IMPLEMENTATION AND EVALUATION OF A SIMULATION-BASED TEAM TRAINING PROGRAM WITHIN AN UNSTABLE PEDIATRICS COURSE UTILIZING THE TEAMSTEPPS® 2.0 FRAMEWORK

by

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According to the Agency for Healthcare Research and Quality (AHRQ), ineffective communication and teamwork are two leading causes of medical errors in the United States. The Institute of Medicine (IOM) recommended that healthcare facilities employ measures to improve patient care and safety including teamwork training. Poor communication and lack of teamwork have been found to be the common denominator in up to 70% of serious or fatal medical errors. The Joint Commission and the IOM recognized that successful teamwork is critical for positive patient outcomes.

TeamSTEPPS® 2.0 is an evidenced-based approach to developing and supporting teamwork in the healthcare setting with a focus on communication, mutual support, situational monitoring, leadership, and team structure. A simulation-based team training event, guided by the TeamSTEPPS® 2.0 framework, was added to an unstable pediatrics course at a rural Montana community hospital. The purpose of this scholarly project was to implement a simulation-based team training (SBTT) component as part of a comprehensive interdisciplinary unstable pediatrics course. Evaluation of the team training included teamwork attitudes, teamwork perceptions, team performance, and participant satisfaction. Twenty employees of a community hospital participated in the unstable pediatrics course. Total teamwork attitudes in all five sub-constructs improved (p=0.0001). Teamwork perceptions improved in communication, leadership, mutual support, and situational monitoring after the training. Participants agreed or strongly agreed when rating satisfaction with the learning modality of SBTT. Observed team performance improved after the SBTT. The results indicate favorable outcomes for use of the TeamSTEPPS framework with SBTT.
CHAPTER ONE – INTRODUCTION

Background

According to the Agency for Healthcare Research and Quality (AHRQ), ineffective communication and teamwork are two leading causes of medical errors in the United States (AHRQ, 2008). The Institute of Medicine’s (IOM) 1999 report, To Err Is Human: Building a Safer Health System, revealed that between 44,000 and 98,000 people die each year in hospitals due to medical errors (IOM, 2000). The IOM recommended healthcare facilities employ measures to improve patient care and safety. After analyzing eight years of data John Hopkins patient safety experts calculated that more than 250,000 deaths per year are due to medical error in the United States (Marary & Daniel, 2016). The Johns Hopkins team says the Centers for Disease Control and Prevention’s (CDC) way of collecting national health statistics fails to classify medical errors separately on the death certificate (Marary & Daniel, 2016). Researchers are advocating for updated criteria by the CDC for classifying deaths on death certificates to capture medical errors. The CDC statistics drive funding and research; without recognition of the medical errors funding is limited to research and mitigate the problems leading to these errors (Marary & Daniel, 2016).

One measure suggested by the IOM and John Hopkins was the implementation of teamwork training sessions (IOM, 2000). Many organizations such as the Joint Commission and the Institute for Healthcare Improvement have advocated for the importance of teamwork in patient safety (King et al., 2008). Evidence shows that
effective teamwork directly correlates with fewer patient errors than when tasks are completed by an individual working autonomously (Capella et al., 2010). Poor communication and lack of teamwork have been found to be the common denominator in up to 70% of serious or fatal medical errors (Laird-Fick et al., 2011). A strong platform of teamwork, communication, and collaboration is essential for healthcare providers to work in highly stressful, high acuity settings (AHRQ, 2008).

The setting is a 99-bed community hospital serving central Montanans. The facility received provisional designation as a Montana Area Trauma Hospital by the State of Montana Trauma Care Committee (STCC) with multiple recommendations for improvement in both 2015 and 2016. Among these recommendations was one to develop an internal trauma education program for the ED specific to the patients in their care (P. Walters, personal communication, August 3, 2016). Five of the ten trauma cases reviewed by the subcommittee involved pediatric patients who suffered significant trauma. While the care in the reviewed pediatric cases appeared to be adequate, it indicated that the hospital needed to be better prepared to care for a significant number of acutely injured pediatric patients, and it would be proactive to provide continuing education for this patient population (P. Walters, personal communication, August 3, 2016).

At the time of review, the hospital did not have interdisciplinary, pediatric trauma education in place to provide adequate training and education in the care of acutely injured pediatric patients (B. Lee, personal communication, August 4, 2016). Staff and providers perceived a lack of positivity towards the current state of interdisciplinary
teamwork in the ED setting and did not feel as though teamwork was a priority to the majority of providers and staff (S. Noem, personal communication, August 5, 2016). The ED director, trauma medical director, trauma coordinator, and ED educator decided in response to the education recommendation from the STCC to develop and implement an unstable pediatric-specific education program available for ED staff and other hospital providers that care for the pediatric population.

**Pediatric Population**

Caring for pediatric patients in the emergency department (ED) is common. In 2010, there were approximately 25.5 million ED visits across the United States for children under the age of 18 (Wier, Yu, Owens, & Washington, 2013). The most common reasons for ED visits for the pediatric population are injuries, poisoning, and respiratory illnesses (Wier et al., 2013). The majority of these children are quickly treated and released (Wier et al., 2013). However, there is a small percentage (4 percent) of critically ill and or injured children that present for care in the ED that are in need of life saving interventions, admittance to the hospital or transfer to a tertiary care facility (Weir et al., 2013). Providers must be proficient in caring for children in these high-risk - low-frequency situations such as significant traumatic injury, respiratory failure, acute poisoning, or overdose (American College of Emergency Physicians [ACEP], 2009). Rapid recognition, assessment, and intervention are crucial for optimal outcomes (ACEP, 2009). To respond effectively to emergent pediatric situations, healthcare teams must have proficiency in communication, teamwork, and multidisciplinary care coordination (ACEP, 2009). When skills are infrequently utilized, proficiency can decline.
SBTT, healthcare providers can maintain competency with high-risk, low-frequency skills in a controlled environment reducing risk to the patient when they are needed to be performed (Gilfoyle, Ng, & Gottesman, 2016).

**Simulation-Based Team Training**

In the wake of the IOM 1999 report, SBTT has gained popularity as a preferred training modality to improve communication and teamwork in acute care settings resulting in reduced medical errors and improved quality of patient care (Gilfoyle et al., 2016). SBTT is defined as any educational activity that utilizes simulation aids to replicate clinical scenarios and is divided into three phases: briefing, implementation, and debriefing (Sørensen et al., 2013). SBTT educational design varies across healthcare settings often depending on the organization’s educational resources and capabilities (Gilfoyle et al., 2016). SBTT using high-fidelity human simulators is gaining popularity within healthcare (Flood, Thompson, Lovell, Field, & Daub, 2011). High-fidelity human simulators are computerized mannequins that mimic real-life patients with a variety of physiologic functions, such as respiratory effort and vital signs. High-fidelity human simulators provides an opportunity for healthcare providers to perform skills such as intubation, intravenous access, emergent obstetric delivery, chest tube insertion, and interosseous access (emergency circulatory system access acquired by drilling directly into bone) (Gaumard, 2016). The AHRQ (2008) acknowledged SBTT in health care creates a safe learning environment for healthcare providers to hone their skills without causing increased risk to patients. While varying in design, overall SBTT programs focus
on skill proficiency, interdisciplinary teamwork, and communication in acute care settings (Gilfoyle et al., 2016).

**TeamSTEPPS® 2.0**

Team Strategies and Tools to Enhance Performance and Patient Safety (TeamSTEPPS® 2.0) is a program researched and designed by the Department of Defense (DoD) and the AHRQ to incorporate teamwork into clinical practice (King et al., 2008). The TeamSTEPPS® 2.0 program is an evidence-based set of teamwork tools, aimed at optimizing patient outcomes through improving communication and teamwork skills among health care professionals across clinical settings (King et al., 2008).

The initiation of the TeamSTEPPS® 2.0 research and design occurred in 2003 when a panel of 30 leading experts on human factors, human error, and medical team training from the DoD and AHRQ assembled (King et al., 2008). The panel discussed competency requirements for medical teams, appropriate training strategies, reliable measurement tools, and knowledge to be gained from other disciplines such as aviation (King et al., 2008). Following the initial meeting, a three-year research program ensued resulting in the TeamSTEPPS® 2.0 program (King et al., 2008).

TeamSTEPPS® 2.0 is built upon the principles of aviation’s Crew Resource Management (CRM) program (American Psychological Association [APA], 2014). CRM was developed by Lauber and Helmreich for the aviation industry in the 1970s in response to identifying that up to 70% of airline crashes were due to human error rather
than mechanical failures or adverse weather (APA, 2014). CRM focusses on group
dynamics, leadership, interpersonal communication, and decision making (APA, 2014).

