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Implementation of TeamSTEPPS in Acute Care Settings

Teresa D. Vincent

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### Abstract

Patient safety in a hospital is the concern of all healthcare team members, whether the patient is in the facility for a few hours or a few days. Even though policies and procedures are in place to reduce the occurrence of errors during the course of a patient's admission to the hospital, adverse outcomes may still occur. Errors and omissions in communication between team members have been identified as one of the leading reasons for injury to patients and organizations are searching for processes that can assist them in improving team communication. Team Strategies and Tools to Enhance Performance and Patient Safety (TeamSTEPPS) is a government-sponsored program founded on the principles of Crew Resource Management (CRM), which is available free of charge. Over the last few years, hospitals across the nation have implemented TeamSTEPPS with varying results. In this work, a systematic literature review was conducted to evaluate the different approaches to TeamSTEPPS implementation within the hospital setting, along with respective outcomes.

*Keywords:* TeamSTEPPS, teamwork, team training, team communication

## Implementation of TeamSTEPPS

In 1999, The Institute of Medicine (IOM) published a report titled *To Err is Human*, estimating that, in the US, 44,000 to 98,000 annual patient deaths are related to care received in a hospital setting. The report identified communication and system factors as leading causes of errors, rather than the weaknesses of individuals. One of the five principles in the IOM report focused on the effectiveness of teamwork. To improve teamwork, hospitals have been utilizing Team Strategies and Tools to Enhance Performance and Patient Safety (TeamSTEPPS) since 2006, which is a free government-sponsored program. The purpose of this literature review is to explore TeamSTEPPS implementation in the acute care settings.

### **Background**

#### **TeamSTEPPS**

The Agency for Healthcare Quality of Research (AHRQ) and the Department of Defense (DoD) worked collaboratively to develop the TeamSTEPPS program. Using 30 years of research experience obtained in the military, aviation, and healthcare industries, the AHRQ and DoD developed materials pertaining to team leadership, situation monitoring, mutual support, and communications aimed at improving team training initiatives and outcomes (Agency for Healthcare Research and Quality & Department of Defense [AHRQ & DoD], 2014). In 2005, the TeamSTEPPS curriculum was field tested with 5,000 trained participants in 19 DoD hospitals and clinics. In 2006, AHRQ expanded TeamSTEPPS into the public arena, resulting in launching of the National Implementation Program in 2007. It was during this time that Master Trainer Courses were developed and offered at regional training centers across the nation. In 2014, the TeamSTEPPS 2.0 Training Curriculum was released with a higher level of attention given to simulation during the implementation process (AHRQ & DoD, 2014).

**Training process.** When implementing TeamSTEPPS, an organization typically identifies and sends several key stakeholders to a government-sponsored training course at one of the National Implementation Resource Training Centers. The majority of the chosen course attendees should serve in some type of management/leadership role within their organization. Upon completion of this training course, these stakeholders are considered Master Trainers.

Master Trainers receive a TeamSTEPPS toolkit, including a detailed curriculum and multimedia tools for teaching others the five key TeamSTEPPS principles, namely (1) team structure, (2) leadership, (3) situation monitoring, (4) mutual support, and (5) communication. The tool kit provides Master Trainers all the resources they need to train other staff in their organization.

TeamSTEPPS provides four distinct training pathways, the first of which is used to train additional Master Trainers. The Master Training program should mimic the AHRQ Master Training Program. The next pathway is referred to as the train-the-trainer, and is a program similar to the Master Training Program, but with the focus on training others on how to use and implement the TeamSTEPPS tools. The train-the-participant, as the next option, is further segregated into two levels, pertaining to direct and non-direct healthcare providers, respectively. The healthcare providers directly involved in patient care should receive 4-6 hours of training focusing on the TeamSTEPP core platform, referred to as TeamSTEPPS Fundamentals. The healthcare providers who will not provide direct patient care attend a 2-hour abbreviated version of the aforementioned training curriculum, denoted as TeamSTEPPS Essentials. The training material for both versions is well defined for an orchestrated delivery to participants.

