients and their family members. Key Findings/Impact: Twenty-eight patients and family members participated in a test of the TeamSTEPPS curriculum. To assess the intervention’s effectiveness, data were collected on two of Kirkpatrick’s four levels of evaluation. Researchers collected reaction data to assess participant “reactions” to the training: (a) did participants like the training (i.e., affective reactions); and (b) did the participants find the training useful (i.e., instrumentality)? Participants completed the reaction questionnaire posttraining only. Second, measures of learning, in terms of both participant attitudes toward teamwork and knowledge of teamwork, were collected. Participants indicated the training was useful, providing very positive reactions to the curriculum and its potential future implementation and use. Moreover, although the training did not affect participant attitudes, it did increase participant knowledge. These results seem reasonable since participant attitudes regarding the importance of teamwork in the delivery of safe care were extremely positive prior to training. But participants were unlikely to know much about TeamSTEPPS before training. In combination, these results appear to support the efficacy of TeamSTEPPS training for patients and families, especially in clinical environments such as labor and delivery, where patient and family education is common. Publications: 4
Brigetta Craft J.R. Reingold & Associates Alexandria, Virginia	HHSA2902012000221- HHSA29032002T [Contract] Revise TeamSTEPPS Long-Term Care (LTC) Curriculum To Include TeamSTEPPS 2.0 2015-2017 \$505,542	Purpose: To integrate the TeamSTEPPS® 2.0 Master Training Course Curriculum into the TeamSTEPPS in Long-Term Care (LTC) curriculum and then focus test and revise the materials as needed. Key Findings/Impact: Researchers revised the LTC curriculum by restructuring content within modules, updated the evidence base, reordered the Fundamentals modules, added a Measurement module, aligned numerous implementation resources into one model, and improved usability of materials. Additional revisions were made to address the concern of long-term suitability to ensure that terminology and sample situations resonated with practitioners in the field. Upon approval of the proposed revisions, researchers tested the revised LTC curriculum and conducted focus groups in Atlanta, Chicago, and Phoenix—cities chosen for their geographic diversity and their high concentrations of LTC facilities. The most common and important lesson learned was that the revised LTC curriculum was a highly effective means of conveying TeamSTEPPS tools and strategies that met the needs of LTC professionals. Participants agreed the curriculum tools and techniques were practical, useful, and applicable; that the example scenarios were accurate and reflected their experiences in the field; and that the videos were largely effective in depicting tools and techniques. Publications: 0

Principal Investigator Organization City, State	Project Number [Type] Project Title Project Period Total Investment	Purpose and Key Findings/Impact Number of Publications (Products)
Sarah Parker Virginia Polytechnic Institute and State University Blacksburg, Virginia	R03 HS24641 [Grant] Using Discourse Analysis To Identify and Predict Leadership Performance in Dynamic Healthcare Teams 2016-2017 \$97,719	<p>Purpose: To improve patient care by analyzing the exact mechanisms of discourse that leaders use to optimize their team's performance toward efficiently achieving clinical care goals in trauma resuscitation teams.</p> <p>Key Findings/Impact: Researchers conducted repeated measure analyses of variance (ANOVAs) and multiple regression and Bayesian regression analyses. Time to patient stabilization (TTS; completion of primary survey, secondary survey) was used as a criterion. Forty-eight videos were included in the final analysis.</p> <p>Comparisons between physicians' and nurses' relational control utterances yielded differences in communication based on whether the speaker and recipient were in the same role. When the roles were the same, there was no relationship between speaker role and relational control attempt (doctors directing to other doctors [p=0.67] or nurses directing to other nurses [p=0.13]).</p> <p>The pattern for doctors speaking to nurses and nurses speaking to doctors was opposite. TTS was significantly shorter when there were more lateral and giving control discourse utterances exhibited by both doctors and nurses. This pattern indicates that sharing information across disciplines leads to more efficient clinical care. This type of cohesiveness could be additionally trained.</p> <p>Practical implications of the findings may involve further improvement of teamwork training for action teams by more explicitly focusing on providing opportunities for training team cohesion via specific team interaction patterns. In other words, working with teams to increase communication about current status or provide information at critical "anchor moments" could help improve the team's efficiency. This finding suggests that—in addition to teaching the importance and performance of particular teamwork competencies—emphasis could be put on identifying and changing discourse patterns as unfolding, interpersonal processes rather than something intrinsic to team members.</p> <p>Publications: 0</p>
WASHINGTON		
Thomas Gallagher University of Washington Seattle, Washington	U18 HS16658 [Grant] Using Team Simulation To Improve Error Disclosure to Patients and Safety Culture 2006-2009 \$598,963 Final Report	<p>Purpose: To determine if team-based simulation training improves team communication and disclosure after harmful errors, enhances transparency and safety culture, increases patient satisfaction, and promotes patient safety.</p> <p>Key Findings/Impact: Researchers designed a simulation-based intervention to teach physicians and nurses about team-based error disclosure. They recruited 127 participants and trained 12 disclosure coaches. Next, they created and validated a web tool for measuring the simulation's impact. A quasi-experimental pre-post study of 38 physicians and 40 nurses with control group (26 physicians and 23 nurses) was conducted with simulations and coaching of participants videotaped and qualitatively analyzed.</p> <p>The results showed that participants found the simulations enjoyable and educational and supported the concept of team disclosure. While encouraging trends were present, neither the web assessment nor the videotape analysis detected improvement in clinicians' skills. Clinicians particularly struggled to respond to patient anger. Interprofessional differences existed in clinicians' comfort with disclosure. Many clinicians failed to explicitly apologize.</p> <p>Publications: 7</p>