The TeamSTEPPS® 2.0 program became available for public use in 2006 (King et
al., 2008). The program focuses on leadership, communication, situational monitoring,
and mutual support skills to enhance patient care team performance, attitudes, and
knowledge (Figure 1.).

- Leadership: Identify a goal and define a plan to achieve the goal, assign tasks and
  responsibilities, share the plan, monitor the plans progress, modify the plan and
  communicate change, review team performance.
- Communication: Complete, clear, brief, and timely.
- Situational monitoring: Continually scanning and assessing a situation to gain and
  maintain an understanding of what is going on around you.
- Mutual support: Team members assisting one another, providing and receiving
  feedback, and exerting assertive and advocacy behaviors when patient safety is
  threatened.

Throughout the TeamSTEPPS® 2.0 program, barriers to teamwork are identified,
tools and strategies to overcome barriers are presented, and expected outcomes are
identified (Figure 2). TeamSTEPPS® 2.0 is designed to be implemented in various
clinical settings such as emergency care, intensive care, pediatrics, primary care, labor
and delivery, neonatal intensive care, and surgical units (TeamSTEPPS® 2.0:
Research/Evidence Base, 2015).
In preparation for TeamSTEPPS® 2.0 implementation, trainers complete twelve online modules to acquire knowledge about the TeamSTEPPS® 2.0 program preparing
them to appropriately implement and evaluate the program within their clinical setting (Table 1). The TeamSTEPPS® 2.0 essentials course is a 1 hour, 27-slide presentation available on the AHRQ website that provides an abbreviated overview of the TeamSTEPPS® 2.0 principles of teamwork and tools and strategies to enhance teamwork in the healthcare workplace (About TeamSTEPPS®, 2017). The TeamSTEPPS® 2.0 curriculum, education materials and evaluation tools developed by the AHRQ are available free for public use through the AHRQ website (About TeamSTEPPS®, 2017).

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Table 1. TeamSTEPPS® 2.0 Master trainer online Modules

TeamSTEPPS® 2.0 has been implemented and evaluated in over 65 health care facilities with an overall improvement in teamwork and reduction in errors related to teamwork and communication (King et al., 2008).
Roy’s Adaptation Model (RAM) was the guiding framework for this SBTT project. Roy developed the RAM in 1970, driven by the importance of nursing to promote successful adaptation in healthcare (Roy & Andrews, 1999). The RAM describes people as adaptive systems always responding to internal and external stimuli. (Figure 3.) Within this project, the participants of the SBTT are the foci of stimulus and subsequent adaptation process. Adaptation refers to “the process and outcome whereby thinking and feeling persons as individuals or in groups, use conscious awareness and choice to create human and environmental integration” (Roy & Andrews, 1999, p. 54). A person’s adaptation level may be described as integrated, compensatory, or compromised (Roy & Andrews, 1999).
In RAM, there are two coping subsystems: the cognator and the regulatory. The cognator involves perceptual and information processing, learning, judgment, and emotion (Masters, 2011). The regulator subsystem is an essential type of adaptive process that responds automatically through neural, chemical, and endocrine coping channels (Masters, 2011). It is not possible to directly observe the function of these coping systems, but the associated behaviors can be observed in four adaptive modes: physiologic-physical, self-concept-group identity, role function and interdependence (Masters, 2011). Throughout the SBTT behaviors of team structure, communication, leadership, situational monitoring, and mutual support were observed. The TeamSTEPPS® 2.0 provided tools and coping mechanisms to be utilized in the group setting to improve team performance. These observed behaviors evaluate the team member’s ability to employ effective cognator coping mechanisms within a simulated patient environment.

**Project Aims**

The primary aim of the scholarly project was for the DNP student to implement and evaluate the effectiveness of a TeamSTEPPS® 2.0 and SBTT within a comprehensive multidisciplinary unstable pediatrics course provided at a local community hospital. For the purpose of this education unstable is defined as hemodynamically compromise of airway, breathing and circulation in individuals. The secondary aim of this TeamSTEPPS® 2.0 intervention was to improve teamwork perceptions, attitudes and
team performance of participating individuals and have participating staff report personal satisfaction with the SBTT education modality.
CHAPTER TWO – LITERATURE REVIEW

**Literature Review**

A thorough literature search and review was conducted to acquire relevant evidence related to the effectiveness of the SBTT modality and the TeamSTEPPS® 2.0 program. A search was conducted of the Cumulative Index of Nursing and Allied Health Literature (CINAHL), PubMed, and Medical Literature Analysis and Retrieval System Online (MEDLINE) databases using the following keywords: interprofessional team training, simulation-based team training, TeamSTEPPS®, healthcare, emergency department, trauma teams, and pediatric teams.

Full text, peer-reviewed articles published in professional nursing or medical journals after 2006 were considered. The relevant studies included systematic reviews, integrative reviews, randomized controlled trials, pre/post, and mixed method design. Upon completion of the review, 26 studies were determined to be relevant to the project topic and included one systematic review, two integrative reviews, six randomized controlled trials, fourteen pre/post design and three mixed method studies (Appendix A). The major outcomes evaluated by the investigators in both SBTT and TeamSTEPPS® 2.0 were clinical outcomes, team performance, participant's satisfaction with training modality, participant's attitudes and behaviors, perceptions, knowledge, confidence and self-efficacy.
Simulation-Based Team Training

SBTT has been found to improve team performance, participant’s attitudes and perceptions, knowledge, confidence, self-efficacy clinical outcomes, and participant's reported satisfaction with the teaching modality of SBTT (Boling and Hardin-Pierce, 2016; Fung et al., 2015; Rice et al., 2016; Ziesmann et al., 2013). There are multiple frameworks an educational provider can use to guide the implementation of a SBTT program (Fung et al., 2015). Though there are various frameworks utilized within the studies cited the overall results show similar benefits of SBTT on improved team performance, attitudes, perceptions, knowledge, confidence, self-efficacy, clinical outcomes, and participant satisfaction with SBTT as an educational modality (Boling and Hardin-Pierce, 2016; Fung et al. 2015; Rice et al. 2016; Ziesmann et al., 2013).

Team Performance

Capella et al. (2010) evaluated the effects of trauma resuscitation teams at a Level I trauma center on clinical outcomes. The authors utilized the TeamSTEPPS® program. The trauma team performance observation tool was utilized pre- and post-team training to evaluate whether team training improved team performance. A sample of 73 (33-pre training and 40 post-training) trauma resuscitations was evaluated, along with surveys of team members (n=114). Comparing pre-training and post-training resuscitations, the authors determined significance using the independent samples t-test. Team performance improved significantly across all non-technical skills (leadership, \( p=0.003 \), situation monitoring, as determined by the \( p=0.009 \), mutual
support, $p=0.004$ and communication, $p=0.001$). Clinical outcomes evaluated included time from arrival to ED to CT scanner, time to endotracheal intubation, and time to the operating room. The times from endotracheal intubation (10.1-6.6 minutes, $p <0.49$), arrival to the CT scanner (26.4-22.1 minutes, $p <0.005$), and the operating room (130.1-94.5 minutes, $p <0.021$) were decreased significantly after the training.

Deering et al. (2011) implemented SBTT in military hospitals in Iraq that resulted in a decrease in communication-related errors, medication and transfusion errors, and needle stick incidents. The investigators reviewed 153 patient safety reports (pre, $n=94$, post, $n=59$) to evaluate team leadership, situation monitoring, mutual support and communication, as well as patient safety. The TeamSTEPPS® tools were evaluated for their value. Cross monitoring was the tool most frequently judged as useful, reported as being applicable in 35 of the 153 reports (23%). Followed by handoffs (10% of cases or 16 of 153). Following the training, there was a significant decrease from 5.2 adverse events per 1,000-inpatient days to 1.8 events post implementation ($p<.05$) This represented a 65% decrease in the rate of incidents in which communication was deemed to be a major precipitating factor.

Falcone et al. (2008) provided monthly SBTT utilizing high fidelity simulators over the course of one year at a pediatric trauma center. Each simulation session included 2 trauma scenarios that were videotaped for debriefing as well as subsequent analysis of team performance. Scored simulations were divided into early (initial quarter) and late (final quarter) for comparison. Members of the multidisciplinary team participated in the
simulation (n=160). In the early group, the mean percentage of appropriately completed tasks was 65%, whereas in the late group, this increased to 75% \((p< .05)\).