While the above is the AHRQ training format for the program, the agency emphasizes on its flexibility, making it possible to customize the content and delivery mode to meet the needs of individual hospitals. According to Stead et al. (2009), only one hospital followed the recommended training program as outlined in the program materials, while others customized it to meet their specific requirements (Beitlich, 2015; Forse, Bramble, & McQuillan, 2011; Mayer et al., 2011; Sheppard, Williams, & Klein, 2013; Sonesh et al., 2015; Thomas & Galla 2012; Turner, 2012; Weaver, Rosen, et al., 2010). Some of the customizations involved teaching only selected key TeamSTEPPS principles or portions thereof (Beitlich, 2015; Sonesh et al., 2015; Thomas & Galla, 2012). Alternatively, some organizations opted for reducing the recommended training time (Forse et al., 2011; Mayer et al., 2011; Sheppard et al., 2013). In their study, Sawyer, Laubach, Hudak, Yamamura, and Pocrnich (2013) followed the recommended TeamSTEPPS training program and added a simulation. The literature included in this review has exposed different levels of success after the implementation of TeamSTEPPS.

**Measurement tools.** The TeamSTEPPS program comprises of measurement tools and Master Trainers are instructed on how to use them. In alignment with Kirkpatrick's Training Model (KTM) (see Table 1), TeamSTEPPS includes six measurement tools (see Table 2), while supporting the use of AHRQ's Hospital Survey on Patient Safety Culture (HSOPSC) to evaluate an organization's progress through training levels. However, some hospitals elect not to follow these recommendations and rather use different measurement tools, or employ a combination of selected TeamSTEPPS measurement tools and hospital-specific measurement tools (see Table 3).

Table 1

*TeamSTEPS Measuring Tools in Alignment with Kirkpatrick Training Model (KTM)*

| <b>KTM Learning Level</b>                   | <b>TeamSTEPS Tool</b>   |
|---|---|
| Level I – Reactions (Like it and useful)    | Course Evaluation Form  |
| Level II – Learning (Think, do, feel)       | Teamwork Attitudes Questionnaire (T-TAQ), Team STEPS Learning Benchmarks (TLB), Team Performance Observation Tool (T-POT), Teamwork and Perceptions Questionnaire (T-TPQ) |
| Level III – Behavior (Transfer to the job)  | Team Performance Tool (TPT), Teamwork Perception Questionnaire (T-TPQ), AHRQ Hospital Survey on Patient Safety Culture (HSOPSC)   |
| Level IV – Results (Organizational results) | Patient Outcomes/Clinical Measurements, HSOPSC, Patient Safety Indicators   |

*Note.* Adapted from “TeamSTEPS® Measurement Tools 2.0 Instructor Manual,” by The Agency for Healthcare Research and Quality and the Department of Defense and 2014, pp. E-10-1-E-10-2, Copyright 2010 by Health Research & Educational Trust.

Table 2

*Non-TeamSTEPS Measuring Tools and Definition*

| <b>Tool</b>  | <b>Definition</b>   |
|--|---|
| Employee Opinion Survey (EOS)  | Measures staff opinions and concerns related to their specific unit   |
| Hospital Consumer Assessment of Healthcare Providers and Systems (HCAHPS)    | Measures perceptions of patients and their families regarding teamwork and communication among healthcare providers   |
| Knowledge, Skill, Attitudes (KSA)  | Measures the attitudes and opinions of staff related to knowledge, skills, and attitudes  |
| Kirkpatrick Training Module (KTM)  | Customized measurement tools aligned with the KTM four levels of training (Level I – reaction, Level II – learning, Level III – behavior, and Level IV – results) |
| Medical Performance Assessment Tool for Communication and Teamwork (MedPACT) | Customized measurement tool combining elements of Communication and Teamwork Skills Observation Tool and TeamSTEPS Leadership Team Events                         |
| National Surgical Quality Improvement Program (NSQIP)                        | Measures changes in surgical quality and risk-adjusted outcomes   |
| National Database of Nursing Quality Indicators (NDNQI)                      | Measures nurses’ job satisfaction, perceived quality of care, and perceived teamwork  |
| Situational-Judgment Test (SJT)  | Used to assess cognitive-based education skills   |
| Surgical Quality Improvement Program (SQIP)                                  | Publicly reported data that measures surgical quality and outcomes  |
| Teamwork Evaluation of Non-Technical Skills (TENTS)                          | Developed to evaluate four TeamSTEPS skill sets (Leadership, Situation Monitoring, Mutual Support, and Communication)   |

|                              |  |
|------------------------------|--|
| Patient or Clinical Outcomes | Unit-specific measurements, comprising of:<br>Decision to Incision for C-sections (Beitlich, 2015)<br>Decreased time for placing patients on extracorporeal membrane oxygenation (Mayer et al., 2011)<br>Transfer of newborn to NICU, newborn length of stay, live birth, maternal length of stay (Sonesh al et., 2015)<br>Decrease in mental patient seclusion (Stead et al., 2009) |
|------------------------------|--|