Principal Investigator Organization City, State	Project Number [Type] Project Title Project Period Total Investment	Purpose and Key Findings/Impact Number of Publications (Products)
Thomas Gallagher University of Washington Seattle, Washington	R18 HS19531 [Grant] Communication To Prevent and Respond to Medical Injuries: WA State Collaborative 2010-2013 \$2,972,209 Final Report	<p>Purpose: To create a statewide initiative involving communication training of healthcare workers and a collaborative with hospitals and a malpractice insurer to improve adverse event analysis, disclosure, and compensation; and enhance the culture of healthcare communication to improve patient safety and decrease medical malpractice liability.</p> <p>Key Findings/Impact: Researchers created a multicomponent intervention across Washington State for preventing and responding to medical injuries, along with a statewide collaborative (“HealthPact”) to ensure the sustainability of this work. Key components included:</p> <ul style="list-style-type: none"> • HealthPact Forum. • Communication training to prevent and respond to medical injuries. • Communication and Resolution Program (CRP)—an emerging best practice for addressing patient harm—at five healthcare institutions and Physicians Insurance, with an emphasis on cases involving multiple insurers. <p>Researchers found that promoting collaboration across these stakeholders, while challenging, was successful. Communication training to prevent medical injuries, as well as disclosure coach training, was widely disseminated; one institution provided this training to more than 1,000 healthcare workers. While the CRP was developed and launched, several barriers were identified to resolving cases involving multiple insurers.</p> <p>Researchers continued the work of the project through HealthPact and the CRP Certification process for collaborating with regulators following medical injury. Together, these accomplishments constituted important steps in the gradual process of moving toward patient-centered accountability after medical injury.</p> <p>Publications: 16</p>
Rosemarie Fernandez University of Washington Seattle, Washington	R18 HS20295 [Grant] Improving Patient Safety Through Leadership and Team Performance in Simulations 2011-2014 \$1,043,339 Final Report	<p>Purpose: To determine the impact of a low-resource-demand, easily disseminated computer-based teamwork process training intervention compared with placebo training on teamwork behaviors and patient care performance in code teams,</p> <p>Key Findings/Impact: Researchers developed a single-format training program, described in Fernandez, et al. (2013), that could be delivered in person or via web. The training comprises didactic learning, demonstrations with positive and negative examples, prompted reflection (i.e., video vignettes with self-reflection opportunity), and situation judgment testing with embedded and targeted feedback.</p> <p>Researchers conducted a three-arm randomized control trial of two different formats of leadership training on interdisciplinary team performance during simulated resuscitations. It was the first multicenter study to systematically evaluate the impact of leadership training.</p> <p>Forty-four teams (132 individuals) from the University of Washington and Detroit-Receiving Hospital were recruited to participate in this project. Team mental model measures were developed, and scores were positively correlated with both teamwork and patient care performance during simulated resuscitations. Although researchers could not detect the impact of the training on teamwork or team performance during simulations, they continued their work with Grant R18 HS22458 to address these issues.</p> <p>Publications (Products): 20 (1)</p>