Figueroa et al. (2012) utilized the TeamSTEPPS® teamwork system approach and tools to determine whether participation in SBTT improved teamwork, confidence and communication in a pediatric ICU. The study consisted of nurses, critical care residents and respiratory therapists (n=37). Following the SBTT, there was a significant increase \((p<0.05)\) in communication, use of debriefing, and perception of mutual respect. Confidence and skill in the roles of team leader, advanced airway management, and cardioversion/defibrillation were significantly \((p<0.05)\) improved immediately after training and three months later. A significant increase \((p<0.05)\) also was observed in the use of Team STEPPS® concepts immediately after training and 3 months later. This study showed SBTT to be effective in improving communication and increasing confidence among members of a multidisciplinary team during crisis scenarios.

Fung et al. (2015) completed a systematic review of evidence on the effectiveness of simulation-based training for interprofessional and interdisciplinary teams. Ten out of the twelve included studies showed positive results in improving teamwork (Fung et al., 2015). Fung noted for the two studies without a significant improvement there were methodological shortcomings including small sample size (Shapiro et al., 2004), short follow-up time (Crofts et al., 2008).

Frengley et al. (2011) utilized a randomized crossover design to evaluate the effect SBTT on critical care unit team’s ability to manage airway and cardiac crises in simulation-based learning. Clinical outcomes were not evaluated. Forty teams from
critical care units, comprised of one doctor and three nurses, participated. The authors reported significant improvement in overall teamwork, leadership and team coordination ($p < .002$) in verbalizing situational information ($p < .02$), and clinical management ($p < .003$). The conclusions support the effectiveness of a simulation-based intervention.

Reed et al. (2017) utilized the TeamSTEPPS® curriculum was used as well as SBTT. Nursing students and fourth-year medical students ($N = 201$) participated in the SBTT. Team performance improved significantly ($p < 0.1$). Maxson et al. (2011) evaluated physician and nurse ($n=28$) collaboration and performance following SBTT results showed significant improvement from baseline to 2 weeks ($p < .002$), a trend that persisted at 2 months ($p < .002$).

Mayer et al. (2011) used TeamSTEPPS® teamwork system to evaluate surgical and pediatric intensive care units team performance within an academic medical center. Physicians, nurses and respiratory therapists ($n=32$) participated and were evaluated on non-technical skills of communication, leadership, situation monitoring, mutual support, overall teamwork and overall leadership using the Teamwork Evaluation of Non-Technical Skills observation tool. Paired t-tests determined significantly improved team performance for leadership ($p < .05$), mutual support ($p < 0.3$), and overall leadership ($p < .002$) from baseline. The remaining three elements—communication, situation monitoring and overall teamwork—were not significantly different from baseline.

Following SBTT, Merriel et al. (2016) reported teams were able to identify
deteriorating patients more effectively utilizing the early warning signs score and collaborate effectively. Murphy, et al. (2016) completed an integrative review to evaluate the current knowledge about the impacts of multidisciplinary SBTT on team performance and patient outcomes in the emergency setting. In the eleven studies included, SBTT improved team performance, and there were timelier decisions and earlier recognition of critical events (Murphy et al., 2016).

Reime et al. (2016) completed a mixed method study that identified improvement in medical and nursing students’ (n = 262) teamwork and collaboration. Rice et al. (2016) identified significantly (p=.000) improved trauma team coordination among nursing staff (n=8). in a trauma ICU following SBTT integrated into a full day trauma education course.

Attitudes and Perceptions

Individuals and organizations (AHRQ, 2008, APA, 2014; Ziesmann et al., 2013) have recognized the importance of team member’s positive attitudes and perceptions towards teamwork to result in both improved team performance and clinical outcomes. Colacchio et al. (2012) and Lisbon et al. (2016) identified significantly (p<0.5; p<0.01 respectfully) improved attitudes towards teamwork following the TeamSTEPPS® 2.0 SBTT intervention. Mayer et al. (2011) identified improved perceptions and Rice et al. (2016) improved both attitudes and perceptions following the TeamSTEPPS® 2.0 SBTT. Improved clinician attitudes were identified as a common outcome of various SBTT in the integrative review completed by Fung et al. (2015). Ziesmann et al. (2013) noted improved attitudes towards simulation and teamwork. Surgical residents, nurses,
respiratory therapists, and surgeons (n=41) participated in the Standardized Trauma and Resuscitation Team Training within a Canadian surgical program focusing on nontechnical team skills. Upon conclusion there was a significant improvement in attitudes toward simulation and overall CRM principles (p = 0.004) following the course, primarily in the domain of teamwork (p = 0.002) (Ziesmann et al. 2013).

Participant Satisfaction

Participant satisfaction is key to the success of any educational intervention (Praslova, 2010). If the training is relevant to the participant, the participant will find the training favorable and will actively engage (Praslova, 2010). The higher degree of satisfaction the more apt participants will be to learn, change behaviors, and achieve results (Praslova, 2010). In the systematic review, Fung et al. (2015) discovered overall satisfaction with a variety of SBTT educational modalities. Gillman et al. (2016) and Ziesmann et al. (2013) both identified high satisfaction with SBTT in the implementation of the Standardized Trauma and Resuscitation Team Training program. All studies evaluated by Murphy et al. (2016) identified SBTT as a preferred modality over traditional educational methods such as lecture, text, and written test evaluation (Reime et al., 2016; Ten Eyck et al., 2009). SBTT provided a platform for an interactive method of knowledge sharing and the opportunity to practice clinical, technical, and teamwork skills in a safe environment, and participants reported satisfaction with the TeamSTEPPS® 2.0 SBTT educational modality (Rice et al., 2016; Ten Eyck et al., 2009). Rice et al. (2016) reported mean satisfaction scores of 21.5 out of a possible 25 points total. The use of high-fidelity human simulators enhances the realistic appearance of the scenario situation.
by imitating human patient presentation for participants to assess, provide interventions, and reassess patient response.

Roh, Lee, Chung, and Park (2013) conducted mannequin based simulation with nursing participants (n=38). The outcomes were measured using the multiple choice questionnaires based on the American Heart Association Advanced Cardiac Life Support Course Questionnaire. The participant’s overall satisfaction rating with the high-fidelity human simulation education was 7.53 (SD=1.20). (Roh, Lee, Chung, and Park, 2013). Wallin et al. (2007) reported that participants perceived simulation as very realistic and recommended the course to peers.

Knowledge

Simulation based team training (SBTT) has been identified as an effective tool to improve clinician knowledge through hands-on realistic training (Boling et al., 2016; Fung et al., 2015; Ten Eyck et al., 2009). Both Boling et al. (2016) and Fung et al. (2015) noted in their reviews that multiple studies resulted in improved participant knowledge of presented material through various evaluation tools. Ten Eyck et al. (2009) evaluated two groups of fourth-year medical students; one group was educated via traditional methods while the other received simulation education. Significantly fewer questions were missed for material presented in simulation format compared with group discussion, with a mean difference per student of 0.7 (95% CI; \( P=.006 \)).
Confidence and Self-Efficacy

Thirteen of the seventeen studies evaluated by Boling et al. (2016) reported participants increased self-confidence in their ability to perform in various clinical settings following the SBTT. Figueroa et al. (2013) identified confidence in skills and in the roles of team leader, advanced airway management, and cardioversion/defibrillation were significantly ($p<0.05$) improved immediately after training and three months later. in self-confidence and skills following the application TeamSTEPPS® 2.0 program. Gordon and Buckley (2009) evaluated the effects of high-fidelity human simulators on nurses own perceived abilities in emergencies. Participants reported increased confidence in their ability to recognize an unstable patient and identify priorities following the immersive simulation experience ($p = .02$ and $< .001$, respectively). Additionally, participants reported increased confidence in their ability to initiate interventions to correct airway obstruction, breathing difficulties, and altered circulation and perform defibrillation ($all\ p < .001$) Laird-Fick et al. (2011) identified significant improvement in nursing ($n=28$) self-efficacy in the patient center care model ($p = 0.02$). Following implementation of the TeamSTEPPS® 2.0 programs, Reed et al. (2017) assessed a significant increase ($p < .001$) in the self-efficacy for fourth-year medical students from baseline evaluation.