Table 3

*Measurement Tools Used to Evaluate TeamSTEPS Implementation and Success*

| Measure-ments               | E O S | H C A H P S | H S O P S C * | K S A | K T M | Med PAC T | N S Q I P | N D N Q I | S J T | S Q I P | T E N T S | T L B * | T-TAQ *    | T - P O T * | T-PQT *    | Out-come | Observa-tion  | Inter-views                        | Other                |
|-----------------------------|-------|-------------|---------------|-------|-------|-----------|-----------|-----------|-------|---------|-----------|---------|------------|-------------|------------|----------|---------------|------------------------------------|----------------------|
| Authors                     |       |             |               |       |       |           |           |           |       |         |           |         |            |             |            |          |               |                                    |                      |
| Beitlich (2015)             |       |             | X             |       |       |           |           |           |       |         |           |         |            |             |            | X        |               |                                    |                      |
| Forse et al. (2011)         |       |             | X             |       |       |           | X         |           |       | X       |           |         | X          |             | X          |          |               |                                    |                      |
| Mayer et al. (2011)         | X     |             | X             |       |       |           |           | X         |       |         |           |         |            |             |            | X        | X Direct      | X Trained Staff                    |                      |
| Sawyer et al. (2013)        |       |             |               |       |       |           |           |           |       |         |           | X       | X          | X           |            |          |               |                                    |                      |
| Sheppard et al. (2013)      |       | X           |               |       |       |           |           |           |       |         | X         |         |            |             |            |          |               |                                    |                      |
| Sonesh et al. (2015)        |       |             |               |       | X     |           |           |           | X     |         |           |         |            |             | X Adapt-ed | X        | X Direct      |                                    |                      |
| Stead et al. (2009)         |       |             | X             | X     |       |           |           |           |       |         |           |         | X Adapt-ed |             |            | X        | X Field Notes |                                    |                      |
| Stewart et al. (2015)       |       |             |               |       |       |           |           |           |       |         |           |         |            |             |            |          |               | X Key people in 12 rural hospitals |                      |
| Thomas & Galla (2013)       |       |             | X             |       | X     |           |           |           |       |         |           |         |            |             |            |          | X Direct      |                                    |                      |
| Turner (2012)               |       |             |               |       |       |           |           |           |       |         |           |         |            |             |            |          |               |                                    | Used no meas-urement |
| Ward et al. (2014)          |       |             |               |       |       |           |           |           |       |         |           |         |            |             |            |          |               | X Structur ed                      |                      |
| Weaver, Rosen et al. (2010) |       |             | X             |       | X     | X         |           |           |       |         |           | X       |            |             |            |          |               |                                    |                      |

Note \* TeamSTEPS measurement tool and recommended AHRQ HSOPSC

## **Methodology**

### **Search**

A systematic literature search was conducted in Cumulative Index to Nursing and Allied Health Literature (CINAHL), Medline, Cochrane Database of Systematic Reviews, and the Joanna Briggs Institute of Evidence-Based Practice databases. Key search phrases were implementation of TeamSTEPPS and teamwork in a hospital setting, TeamSTEPPS and team training in a hospital setting, and TeamSTEPPS and team communication in the hospital setting. The initial search produced 493 articles.

### **Inclusion/Exclusion Criteria**

All articles yielded by the aforementioned search were published in professional healthcare journals. Only articles that contained the phrase “Implementation of TeamSTEPPS in a hospital setting,” and were published between January 2007 and September 2015, as well as printed in the English language, were considered for inclusion in a more detailed review. The selection of articles was not based on study design, measurement tool, implementation process, or articulated outcomes. This filtering process reduced the original 493 articles to 118, which were further assessed and excluded if they pertained to students, education, attitudes, and curriculum. Moreover, books, book summaries, and editorial letters were also eliminated, which led to 54 possible articles. Following a review of the 54 abstracts, to ensure that TeamSTEPPS was the primary intervention in the study, only 12 articles emerged as appropriate for inclusion in this review.

### **Evidence and Organization of Results**

The Johns Hopkins Research Evidence Appraisal Tool (JHREAT) was used to rank the strength and quality of the evidence presented in this article. The JHREAT is a five-level tool

that evaluates the strength of evidence provided in research and non-research based articles (see Table 4). No data was pooled for analysis due to significant differences in the implementation process and outcome indicators described in individual articles.