Principal Investigator Organization City, State	Project Number [Type] Project Title Project Period Total Investment	Purpose and Key Findings/Impact Number of Publications (Products)
Rosemarie Fernandez, University of Washington Seattle, Washington	R18 HS22458 [Grant] Translating Simulation-Based Team Leadership Training Into Patient-Level Outcomes 2014-2017 \$747,729 Final Report	<p>Purpose: To assess the clinical impact of simulation-based team leadership training on team leadership effectiveness and patient care during actual trauma resuscitations.</p> <p>Key Findings/Impact: This project produced a team leadership simulation-based training curriculum (described in Rosenman, et al., 2019), teamwork leadership measure, trauma patient resuscitation measure, video library containing 360 video-recorded trauma resuscitation events with patient de-identification, event-based approach to measurement (EBAM), and methodology for video capture of live events. To evaluate the training program, researchers randomized eligible trauma team leaders to an intervention—a 4-hour simulation-based leadership training—or control (standard training) condition. Subject-led actual trauma patient resuscitations were video recorded and coded for leadership behaviors (primary outcome) and patient care (secondary outcome) using novel leadership and trauma patient care metrics.</p> <p>Patient outcomes for trauma resuscitations were obtained through the Harborview Medical Center Trauma Registry and analyzed descriptively. A one-way analysis of covariance (ANCOVA) was conducted to test the effectiveness of the training intervention versus a control group for each outcome (leadership effectiveness and patient care) while controlling for pretraining performance, injury severity score, postgraduate training year, and days since training occurred.</p> <p>With 60 team leaders (i.e., 30 in each condition), there was a significant difference in posttraining leadership effectiveness [$F(1,54)=30.19, p<0.001, \eta^2=0.36$] between the experimental and control conditions. There was no direct impact of training on patient care [$F(1,54)=1.0, p=0.33, \eta^2=0.02$]. Leadership effectiveness mediated an indirect effect of training on patient care. However, across all trauma resuscitations, team leader effectiveness correlated with patient care ($p<0.05$) as predicted by team leadership conceptual models.</p> <p>Researchers noted that before this project, translational simulation-based research was limited to simple or complicated tasks due to significant limitations in measurement. The project’s creation of EBAM filled that need and could be applied across multiple clinical tasks and environments. In addition, novel team leadership metrics and patient care measures were found to be reliable. This research provides a roadmap for translational research in simulation and medical education that can be adopted by national bodies and organizations.</p> <p>Publications (Products): 17 (6)</p>
WASHINGTON, DC		
David Baker American Institutes for Research Washington, DC	290-06-00019-1 [Contract] Development and Testing of a Rapid Response Team Training Module Within TeamSTEPPS Curriculum 2006-2008 \$248,680	<p>Purpose: To create a training module for rapid response teams as part of the TeamSTEPPS team training curriculum and support materials.</p> <p>Key Findings/Impact: A final report was not available, and articles for this project were not found.</p> <p>Publications (Products): 0 (1)</p>

Principal Investigator Organization City, State	Project Number [Type] Project Title Project Period Total Investment	Purpose and Key Findings/Impact Number of Publications (Products)
American Institutes for Research Washington, DC	HHSA290200600019-3 [Contract] National Implementation of TeamSTEPPS 2007-2009 NA	Purpose: To develop, deploy, and implement a program to support the adoption and use of TeamSTEPPS by health systems, healthcare provider institutions, and educational institutions nationwide. Key Findings/Impact: A final report was not available, and articles for this project were not found. Publications (Products): 0 (1)
David Baker American Institutes for Research Washington, DC	290-06-00019-3 [Contract] National Implementation of TeamSTEPPS 2007-2012 \$2,997,476	Purpose: To develop, deploy, and implement a national implementation program to support the adoption and use of TeamSTEPPS by health systems, healthcare provider institutions, and educational institutions nationwide. Key Findings/Impact: This study yielded valuable information for enhancing the TeamSTEPPS material and supporting the expanding interest. Core findings from the evaluation of two major phases of the national implementation program found: <ul style="list-style-type: none"> • Participants were actively engaged in implementing and supporting TeamSTEPPS initiatives and identified features that facilitated successful implementation. • Organizations successfully implemented TeamSTEPPS, but few were engaging in activities to sustain the program long term. • Few organizations were engaged in activities to measure TeamSTEPPS effectiveness. • Most of the TeamSTEPPS tools and strategies were used and considered very helpful. • Common facilitators and barriers encountered when implementing and sustaining TeamSTEPPS tools and concepts were physician and leadership buy-in, availability of resources, staff willingness to adopt, importance of interprofessional teams, and staff and leadership turnover. • Participants spread TeamSTEPPS both within and outside their organizations. • The patient was considered a crucial team member. • The TeamSTEPPS training program was associated with an increased level of communication among team members. <p>Based on the findings, researchers recommended that AHRQ continue the National Implementation of TeamSTEPPS program by making enhancements, providing guidance and support to facilitate sustainment, and measuring progress and outcomes.</p> Publications (Products): 0 (1)

Principal Investigator Organization City, State	Project Number [Type] Project Title Project Period Total Investment	Purpose and Key Findings/Impact Number of Publications (Products)
Karen Frazier American Institutes for Research Washington, DC	290-06-00019-6 [Contract] TeamSTEPPS Final Project Report 2008-2010 \$349,955	<p>Purpose: To implement TeamSTEPPS at five sites and to evaluate the content and process for its validity in handovers in the Australian context.</p> <p>Key Findings/Impact: Researchers found that the TeamSTEPPS program is “applicable, relevant, and adaptable” to Australian healthcare organizations. The sites embraced the TeamSTEPPS philosophy of improving teamwork, communication, and patient safety through structured communication techniques. Implementation generally was observed to have occurred systematically and in collaboration with multidisciplinary team members.</p> <p>Process changes included improved quality of communication, handover, teamwork, and relationships. The structural changes included the introduction of patient whiteboards, restructuring of clinical loads, clear and visible team roles and responsibilities, and introduction of patient charts to facilitate handovers. Outcome changes included time and cost efficiencies, opportunities for improved coordination of clinical care, and optimal use of staff time and resources.</p> <p>Researchers found that communication and teamwork support clinical activity and provide a safety net for patients and are therefore part of daily care. Therefore, TeamSTEPPS should not be seen in isolation as a quality improvement activity, and its systemwide benefit would be realized through its merger into existing programs and structures.</p> <p>Publications (Products): 0 (1)</p>



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