Clinical Outcomes

Deering et al.’s. (2011) implementation of TeamSTEPPS® 2.0 significantly reduced communication-related errors, medication and transfusion errors, and needle stick incidents from 5.2 adverse events per 1,000-inpatient days to 1.8 events post
implementation (Pearson’s chi-square test=$5.54$, $p<.05$) resulting in improved patient outcomes. Improved clinical outcomes in various settings were identified by Fung et al. (2015) following SBTT. Riley et al. (2011) implemented varying levels of the TeamSTEPPS 2.0 program in three hospitals; the facility with the full intervention had a 37% reduction in perinatal harm. Strasser et al. (2008) implemented a team training program in a stroke rehabilitation center. Following the training, there was an improvement in patient's functional independence measure, increased discharges home to the community, and a reduction in length of stay. Mayer et al. (2011) implemented the TeamSTEPPS® 2.0 model on a surgical and ICU. Results showed the rate of nosocomial infections at post-implementation was below the upper control limit for seven out of eight months in both the PICU and the SICU signifying a significant decrease (Mayer et al., 2011).

While there are many forms of SBTT available, it is to note ten studies within the literature review above specifically utilized the TeamSTEPPS® 2.0 framework to evaluate several outcomes following the implementation in various clinical settings (Capella et al., 2010; Colacchio et al., 2012; Deering et al., 2011; Figueroa et al., 2013; Lisbon et al., 2016; Maxson et al., 2011; Mayer et al., 2011; Reed et al., 2017; Rice et al., 2016; Riley et al., 2011).
<table>
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<tr>
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<td>Capella et al. (2010)</td>
<td>Teamwork training improves the clinical care of trauma patients.</td>
<td>Trauma</td>
<td>TTPOT</td>
<td>Surgical residents, faculty, and nurses</td>
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<td>Colacchio, et al. (2012)</td>
<td>An approach to unit-based team training with simulation in a neonatal intensive care unit.</td>
<td>Neonatal ICU</td>
<td>Teamwork Attitudes Questionnaire (TAQ) TeamSTEPPS</td>
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<td>Deering et al. (2011)</td>
<td>On the front lines of patient safety: Implementation and evaluation of team training in Iraq.</td>
<td>Combat support hospital</td>
<td>Rates of communication-related errors, medication and transfusion errors, and needle stick incidents</td>
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<td>Figueroa, et al. (2013)</td>
<td>Improving teamwork, confidence, and collaboration among members of a pediatric cardiovascular intensive care unit multidisciplinary team using simulation-based team training.</td>
<td>Pediatric Cardiovascular ICU</td>
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<td>Lisbon, et al. (2016)</td>
<td>Improved Knowledge, Attitudes, and Behaviors After Implementation of TeamSTEPPS Training in an Academic Emergency Department: A Pilot Report.</td>
<td>ED</td>
<td>TeamSTEPPS knowledge test</td>
<td>ED staff, physicians, and residents</td>
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<td>Maxson et al. (2011)</td>
<td>Enhancing nurse and physician collaboration in clinical decision making through high-fidelity interdisciplinary simulation training.</td>
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<td>Mayer et al. (2011)</td>
<td>Making efforts to optimize TeamSTEPPS implementation in surgical and pediatric intensive care units.</td>
<td>Pediatric ICU Surgical ICU</td>
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<td>All PICU, SICU, and RT</td>
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<td>Reed et al. (2017)</td>
<td>Simulation using TeamSTEPPS to promote interprofessional education and collaborative practice.</td>
<td>ED</td>
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<td>BSN nursing students 4th year medical students (ED)</td>
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<td>Rice, et al. (2016)</td>
<td>Implementation and Evaluation of a Team Simulation Training Program.</td>
<td>Trauma ICU</td>
<td>T-TAQ, TTPOT, T-TPQ, NLN satisfaction Survey</td>
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<tr>
<td>Riley et al. (2011)</td>
<td>Didactic and simulation non-technical skills team training to improve perinatal patient outcomes in a community Hospital.</td>
<td>Perinatal units within community hospitals</td>
<td>Weighted Adverse Outcomes Score (WAOS) and Safety Attitudes Questionnaire</td>
<td>All staff on perinatal unit</td>
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</table>

Table 2. Summary of TeamSTEPPS® 2.0 studies

Capella et al. (2010) evaluated team performance and clinical outcomes on trauma resuscitation teams through pre- and post-assessment of performance and identified significant improvement in leadership, situational monitoring, mutual support, and communication. Colacchio et al. (2012) implemented TeamSTEPPS® 2.0 in a neonatal ICU where staff attitudes improved. Deering et al. (2011) implemented TeamSTEPPS® 2.0 in a military hospital in Iraq reporting a reduction in errors and improved
communication. Lisbon et al. (2016) successfully implemented the TeamSTEPPS® 2.0 program in a large academic emergency department. Lisbon et al. (2016) evaluated staff knowledge and teamwork attitudes 45 and 90 days following the training, results indicated results significantly improved from baseline on day 45 and results were sustained on day 90.

Maxson et al. (2011) provided a collaboration education program for physicians and nurses that was derived from key concepts of the TeamSTEPPS® 2.0. Two months following the program participant scores on the Collaboration and Satisfaction About Care Decisions survey were much higher ($p < .002$), than baseline before the education (Maxson et al. 2011). Mayer et al. (2011) implemented the TeamSTEPPS® 2.0 model on a surgical and pediatric ICU; the program’s effectiveness was evaluated through staff interviews and surveys, observation, and clinical outcome data with optimal results in team performance for leadership ($p < .05$), mutual support ($p < .03$), and overall leadership ($p < .002$). Reed et al. (2017) successfully applied the TeamSTEPPS® 2.0 program for fourth-year medical students; upon evaluation, participants showed improvement in their knowledge of the TeamSTEPPS® 2.0 principles, team performance ($p<0.1$), and self-efficacy ($p<0.1$). Rice et al. (2016) reported improved ($p<0.001$) perceptions, attitudes, and performance of a team of trauma ICU nurses following TeamSTEPPS® 2.0 simulation. Riley et al. (2011) implemented varying levels of the TeamSTEPPS® 2.0 program in three hospitals; the facility with the full
intervention (didactic and simulation) reported a 37% reduction in perinatal complications.
CHAPTER THREE – METHODS

Local Problem

The setting is a 99-bed community hospital serving central Montanans. In 2015, the facility received provisional designation as a Montana Area Trauma Hospital by the State of Montana Trauma Care Committee (STCC) with multiple recommendations for improvement that would be revisited in 2016. The purpose of the STCC is to reduce the instances of traumatic injury in Montana and to promote and advance the quality care of injured patients (Department of Public Health and Human Service [DPHHS], 2017a). According to the State of Montana, “an Area Trauma Hospital is capable of handling most trauma patients within their service area” (DPHHS, 2017b). To earn Area Trauma Hospital designation, facilities must meet requirements related to facility organization, resources, clinical capabilities, clinical qualifications, continuing education, outreach, and prevention (DPHHS, 2014).

There are many financial and operational advantages to acquiring a trauma designation that can facilitate overall hospital improvement (Josephs, 2013). Trauma patients receive extensive evaluation and treatment that requires resources beyond the ED (DPHHS, 2010). Only hospitals with state trauma designation can bill for trauma team activation allowing the facility to recoup expenditures and continue the viability of the trauma program (DPHHS, 2010). It has also been found facilities increase their intake of patients with trauma designation resulting in increased revenue for the facility (Josephs, 2013). Process improvement programs are a requirement for trauma designation; trauma
designation has been shown to raise the bar of the assessment and intervention process and overall care and patient outcomes (Josephs, 2013). Surgeon satisfaction, recruitment, and retention is improved with trauma designation (Josephs, 2013). Overall trauma designation can elevate the reputation of the facility and equip it to better serve the surrounding community.

On August 1, 2016, a trauma center focused review was completed by the STCC subcommittee to assess the hospital’s progress on the recommendations made in the 2015 review. The focused review assessed how the facility had addressed the recommendations from the 2015 review and completed an in-depth review of ten trauma cases that had occurred over the past year. These were chosen due to their complexity and high trauma acuity. The subcommittee that completed the review consisted of a fellow of the American College of Surgeons, a trauma nurse consultant, and a nursing representative of the State of Montana Emergency Medical Services Trauma System. Upon completion of the investigation, the STCC subcommittee recommended to Montana DPHHS the facility again receive provisional designation as a Montana Area Trauma Hospital with a focused review scheduled in one year to assess progress in response to numerous recommendations (P. Walters, personal communication, August 3, 2016).