Table 4 *Johns Hopkins Research and Non-Research Evidence Rating*

| <b>Level</b>            | <b>Definition</b>  |
|-------------------------|--|
| <b>Level I</b>          | Randomized Controlled Trial (RTC) or Experimental Study (ES)<br>Meta-analysis/synthesis, whereby all studies are RTC or ES   |
| <b>Level II</b>         | Quasi Experimental (QE)<br>Meta-analysis/synthesis, where studies are either QE or a combination of RTC and QE   |
| <b>Level III</b>        | Non-Experimental (NE)<br>Meta-analysis/synthesis, all studies are NE or a combination of RTC, QE, and NE; alternatively, any study in the review is qualitative  |
| <b>Level IV</b>         | Clinical Practice Guidelines, Consensus or Position Statement  |
| <b>Level V</b>          | Literature Review without a systematic appraisal of evidence; Expert Opinion, Quality Improvement, Financial Evaluation, Program Evaluation, Case Report, Community Standard, Clinician Experience, or Consumer Preference |
| <b>Grade Assignment</b> | <b>Definition</b>  |
| <b>A</b>                | High quality   |
| <b>B</b>                | Good quality   |
| <b>C</b>                | Low quality or major flaws   |

*Note.* Adapted from "Research and Non-Research Evidence Appraisal Tool," by The Johns Hopkins Hospital/The Johns Hopkins University, 2012, *Johns Hopkins Nursing Evidence-Based Practice Model and Guidelines* (2nd ed.), pp. 238-240, Copyright 2012 by the Sigma Theta Tau International.

### **Main Findings**

Results yielded by analyzing the 12 articles are summarized in the Appendix. All articles were published before the revised TeamSTEPS 2.0 (AHRQ & DoD, 2014) materials became available. Seven articles discussed the TeamSTEPS implementation process in a specific unit or by a team within a hospital (Beitlich, 2015; Forse et al., 2011; Mayer et al., 2011; Sonesh et al., 2015; Stead et al., 2009; Turner, 2012; Weaver, Rosen, et al., 2010). Two articles explored the implementation process across a healthcare system (Sheppard et al., 2013; Thomas & Galla, 2013).

The remaining three articles investigated TeamSTEPPS implementation in alternative ways. Sawyer et al. (2013) trained staff from a hospital unit and measured their results in a simulation laboratory. On the other hand, Stewart, Manges, and Ward (2015) and Ward, Zhu, Lampman, and Stewart (2014) used structured interviews with leaders to elucidate their perceptions of TeamSTEPPS implementation in their organizations. The majority of articles addressing TeamSTEPPS implementation were of low level and provided low quality of evidence. In addition, a variety of measurement tools were used, with a low or no statistical power, making it difficult to scientifically link the implementation of TeamSTEPPS with direct results.

### **Methods of Implementation**

Tripler Army Medical Center Neonatal Intensive Care Unit (NICU) (Sawyer et al., 2013) and the inpatient mental health hospital of SA Health Care System (Stead et al., 2009) closely followed the recommended implementation of the TeamSTEPPS training program. In addition, Tripler Army Medical Center NICU added medical simulation to the training process, allowing the TeamSTEPPS to be practiced and evaluated. Conversely, eight hospitals modified and customized the recommended TeamSTEPPS training program to fit their needs (Beitlich, 2015; Forse et al., 2011; Mayer et al., 2011; Sheppard et al., 2013; Sonesh et al., 2015; Thomas & Galla, 2012; Turner, 2012; Weaver, Rosen, et al., 2010).

Stewart et al. (2015) and Ward et al. (2014) conducted interviews with key hospital staff to evaluate the implementation of TeamSTEPPS. Specifically, as a part of their study, Stewart et al. interviewed key stakeholders from 12 rural hospitals to determine how TeamSTEPPS was implemented. Based on the findings yielded by the interviews, the authors classified each of the

12 hospitals as implementing TeamSTEPPS via either top-down or bottom-up strategy, or a combination of both.

In the top-down approach, TeamSTEPPS implementation was planned, developed, and maintained by formal leadership. Top-down change efforts were driven by hospital, nursing, or quality officers, with the ultimate goal of training staff as quickly as possible. Conversely, the bottom-up approach involved an incremental conversion developed by frontline leaders and staff over time, and was found to be slow and difficult to produce change. Lastly, healthcare settings that employed a combination of these approaches utilized a variety of implementation strategies that could be classified as either top-down or bottom-up. More specifically, in these hospitals, leadership initiated and supported TeamSTEPPS implementation, while staff members were allowed to handle the details of the implementation process. According to Stewart et al. (2015), the combination approach resulted in a greater TeamSTEPPS implementation success.

Ward et al. (2014) conducted structured interviews guided by 11 key questions to evaluate the different TeamSTEPPS training methods employed in community hospitals. The authors used a combination of on-site and phone interviews. They found discrepancies between community and larger hospitals that centered on limited resources and dedicated trainers. More specifically, while larger hospitals typically had resources to enhance the TeamSTEPPS implementation process, and could afford to hire experts to train personnel, smaller hospitals lacked the necessary means for more extensive training.