At the time, the hosting hospital’s trauma program consisted of multiple core clinicians including the trauma medical director, ED director, and trauma coordinator (S. Noem, personal communication, July 14, 2016). All core members of the trauma program had been in their respective positions for less than four years with the trauma coordinator in her position for less than one year (S. Noem, personal communication, August 14,
The trauma coordinator works closely with the trauma medical director with responsibilities including clinical care and oversight, provision of clinical trauma education and prevention, performance improvement, provision of feedback to referring facility trauma programs, trauma registry, utilization of the Montana Trauma Team Manual, and involvement in trauma system activities (DPHHS, 2014).

The ED director, trauma medical director, and trauma coordinator reviewed the recommendations from the STCC subcommittee. Among these recommendations was one to develop an internal trauma education program for the ED specific to the patients in their care (P. Walters, personal communication, August 3, 2016). Five of the ten trauma cases reviewed by the subcommittee involved pediatric patients who suffered significant trauma. Three expired soon after transfer to a tertiary care facility (P. Walters, personal communication, August 3, 2016). While the care in the reviewed pediatric cases appeared to be adequate, it indicated that the hospital needed to be better prepared to care for a significant number of acutely injured pediatric patients, and it would be proactive to provide continuing education for this patient population (P. Walters, personal communication, August 3, 2016). The core trauma program members solicited the assistance of the ED educator.

At the time of review, the hospital did not have interdisciplinary, pediatric trauma education in place to provide adequate training and education in the care of acutely injured pediatric patients (B. Lee, personal communication, August 4, 2016). The need for
interdisciplinary team training was recognized through informal discussion among staff members, providers, and management. Staff and providers perceived a lack of positivity towards the current state of interdisciplinary teamwork in the ED setting and did not feel as though teamwork was a priority to the majority of providers and staff (S. Noem, personal communication, August 5, 2016).

The community hospital previously had annual pediatric-specific skill competencies requirements of nurses for the utilization of the infant warmer, emergency obstetric kit, interosseous access, syringe pump, pediatric crash cart contents and use (B. Lee, personal communication September 24, 2016). The learning objective for the previous annual competencies was solely to ensure the nursing staff was proficient in the use of equipment. This annual training did not include simulation team training or interdisciplinary team dynamic education. Prior to the unstable pediatrics course, nurses were signed off in return demonstration on the skills competencies individually by the ED educator during the month of March. Previous completion of the skills competencies was poor according to the ED educator being challenged by scheduling individual sign off times for over twenty-five nurses (B. Lee, personal communication September 24, 2016).

The ED director, trauma medical director, trauma coordinator, and ED educator decided in response to the education recommendation from the STCC to develop and implement an unstable pediatric-specific education program available for ED staff and other hospital providers that care for the pediatric population. The unstable pediatrics
course would include skills stations and didactic presentations (B. Lee, personal communication, August 4, 2016).

In January 2016, the ED director was approached by a critical care pediatric flight nurse from Intermountain Life Flight at Primary Children’s Hospital in Salt Lake City, UT with interest in providing pediatric critical care education for the community hospital staff (S. Noem, personal communication, August 5, 2016). Primary Children’s Hospital is a not-for-profit, children’s hospital providing healthcare for children with complex illnesses and injuries (Primary Children’s Hospital, 2017). Intermountain Life Flight often provides outreach education to the outlying facilities that refer patients to them (Outreach Education, 2017). The curriculum of the clinical care didactic presentation would be provided by Primary Children’s Hospital with an emphasis on pediatric assessment, respiratory emergencies, cardiac emergencies, traumatic injury, and the appropriate interventions to take in caring for critically ill or injured children (L. Merrick, personal communication January 18, 2017).

Before the STCC review, the DNP student had approached the ED director and ED educator about interest in implementing a program to assist with educational needs within the department in fulfillment of the scholarly project requirements. The DNP student presented the TeamSTEPPS® 2.0 program to the ED director, trauma director, trauma coordinator, and ED educator on August 10, 2016. The ED director, trauma director, trauma coordinator, and ED educator determined the TeamSTEPPS® 2.0 program with SBTT to be an appropriate addition to the unstable pediatrics program and agreed to have the DNP student present the TeamSTEPPS® 2.0 program, direct the
simulations and evaluate the effectiveness of the program on teamwork perceptions, attitudes, and performance.

**Intended Improvement**

The primary purpose of the scholarly project was for the DNP student to implement and evaluate the effectiveness of a TeamSTEPPS® 2.0 and SBTT within a comprehensive multidisciplinary unstable pediatrics course provided at a local community hospital. Registration for the unstable pediatrics course was available on the hospital's online educational bulletin board. Promotion of the course was completed by hanging flyers in the ED, ICU, and pediatric unit. The DNP student also announced the availability of the course at the ED, ICU, and pediatric unit staff meetings. The unstable pediatrics course occurred in four, five-hour identical sessions over two days in March 2016. The course was available to all employees at the community hospital that provides care for pediatric patients. All staff that attended the unstable pediatrics course were compensated their standard hourly hospital wage for hours attended. The wages were covered from the educational budgets of each department. Per the ED educator, the hospital budgets for 25 hours of continuing education per employee per year (B. Lee, personal communication, August 18, 2016). The course was approved for continuing education credit by the Montana Nurses Association (MNA). The secondary aim of this TeamSTEPPS® 2.0 intervention was to improve teamwork perceptions, attitudes, and team performance of participating individuals and have participating staff report personal satisfaction with the SBTT education modality.
Ethical Issues

The TeamSTEPPS® 2.0 intervention and SBTT presented during the unstable pediatric course was adapted from the AHRQ TeamSTEPPS® 2.0. The complete TeamSTEPPS® 2.0 program is a four-hour course, designed to be tailored to individual clinical settings needs (AHRQ, 2011). To accommodate the time restrictions of the unstable pediatrics course, the DNP student presented the 1-hour TeamSTEPPS® 2.0 essentials course (Appendix B). The DNP student completed the twelve online training modules provided by the AHRQ (Table 1.). The twelve training modules provided comprehensive training to the DNP student on the subject of essentials, fundamentals and the trainer instructional modules ensuring the preservation of the vital principles of the TeamSTEPPS® 2.0 program throughout the presentation.

Before the implementation of the intervention, the DNP student gained approval from her project committee, the ED nursing director, ED medical director, and chief nursing officer of the hosting facility. The project was deemed exempt of further review by the Montana State University Institutional Review Board.

Participants could withdraw from the training at any time without penalty. Nurse participants received four continuing education credits upon completion of the course provided by the MNA. To gain approval from the MNA for the continuing education credits the DNP student and ED educator submitted the schedule (Appendix C), learning objectives (Appendix D) and evaluation tools to the MNA. The ED educator is the community hospital’s MNA representative for the department and completed the required
MNA paperwork. Upon approval by the MNA, the DNP student and other presenters signed a no conflict of interest form in compliance with the MNA. To gain approval from the MNA for the continuing education credits the DNP student and ED educator submitted the schedule (Appendix C), learning objectives (Appendix D) and evaluation tools to the MNA. The ED educator is the community hospital’s MNA representative for the department and completed the required MNA paperwork. Upon approval by the MNA, the DNP student and other presenters signed a no conflict of interest form in compliance with the MNA. Before the initiation of the course all participants provided consent for data to be used in the evaluation of the effectiveness of the SBTT through written permission (Appendix E).

Participants were given a participant number at the initiation of the unstable pediatrics course; the participant was the only person aware of their number. This allowed them to fill out the evaluation tools with protection of their identity. The demographic data (Appendix F) collected could not link participants to their numbers. Data was collected by the DNP student and solely used to assess the effectiveness of the TeamSTEPPS® 2.0 SBTT on teamwork attitudes, perceptions, team performance and participant satisfaction with training modality. The data was entered into an Excel file (Microsoft Excel version:15-23-1(160617).) that was accessible by the DNP student on a password protected computer.
Financial Implications

The hosting facility provided training space in a conference room without charge and was reserved and scheduled by the ED educator. The high-fidelity human simulators was borrowed by the DNP student with permission from her full-time employer a local critical care air medical company. Training supplies for the infant warmer, emergency obstetric kit, interosseous access, syringe pump, and pediatric crash cart were acquired from the stocked training and education room at the hosting facility. The conference room was equipped with a projector, and the DNP student and the pediatric flight nurse utilized their personal computers for the presentations. The hosting facility is an approved provider by the MNA (B. Lee, personal communication September 24, 2016). Following submission of the application for the continuing education credits, the hosting facility was approved by the MNA to award four continuing education credits per nursing participant.

Throughout the development of the unstable pediatrics course, the DNP student worked closely with the ED director and ED educator. Both the director and educator are salaried positions, and meetings and planning occurred during their regular working hours. The TeamSTEPPS® 2.0 curriculum, training and evaluation materials were available from the AHRQ free of charge for healthcare professionals to utilize. The pediatric flight nurse provided her portion of the unstable pediatrics course free of charge for the hosting facility through the outreach program at Intermountain Medical Center. Participants were compensated their hourly wage by the hosting facility for hours attended.
Participants and Setting

The setting is an Area Trauma Hospital in central Montana. Participation was open to all clinical employees such as physicians, nurses, respiratory therapists, and EMS providers that provide medical care for children within the facility. The unstable pediatrics course occurred in an education room within the hospital.

Intervention Process and Evaluation

A pre-test / post-test design was used to evaluate the TeamSTEPPS® 2.0 presentation and SBTT component of the unstable pediatrics course. The three tools used pre- and post-test were: TeamSTEPPS® Teamwork Attitudes Questionnaire (T-TAQ) (Appendix G), TeamSTEPPS® Teamwork Perceptions Questionnaire (T-TPQ) (Appendix H) and the Team Performance Observational Tool (TPOT) (Appendix I). Evaluation of staff satisfaction with the SBTT educational platform was evaluated post-intervention with the Satisfaction with Simulation Experience Scale (SSES) (Appendix J). Approval for use of the SSES was obtained from the creator via email contact. All four evaluation tools were utilized in their original form and were not altered by the DNP student prior to use.

Evaluation Tools

The tools developed by the AHRQ for the evaluation of the effectiveness TeamSTEPPS® 2.0 program were guided by the Kirkpatrick Model (Team STEPPS® 2.0,
The Kirkpatrick Model is the worldwide standard for the evaluation of the effectiveness of training and educational programs taking into account any style of training, both informal and formal (Praslova, 2010). The Kirkpatrick Model has four levels: reaction, learning, behavior, and results (Praslova, 2010). In the reaction phase, participant reaction is assessed: to what degree did they enjoy the training and how relevant do they find it to their job (Praslova, 2010). Secondly, participant learning is assessed by evaluating attitudes, knowledge, and skills (Praslova, 2010). Third, is the evaluation of behaviors and their potential to transfer back to the workplace (Praslova, 2010). Finally, phase four evaluates the degree of effect the training had on targeted outcomes in the workplace (Praslova, 2010).

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<th>Abbreviation</th>
<th>Purpose</th>
<th>Result use</th>
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<tr>
<td>TeamSTEPPS® Teamwork Attitudes Questionnaire</td>
<td>T-TAQ</td>
<td>Evaluate participant attitudes towards the 5 components of teamwork before and after TeamSTEPPS presentation and SBTT</td>
<td>Pre- and post-intervention via participant report</td>
</tr>
<tr>
<td>TeamSTEPPS® Teamwork Perceptions Questionnaire</td>
<td>T-TPQ</td>
<td>Evaluate participant perceptions of the teams’ perceptions of the 5 components of teamwork before and after TeamSTEPPS presentation and SBTT</td>
<td>Pre- and post-intervention via participant report</td>
</tr>
<tr>
<td>Team Performance Observational Tool</td>
<td>TPOT</td>
<td>Evaluation of the participants’ teamwork in the SBTT before and after the TeamSTEPPS presentation</td>
<td>Pre- and post-intervention via DNP observation</td>
</tr>
<tr>
<td>Satisfaction with Simulation Experience Scale</td>
<td>SESS</td>
<td>Evaluation of participant’s satisfaction with the simulation educations setting at the conclusion</td>
<td>Post-intervention via participant report</td>
</tr>
</tbody>
</table>

Table 3: Evaluation tools.

There were four evaluation tools utilized to evaluate the TeamSTEPPS® 2.0 SBTT portion of the unstable pediatrics course: TeamSTEPPS® Teamwork Attitudes Questionnaire (T-TAQ) (Appendix G), TeamSTEPPS® Teamwork Perceptions Questionnaire (T-TPQ), Team Performance Observational Tool (TPOT), and Satisfaction with Simulation Experience Scale (SESS).
Questionnaire (T-TPQ) (Appendix H) and the Team Performance Observational Tool (TPOT) (Appendix I) and the Satisfaction with Simulation Experience Scale (SESS) (Appendix J).

**Teamwork Attitude**

The T-TAQ was developed to assess an individual’s attitudes towards team structure, leadership, mutual support, situation monitoring, and communication (Baker, Krokos, & Amodeo, 2008). The T-TAQ can be utilized to assess specific needs of an organization and/or whether the TeamSTEPPS® 2.0 program produced improvement in participants attitudes towards teamwork (Baker et al., 2008). The T-TAQ was developed by researchers at the AHRQ following an extensive literature review, item development, pilot testing, item selection and psychometric testing (Baker et al., 2008). The T-TAQ is a 30-item tool to measure teamwork attitudes in five subsections: (a) team structure, (b) leadership, (c) situation monitoring, (d) mutual support, and (e) communication.

Participants rate each item on a Likert Scale with the following response options: 1 = Strongly Disagree. 2 = Disagree, 3 = Neutral, 4 = Agree, and 5 = Strongly Agree. Lower scores reflect poorer attitudes related to teamwork attitudes. While guided by the Kirkpatrick Model, the T-TAQ can evaluate for the success in the learning phase assessing participant’s attitudes towards the training information (Team STEPPS® 2.0, n.d. a). The more positive the participant's attitudes towards the training, the more effective the training will be (Praslova, 2010). The evaluation of teamwork attitudes was completed through the administration of the T-TAQ before and following the TeamSTEPPS® 2.0 presentation and SBTT.
Teamwork Perception

Research professionals at the AHRQ found the T-TAQ was not sufficient in capturing the participant's perceptions of teamwork within an organization as a whole (Battles, 2010). In response to this deficiency, James Battles (2010) created the T-TPQ. Assessing individual perceptions of teamwork in an organization can elicit a better understanding of an organizations team atmosphere (TeamSTEPPS® 2.0, n.d. a). The T-TPQ is a 35-item tool measuring teamwork perception in five subgroups: (a) team structure, (b) leadership, (c) situation monitoring, (d) mutual support, and (e) communication. Respondents rate each item on a Likert Scale with the following response options: 1 = Strongly Agree, 2 = Agree, 3 = Neutral, 4 = Disagree, and 5 = Strongly Disagree. With this rating, lower scores represent positive perceptions related to teamwork, whereas higher scores represent negative perceptions. The evaluation of teamwork perceptions was completed through the administration of the T-TPQ before and following the TeamSTEPPS® 2.0 presentation and SBTT.

The T-TAQ and T-TPQ provided two different forms of evaluation of the TeamSTEPPS® 2.0 presentation and SBTT. The T-TAQ evaluated the effectiveness of the training on the participant’s attitudes personally, while the T-TPQ evaluates the participant’s perception of the training’s effectiveness on the group or organization as a whole. The T-TAQ is an internal evaluation while the T-TPQ is an external evaluation of the training.
Simulated Team Performance

It is important to evaluate the effectiveness of any training. One method of evaluation is through performance observation (Bremner, Maguire & Yanosky, 2014). The TPOT was developed by the AHRQ and DoD to provide a performance observation tool to evaluate TeamSTEPPS® 2.0 influence on team performance (Bremner et al., 2014). The TPOT is a 25-item tool used to evaluate five areas of team performance. The areas are team structure, leadership, situation monitoring, mutual support, and communication. The TPOT uses a 5-point scale that ranges from 1 (very poor) to 5 (excellent). The maximum score possible on the TPOT is 125 points (TeamSTEPPS® 2.0, n.d. a).