### **Measurement Tools**

Two main themes emerged when measuring the impact of TeamSTEPPS implementation, namely (1) the relationship between TeamSTEPPS implementation and improved patient/clinical outcomes (Bietich, 2015; Mayer et al., 2011; Sonesh et al., 2015; Stead et al., 2009), and (2) the

evaluation of teamwork for improved patient safety after the TeamSTEPPS implementation (Bietich, 2015; Forse et al., 2011; Mayer et al., 2011; Sawyer et al., 2013; Sonesh et al., 2015; Stead et al., 2009; Thomas & Galla, 2013; Weaver, Rosen, et al., 2010). In addition, the literature review identified a variety of measurement tools employed to evaluate the impact of TeamSTEPPS on patient/clinical outcomes and teamwork (see Table 3).

Hospital Survey on Patient Safety Culture (HSOPSC) was the most widely used measurement tool. The HSOPSC survey tool was developed and is maintained by AHRQ (2016) and has 42 items that measure 12 dimensions of patient safety culture. Hospitals administer the survey to staff to assess their perceptions' of the patient safety culture within the hospital. The survey can be administered at any interval; however, AHRQ recommends the intervals to be greater than every six months. Following TeamSTEPPS implementation, authors of six articles included in the review reported positive changes in at least one HSOPSC area (Bietich, 2015; Forse et al., 2011; Mayer et al., 2011; Stead et al., 2009; Thomas & Galla, 2013; Weaver, Rosen, et al., 2010).

**Patient/clinical outcomes.** In four of the twelve studies reviewed as a part of this investigation, specific patient/clinical outcomes were used as a measure of TeamSTEPPS implementation success (Bietich, 2015; Mayer et al., 2011; Stead et al., 2009; Sonesh et al., 2015). For example, Bietich measured decision to incision times for emergent cesarean sections, while Mayer et al. measured the time required to place patients on extracorporeal membrane oxygenation, as well as nosocomial infection rates. In their work, Stead et al. measured seclusion rates, whereas Sonesh et al. measured length of stay for newborns and mothers, transfer of newborns to the neonatal intensive care unit (NICU), and infant morbidity. All authors reported movement in positive direction, with the exception of Sonesh and colleagues,

who reported no change in mothers' length of stay, newborn transfers or infant morbidity, and a marginal decrease in infant length of stay ( $p < .05$ ). While Forse et al. (2011) did not list specific patient outcomes, two of the measurement tools the authors used (Surgical Quality Improvement Program (SQIP) and National Surgical Quality Improvement Program (NSQIP) address patient/clinical outcomes. Their findings revealed a statistically significant increase in compliance ( $p < .05$ ) with antibiotic administration, venous thromboembolism administration, and Beta blocker administration, along with a significant decrease ( $p < .05$ ) in morbidity and mortality.

**Teamwork.** In eight of the articles included in this assessment, the authors evaluated the impact of TeamSTEPPS implementation on teamwork, yet these studies employed different measurement tools to evaluate the concept of teamwork (see Table 3). Forse et al. (2011), Sawyer et al. (2013), and Weaver, Rosen, et al. (2010) utilized some of the TeamSTEPPS recommended measurement tools, while Sonesh et al. (2015) and Stead et al. (2009) relied on their modified versions. On the other hand, Bietich (2015), Mayer et al. (2011), and Thomas and Galla (2013) utilized the HSOPSC for measuring the staff perceptions of teamwork. None of the authors used all of the recommended TeamSTEPPS measurement tools (See Table 1, 2, 3, and the Appendix). Yet, despite inconsistencies in the approaches adopted, an improved perception of teamwork was correlated to the TeamSTEPPS implementation in all eight cases.

To sustain the observed improvement in teamwork, Forse et al. (2011), Sonesh et al. (2015), Thomas and Galla (2013), Turner (2012), and Ward et al. (2014) recommended "re-dosing" at regular intervals. None of the authors reported any negative outcomes stemming from the utilization of TeamSTEPPS and the concept of teamwork.

### **Discussion**

Measuring the impact of TeamSTEPPS across hospitals and systems is difficult due to the various tools used to evaluate outcomes. This is understandable, as implementing TeamSTEPPS presupposes that those involved possess appropriate knowledge, skills, and attitudes that require different observations and evaluation measures. While there are specific recommended TeamSTEPPS measurement tools, their use in the evaluated studies was inconsistent. Detailed evaluation of the TeamSTEPPS' impact on teamwork in hospitals is hindered further by the use of non-TeamSTEPPS evaluation measures.