Bremner, et al. (2014) performed a validation study on the TPOT; 31 nurse educators completed the TPOT to assess the reliability and validity. The authors determined the TPOT to have strong internal consistency reliability and validity for the measurement of team performance in simulated situations in the five categories of team performance. The areas are team structure, leadership, situation monitoring, mutual support, and communication (Bremner et al., 2014). The TPOT was completed by the DNP student through visual observation of team performance in the simulations before and following the TeamSTEPPS® 2.0 presentation. This was completed by using the TPOT form provided by the AHRQ. The TPOT scoring form uses a 5-point scale that ranges from 1 (very poor) to 5 (excellent) in each area. As the DNP student had completed the TeamSTEPPS® 2.0 training modules, she was able to identify and observe the team’s performance in team performance. The areas are team structure, leadership, situation monitoring, mutual support, and communication.
Participant Satisfaction

The Kirkpatrick Model emphasizes the importance of participant satisfaction with the training for it to be successful (Praslova, 2010). When participants are engaged in meaningful learning, they are much more likely to respond positively to the training (Levett-Jones et al., 2011). To measure the participant's satisfaction with the SBTT respondents answered a post-intervention evaluation utilizing the SSES tool. The SSES tool was developed by Levett-Jones and colleagues (2011) to ascertain participant’s satisfaction with simulation experiences after through clinical literature review. Levett-Jones et al. (2011) evaluated the validity and reliability of the SESS with second- and third-year nursing students at a large university. The authors found the SESS to be a reliable psychometric evaluation of SBTT (Levett-Jones et al., 2011). The SESS reliability and validity were confirmed within a validation study completed at an undergraduate paramedic program at another large university (Williams, Abel, Khasawneh, Ross, & Levett-Jones, 2016). The SESS is an 18-question simulation satisfaction evaluation tool with three subgroups: (a) debriefing and reflection, (b) clinical reasoning, and (c) clinical learning. Respondents rate each item on a Likert Scale with the following response options: Strongly Disagree, Disagree, Unsure, Agree, and Strongly Agree. With this measurement tool, the responses of Agree or Strongly Agree identified positive satisfaction with the SBTT by the participants.
Curriculum Development

The ED educator directed the development of the curriculum and learning objectives for the unstable pediatrics course. The unstable pediatric course was offered in four identical sessions over two days in March 2016 to include a clinical didactic presentation, pediatric-specific skills practice, TeamSTEPPS® 2.0 presentation, group simulations utilizing an high-fidelity human simulators mannequin, and course evaluation (Appendix C). The DNP student being responsible for the TeamSTEPPS® 2.0 presentation, group simulations, and course evaluation.

The course curriculum and implementation dates for the unstable pediatric course were determined by the ED educator, ED director, and DNP student. The learning objectives and skills of the unstable pediatrics course incorporated annual competency testing (e.g. interosseous access, infant warmer, syringe pump) into the training (Appendix D).

Eleven learning objectives guided content and learning activities guided the unstable pediatrics course (Appendix D). The learning objectives developed were to identify improved pediatric-specific skills and improved teamwork through the unstable pediatrics course. Three learning objectives were evaluated by the DNP student for this scholarly project that pertained to the TeamSTEPPS 2.0 essentials course and simulation provided by the DNP students portion of the unstable pediatrics course (Appendix D).

- Upon completion of the unstable pediatrics course, participants will be able to perform effective teamwork in the sub-constructs of communication, leadership,
mutual support, situational monitoring, and team structure through demonstration in simulation scenarios (Objective 2).

- Upon completion of the unstable pediatrics course, participants will report satisfaction in team collaboration from the simulation team training scenarios (Objective 9).
- Upon completion of the unstable pediatrics course, participants will report improved perceptions and attitudes towards teamwork and collaboration (Objective 10).

**Didactic Presentation.** The pediatric flight nurse conducted the clinical and didactic portion of the course while the DNP student conducted the TeamSTEPPS® 2.0 portion, simulation, and evaluation. The didactic presentation emphasized pediatric assessment, respiratory emergencies, cardiac emergencies, traumatic injury, and the appropriate interventions to take in caring for critically ill or injured children (L. Merrick, personal communication January 18, 2017).

**TeamSTEPPS® 2.0 and Simulations.** The DNP student provided all the material and education for the TeamSTEPPS® 2.0 section, facilitated three simulations, and managed the evaluation of the TeamSTEPPS® 2.0 and simulation sections of the unstable pediatrics course. The TeamSTEPPS 2.0 Essentials course is a one-hour lecture course given via PowerPoint (Microsoft® PowerPoint for Mac version: 15.23 (160611).) to educate team members on team structure, leadership, situational monitoring, mutual support, and communication (Appendix B).
The three simulation scenarios were developed by the DNP student with oversight by the ED educator. These scenarios included pediatric acute poisoning, respiratory distress leading into cardiac arrest, and acute significant trauma (Appendix J). Simulation scenarios were developed from a case review of critical care pediatric patients seen in the ED of the hosting hospital within the past year. The DNP student also considered the most common causes of ED visits for pediatrics nationwide: injuries, poisoning, and respiratory illnesses. Each simulation scenario included an initial presentation and history of present illness. Findings were provided to team members as they completed a physical assessment. Diagnostic information was provided when requested. Key interventions previously identified by the DNP student and the ED educator as critical to the care of the patient were ‘checked off’ by the DNP student as they were completed by the team (Appendix J).

Course Timeline

Following introductions and completion of consent by participants, the DNP student acquired demographic information (Appendix F). Participants then completed self-assessments of their baseline attitudes and perceptions of the importance of leadership, communication, mutual support, situational monitoring, and mutual support skills utilizing the T-TAQ and T-TPQ respectfully (Appendix G; Appendix H).

The pediatric flight nurse presented the didactic clinical presentation. The skills stations were led by the ED educator and assisted by the DNP student with return demonstration.
Three simulation scenarios utilizing a high-fidelity simulation mannequin were facilitated by the ED educator before the one-hour TeamSTEPPS® 2.0 presentation PowerPoint (Microsoft® PowerPoint for Mac version: 15.23 (160611) with TPOT evaluation by the DNP student. All participants engaged in the simulation scenarios with a concise debriefing conversation after.

The DNP student then presented the TeamSTEPPS® 2.0 Essentials course (Appendix B). Following the TeamSTEPPS® 2.0 presentation, participants engaged in three different simulations facilitated by the ED educator with TPOT evaluation by the DNP student with a debriefing session afterward.

Upon conclusion of the second round of simulation, participants repeated self-assessment of their attitudes and perceptions via the T-TAQ and T-TPQ (Appendix G; Appendix H). Participants also reported their satisfaction with the simulation education modality through the completion of the SESS (Appendix J).

Data Analysis

Raw paper data was collected from the unstable pediatrics course by the DNP student. The results of the demographic survey, T-TAQ, T-TPQ, and TPOT scales were entered in an Excel file (Microsoft® Excel version: 15-23-1(160617)) by the DNP student. The T-TPQ Likert Scale was written inverted with values from the T-TAQ (Appendix H). As in 1=agree in the T-TPQ, while 1= strongly disagree in the T-TAQ. For ease of statistical evaluation, the T-TPQ Likert Scale was inverted to align with the T-TAQ (1 = Strongly Disagree, 2 = Disagree, 3 = Neutral, 4 = Agree, and 5 = Strongly
Agree). This provided consistency between the T-TAQ and T-TPQ reflecting higher score demonstrated participants agreed with the statements posed on the evaluation tools.

The Montana State University Statistical Consulting and Research Services staff assisted with data analysis and interpretation. The data from the T-TAQ, T-TPQ, and TPOT was analyzed utilizing a paired difference t-test. In a paired difference t-test each subject is measured twice, resulting in paired observations (Gravetter and Wallnau, 2014). This analysis method allowed for pre- and post-TeamSTEPPS® 2.0 presentation comparison of the T-TAQ, T-TPQ, and TPOT results for each participant. Statistical significance was set at 0.05 (Polit, 2010). Descriptive statistics were ascertained from the numerical sum of the Likert Scale of the T-TAQ and T-TPQ of each sub-construct: team structure, leadership, situational monitoring, mutual support, and communication. Each of the five TeamSTEPPS® 2.0 sub-constructs of the T-TAQ and T-TPQ were analyzed individually. Descriptive statistics were ascertained from the sum of participant group simulation scores of the TPOT. Significance was established with p <0.05. Smaller p-values indicate stronger evidence that the TeamSTEPPS 2.0 training and SBTT were effective in improving teamwork perceptions, attitudes, and team performance.

Participants completed the SESS at the conclusion of the unstable pediatrics course to evaluate their satisfaction with the training modality and the results were summarized by the DNP student.
CHAPTER FOUR – RESULTS

Demographics

The participating population consisted of 20 employees of the community hospital (Table 4). The participants included three physicians, two physician assistants, twelve registered nurses, and two paramedics. The average years of experience within their reported profession were 8.8 years. The average time of employment at the facility was 5.35 years. Each session had five participants with varying roles and years of experience.