### **Conclusion**

As the authors of the reviewed studies confirmed, reliable evaluation of the TeamSTEPPS impact in healthcare settings requires longer measurement phases and a standardized approach. All of the authors reported positive improvements within their hospitals following the implementation of TeamSTEPPS. Some hospitals were more successful in obtaining some statistically significant results, while others could only summarize that there were positive improvements. The varying implementation processes and the use of diverse and incongruent measurement tools compounded the issue of determining the best implementation process and measurement tools. Gaps in literature and the quality of available sources indicate the need for additional research to determine if TeamSTEPPS is making a positive impact on clinical/patient outcomes and teamwork within hospitals.

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**Appendix A Integrated Literature Review with Johns Hopkins Rating System**

| <b>Author/<br/>Year</b>        | <b>Purpose</b>   | <b>Implementa-<br/>tion</b>   | <b>Study<br/>Design</b> | <b>Instrument</b>  | <b>Sample</b>                          | <b>Results with<br/>Movement in the<br/>Positive Direction</b>   | <b>Conclusions</b>   | <b>Limitations</b>  | <b>Strength<br/>and<br/>Quality of<br/>Evidence</b> |
|--------------------------------|--|---|-------------------------|--|--|--|--|---|---|
| <b>Beitlich<br/>(2015)</b>     | Implementing Team-STEPPS communication tools to improve the perception of teamwork and patient outcomes in a labor and delivery unit (L&D) | Master Trainers<br><br>Focus training with staff                                  | Quality Improvement     | <b>Hospital Survey on Patient Safety Culture (HSO6PSC)</b><br><br><b>Clinical outcomes</b>   | <i>n</i> = 42<br>Physicians and nurses | <b>HSOPS</b> <i>p</i> < .05 in Manager expectations, organizational learning, Teamwork within hospital units, non-punitive response to error, staffing, teamwork across hospital units, overall perception of safety<br><br><b>Clinical outcomes</b><br>Decision to Incision for emergent C-sections decreased.<br><i>p</i> value not reported | The results point to better teamwork and patient outcomes with the implementation of TeamSTEPPS.<br><br>TeamSTEPPS communication tools (Briefs, Huddles, Debriefs, and SBAR) were hardwired into the day-to-day operations.                  | Implementa-<br>tion of<br>TeamSTEPPS<br>requires long-<br>term<br>commitment<br>and process<br><br>Only 42 of the<br>200 original<br>sample<br>completed the<br>HSOPSC<br><br>Minimal<br>statistical data | Level V<br>Grade C                                  |
| <b>Forse et<br/>al. (2011)</b> | To determine if team training using a well defined and tested system will improve OR performance   | Master Trainers, Champions, Customized training for direct patient care providers | Quasi-Experimental      | <b>T-TPQ</b><br><br><b>Surgical Quality Improvement Program (SQIP)</b><br><br><b>National Surgical Quality Improvement Program (NSQIP)</b> | Sample size not reported               | <b>T-TPQ</b><br>Team skills <i>p</i> < .05<br><br><b>SQIP</b><br>Administration of antibiotics, venous thromboembolism, and Beta blockers<br><i>p</i> < .05<br><br><b>NSQID</b><br>Morbidity and mortality <i>p</i> < .05  | Team training improved OR performance and substantiated the evidence supporting team training for OR staff. Outcomes measured by SQIP parameters improved.<br><br>After funding was cut for the project, some of the achievements were lost. | Training stopped due to financial difficulties. Limited training for anesthesiologists and surgeons. Conducted in a single area with small sample size, high staff turnover                               | Level III<br>Grade B                                |

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| <b>Mayer et al. (2011)</b> | To implement Team-STEPPS training to improve teamwork and patient outcomes | Master Trainers, Change team, Customized course to train direct care providers | Quasi-Experimental | <b>Direct observation of teamwork</b><br><br><b>HSOPSC</b><br><br><b>Clinical outcomes</b> | Two units PICU and SICU<br><i>n</i> = 259<br>Physicians, nurses, and respiratory therapists | <b>Direct observation of teamwork</b><br>1 month<br>Communication<br>Leadership, Situation monitoring, Mutual support, Overall teamwork, Overall leadership: <i>p</i> < .05<br><br>6 months<br>Leadership, Mutual support, Overall leadership: <i>p</i> < .05<br><br>12 months<br>Communication, Leadership, Mutual support, Overall teamwork, Overall leadership: <i>p</i> < .05<br><br><b>HSOPS</b><br>PICU<br>Overall perceptions of safety, Communication openness: <i>p</i> < .05<br><br>SICU<br>Teamwork within the unit, Overall perceptions of safety, Communication openness: <i>p</i> < .05<br><br><b>Clinical outcomes</b><br>Placing patients on extracorporeal | Training was successful and added to the body of knowledge supporting implementation of TeamSTEPPS training | Working with non-trained staff was detrimental to the teamwork, no control group. Organizational influences and initiatives made it difficult to ascertain a direct link between TeamSTEPPS training and positive improvement. | No discussion of clinical outcomes for the random sample. | Level II<br>Grade B |
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|                               |   |  |                     |   |   | membrane oxygenation $p = <.05$   |   |  |                    |
|                               |   |  |                     |   |   | Decrease in nosocomial infections on PICU and SICU<br>$p$ value not reported  |   |  |                    |
| <b>Sawyer et al. (2013)</b>   | To determine the impact of Team-STEPPS on teamwork skills during neonatal resuscitation | Used the TeamSTEPPS curriculum and added simulation  | Quality Improvement | <b>Teamwork Attitudes Questionnaire (T-TAQ)</b><br><br><b>TeamSTEPPS Learning Benchmarks (TLB)</b><br><br><b>TeamSTEPPS Team Performance Observation (TPOT)</b> | $n = 42$<br>Physicians, nurses and respiratory therapists | <b>T-TAQ</b> attitudes $p < .001$<br><br><b>TLB</b> knowledge $p < .001$<br><br><b>TPOT</b> Team structure, Situation Monitoring, Mutual support, Communication: $p < .01$  | Teamwork skills that were addressed in simulation were associated with improvements in teamwork, attitude, and knowledge in the NICU.<br><br>Further research is needed to link TeamSTEPPS training to improved patient outcomes                  | Bias due to non-blinded observations. Technical resuscitation performance was not measured. Outcomes based on a simulation environment | Level V<br>Grade B |
| <b>Sheppard et al. (2013)</b> | Review of Implementation of Team-STEPPS in two large healthcare systems                 | Master Trainers Customized plan to integrate TeamSTEPPS into daily activities and current practice | Program Evaluation  | <b>Teamwork Evaluation of non-technical skills (TENTS)</b><br><br><b>Hospital Consumer Assessment of Healthcare Providers and System (HCAHPS)</b>               | $n = 10$<br>Hospitals                                     | <b>TENTS</b> 8 out of 10 hospitals reported improvement in TeamSTEPPS skills of Leadership, Situation monitoring, Mutual support and Communication; $p$ value not reported<br><b>HCAHPS</b> Patient satisfaction scores increased, $p$ value not reported | Commitment from leadership led to the successes of the implementation process.<br><br>Ensuring physician involvement was the greatest challenge.<br><br>The two hospitals without improvement were undergoing leadership transition and turnover. | The article only focused on one of the two hospital systems when assessing implementation and reporting results                        | Level V<br>Grade C |

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|                              |   |  |                    |  |  |   | TeamSTEPPS has been instrumental in establishing a culture of safety in both healthcare systems.  |  |                      |
| <b>Sonesh et al. (2015)</b>  | Assess the effectiveness of team training on improved learning and transfer of teamwork | Master Trainer<br>Customized TeamSTEPPS to target four content areas | Quasi-experimental | <b>Direct behavioral observations of decisions related to patient outcomes</b> | <i>n</i> = 43<br>Physicians and nurses | <b>Direct behavioral observations of decisions related to patient outcomes</b><br><i>p</i> < .05  | Portions of the training program should be considered for implementing.<br><br>Low statistical power led to inability to determine effects on patient outcomes                          | Data analysis was confined to global comparison, low statistical power, and probable Type II error. Study sample did not include non-nursing personnel. Further, short training session and low rate of outcomes compromised analyses. | Level III<br>Grade C |
| <b>Stead et al. (2009)</b>   | Evaluate the implementation of TeamSTEPPS in an Australian mental health hospital       | Master Trainers<br>Leaders trained under the Train the Trainer model | Quasi-experimental | <b>HSOPSC<br/>Clinical outcomes</b>  | <i>n</i> = 23<br>Hospitals             | <b>HSOPSC</b><br>Frequency of event reporting,<br>Organizational learning: <i>p</i> < .05<br><br><b>Clinical outcomes</b><br>Decreased seclusion<br><i>p</i> < .001 | Several areas demonstrated no or minimal improvement after implementation.<br><br>Positive changes were evident but the time frame was too short to validate a lasting cultural change. | Short implementation period, lack of baseline data, site selection process, small sample size, no control sites  | Level III<br>Grade C |
| <b>Stewart et al. (2015)</b> | Identifying different approaches  | “Top-down” versus  | Program Evaluation | <b>Semi-structured interviews</b>  | <i>n</i> = 12<br>Hospitals             | Four hospitals that followed “Top-down” approach had  | Engaging frontline staff and obtaining leadership support   | Vague information on how each  | Level V<br>Grade A   |

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|                                  | for implementing Team-STEPPS   | “Bottom-up” approach   |                     | with predetermined topics to focus on adherences, TeamSTEPPS Implementation Guide |  | unstained change, four hospitals identified as having adopted “Bottom-up” approach had positive change in some units, and four hospitals that employed a combination of these strategies successfully implemented TeamSTEPPS. No <i>p</i> value reported | increased the chance of sustainment of TeamSTEPPS.   | hospital completed TeamSTEPPS training  |                    |
| <b>Thomas &amp; Galla (2013)</b> | Implementation and sustainment of TeamSTEPPS for a culture of safety across a multihospital system | Master Trainers Customized TeamSTEPPS to the organizational, care model, vision and mission. | Program Evaluation  | <b>HSOPSC</b>   | 1st phase: <i>n</i> = 1,300 hospital employees<br><br>2nd phase: <i>n</i> = 32,150 hospital, long-term care, and outpatient clinic employees | <b>HSOPSC</b><br>Reflected positive changes in some areas from baseline survey to post-implementation survey.<br>No <i>p</i> value reported  | TeamSTEPPS made some positive impact, which could not be directly correlated to clinical outcomes.<br><br>Leadership and physician involvement is a prerequisite for success.<br><br>Standardization of training and implementation across units.<br><br>Re-dosing must be performed at regular intervals. | Greater number of trainers could impact content delivery. Other competing patient safety initiatives. Limited statistical data. No control units. | Level V<br>Grade A |
| <b>Turner (2012)</b>             | Implementation of Team-STEPPS in   | Master Trainers  | Quality Improvement | <b>Wrap up Reports</b>  | <i>n</i> = 1 ED  | Information obtained on the Wrap up Reports was used to educate staff and  | Some positive results. The video vignettes created staff buy-in.   | No measurement tools and time constraints   | Level V<br>Grade C |

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|                                      | the<br>Emergency<br>Department<br>(ED)  | Customized<br>training<br>sessions               |                    |   |                            | keep leaders<br>informed of issues<br>requiring their<br>attention.<br>No <i>p</i> value reported   | Implementation of<br>TeamSTEPPS in<br>this unit contributed<br>to an institution-<br>wide rollout of the<br>program.   |  |                     |
| <b>Ward et al. (2015)</b>            | Examine approaches taken by community hospitals and compare them to the best practices Recommended by Weaver, Lyons, et al., (2010) | Structured interviews using 11 key questions     | Program Evaluation | <b>Interviews</b>   | <i>n</i> = 22<br>Hospitals | All 22 hospitals reported having Master Trainers<br><br>Various approaches used for implementation of TeamSTEPPS. Six hospitals did not implement TeamSTEPPS within one year of Master Training, which resulted in their removal from the study sample.<br>No <i>p</i> value reported | Implementation in the field reflects the following three areas for improvement:<br>(1) Select leaders who have skill-sets to become effective trainers;<br>(2) Focus on active learning approach, rather than trying to cover a vast amount of material in a short training session; and<br>(3) Seek out opportunities for training the staff on the job and provide feedback. | Limited resources, such as educators. Lack of physician's involvement. Master Trainers had no experience in training others. Short training session for staff. | Level V<br>Grade B  |
| <b>Weaver, Rosen, et al., (2010)</b> | Improve teamwork among OR teams and evaluate the impact of the Team-STEPPS program  | Master Trainers Customized TeamSTEPPS curriculum | Quasi-Experimental | <b>Medical Performance Assessment Tool for Communication and Teamwork (MedPACT)</b> | <i>n</i> = 2<br>Hospitals  | <b>MedPACT</b><br>Conducting briefings, Information sharing, Discussions, Communication, Mutual support, Conducting debriefings, Teamwork, Task work: <i>p</i> < .05  | Results support the use of TeamSTEPPS training to improve the quality of teamwork within the operating room.<br><br>Simulation training should be included in future projects.   | Low statistical power, TeamSTEPPS training was carried out in one OR only. Control group did not meet all qualifications of an exact matched control group.    | Level II<br>Grade B |