<table>
<thead>
<tr>
<th>Index</th>
<th>Role</th>
<th>Department</th>
<th>Years of Experience</th>
<th>Years at Hospital</th>
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</thead>
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<tr>
<td>P1</td>
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<td>ED</td>
<td>14</td>
<td>6</td>
</tr>
<tr>
<td>P2</td>
<td>MD</td>
<td>ED</td>
<td>9</td>
<td>4</td>
</tr>
<tr>
<td>P3</td>
<td>MD</td>
<td>ED</td>
<td>5</td>
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<td>P4</td>
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<td>3</td>
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<td>P6</td>
<td>RN</td>
<td>ED</td>
<td>17</td>
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<td>P7</td>
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<td>11</td>
<td>6</td>
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<td>P8</td>
<td>RN</td>
<td>ED</td>
<td>11</td>
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<td>RN</td>
<td>ED</td>
<td>7</td>
<td>4</td>
</tr>
<tr>
<td>P11</td>
<td>RN</td>
<td>ED</td>
<td>3</td>
<td>1</td>
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<tr>
<td>P12</td>
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<td>ED</td>
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<td>P13</td>
<td>RN</td>
<td>Pediatrics</td>
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<td>16</td>
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<td>P14</td>
<td>RN</td>
<td>Pediatrics</td>
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<td>4</td>
</tr>
<tr>
<td>P15</td>
<td>RN</td>
<td>Pediatrics</td>
<td>9</td>
<td>6</td>
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<tr>
<td>P16</td>
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<td>3</td>
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<td>P17</td>
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<td>Pediatrics</td>
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<td>2</td>
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<td>P18</td>
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<td>EMS</td>
<td>22</td>
<td>20</td>
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<td>P20</td>
<td>Paramedic</td>
<td>EMS</td>
<td>7</td>
<td>3</td>
</tr>
</tbody>
</table>

Table 4: Summary information of the n = 20 project participants.

Teamwork Attitudes

A paired difference t-test (table 3.) was conducted to evaluate the effects of the TeamSTEPPS® 2.0 training on teamwork attitudes via their T-TAQ scores pre- and post-
intervention. The degree of significance was set at <0.05 this signifies the results of the data acquired was statistically significant. Attitudes towards teamwork on all five sub-constructs of the T-TAQ (Figure 4) were significantly different (<0.0001) identifying a statistically significant change in participant’s attitudes towards teamwork following the TeamSTEPPS 2.0 presentation and SBTT (Table 5).

<table>
<thead>
<tr>
<th>Test</th>
<th>Construct</th>
<th>n</th>
<th>d</th>
<th>SD</th>
<th>SE</th>
<th>df</th>
<th>t</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>T-TAQ</td>
<td>Communication</td>
<td>20</td>
<td>0.6417</td>
<td>0.3796</td>
<td>0.0849</td>
<td>19</td>
<td>7.56</td>
<td>&lt; 0.0001</td>
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<td>T-TAQ</td>
<td>Leadership</td>
<td>20</td>
<td>0.5083</td>
<td>0.2834</td>
<td>0.0634</td>
<td>19</td>
<td>8.0206</td>
<td>&lt; 0.0001</td>
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<tr>
<td>T-TAQ</td>
<td>Mutual Support</td>
<td>20</td>
<td>0.2417</td>
<td>0.2127</td>
<td>0.0476</td>
<td>19</td>
<td>5.0808</td>
<td>&lt; 0.0001</td>
</tr>
<tr>
<td>T-TAQ</td>
<td>Situational</td>
<td>20</td>
<td>0.375</td>
<td>0.2014</td>
<td>0.045</td>
<td>19</td>
<td>8.3261</td>
<td>&lt; 0.0001</td>
</tr>
<tr>
<td></td>
<td>Monitoring</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>T-TAQ</td>
<td>Team Structure</td>
<td>20</td>
<td>0.4167</td>
<td>0.3647</td>
<td>0.0816</td>
<td>19</td>
<td>5.1087</td>
<td>&lt; 0.0001</td>
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</tbody>
</table>


Figure 4 visually displays the difference between the participants’ pre- and post-presentation response to the T-TAQ. A score of zero indicates no change in participant attitudes towards teamwork following the training. TeamSTEPPS® 2.0 and the TeamSTEPPS® 2.0 and SBTT had no effect on their attitudes in the four subcategories of communication, leadership, mutual support, situational monitoring, and team structure. Participants scoring above zero indicated the TeamSTEPPS® 2.0 and SBTT had an effect on their attitudes. A score below zero indicated a negative effect of the TeamSTEPPS® 2.0 and SBTT on teamwork attitudes. Demographic data were collected, identifying the participant’s roles.
Figure 4: T-TAQ: Participant differences vs. participant for each construct. Reprinted from EXAMINING EFFECTS OF TEAM TRAINING ON PERCEPTIONS AND ATTITUDES OF HOSPITAL STAFF (15), by S.J. Walsh, 2017, Bozeman, MT, Statistical Consulting and Research Services: Montana State University. Copyright [2017] by S.J. Walsh. Reprinted with permission.
This information was included if further analysis of the TeamSTEPPS® 2.0 and SBTT in relation to role would be performed. No further investigation of the TeamSTEPPS® 2.0 and SBTT pertaining to role was completed during this project.

**Teamwork Perceptions**

The calculated $p$-value for the sub-construct’s communication, mutual support, and situational monitoring of the T-TPQ following the paired difference $t$-test was $<0.0001$ (Table 6). The TeamSTEPPS® 2.0 and SBTT was statistically significantly effective on the participant's perceptions of communication, mutual support, leadership, and situational monitoring. The paired difference t-test revealed no statistical significance in team structure following the TeamSTEPPS® 2.0 and SBTT. (Figure 5.)

<table>
<thead>
<tr>
<th>Test</th>
<th>Construct</th>
<th>$n$</th>
<th>$d$</th>
<th>SD</th>
<th>SE</th>
<th>df</th>
<th>$t$</th>
<th>$p$-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>T-TPQ</td>
<td>Communication</td>
<td>20</td>
<td>1.1143</td>
<td>0.313</td>
<td>0.07</td>
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<td>15.9217</td>
<td>$&lt;0.0001$</td>
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<td>T-TPQ</td>
<td>Leadership</td>
<td>20</td>
<td>0.1071</td>
<td>0.196</td>
<td>0.0438</td>
<td>19</td>
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<tr>
<td>T-TPQ</td>
<td>Mutual Support</td>
<td>20</td>
<td>0.4143</td>
<td>0.3557</td>
<td>0.0795</td>
<td>19</td>
<td>5.2086</td>
<td>$&lt;0.0001$</td>
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<tr>
<td>T-TPQ</td>
<td>Situational Monitoring</td>
<td>20</td>
<td>0.2714</td>
<td>0.2119</td>
<td>0.0474</td>
<td>19</td>
<td>5.7287</td>
<td>$&lt;0.0001$</td>
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<td>Team Structure</td>
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<td>0.1278</td>
<td>0.0286</td>
<td>19</td>
<td>1</td>
<td>0.1649</td>
</tr>
</tbody>
</table>

Figure 5: T-TPQ: Participant differences vs. participant for each construct. Reprinted from *EXAMINING EFFECTS OF TEAM TRAINING ON PERCEPTIONS AND ATTITUDES OF HOSPITAL STAFF* (15), by S.J. Walsh, 2017, Bozeman, MT, Statistical Consulting and Research Services: Montana State University. Copyright [2017] by S.J. Walsh. Reprinted with permission.
Figure 5 visually displays the difference between the participants’ pre- and post-presentation response to the T-TPQ. A scoring of zero indicates no change in participant perceptions towards teamwork following the training. Participants scoring above zero indicate the TeamSTEPPS® 2.0 and SBTT had an effect on their perceptions of teamwork in the four subcategories of communication, leadership, mutual support, situational monitoring, and team structure. A score below zero indicates a negative effect of the TeamSTEPPS® 2.0 and SBTT on teamwork perceptions. Demographic data were collected identifying the participant’s roles. This information was included if further analysis of the TeamSTEPPS® 2.0 and SBTT in relation to role would be performed. No further investigation of the TeamSTEPPS® 2.0 and SBTT pertaining to role was completed during this project.

Simulated Team Performance

Following the TeamSTEPPS® 2.0 and SBTT, team performance in the sub-constructs of communication, leadership, mutual support, and team structure all showed statistically significant improvement with p < 0.05 (Table 7). Situational monitoring showed no statistically significant improvement following the TeamSTEPPS® 2.0 and SBTT (Figure 6).

Figure 6 displays the pre- and post-test results of the T-POT following the SBTT presentation by the DNP student. Scores for each of the four groups were analyzed in each sub-construct (communication, leadership, mutual support, team structure, and situational awareness). Increase in scores from zero indicates a positive change from the initial SBTT performance.

Participant Satisfaction

At the conclusion of the TeamSTEPPS® 2.0 and SBTT, participants completed the SESS to evaluate their satisfaction with the educational modality. All participants selected ‘agree’ or ‘strongly agree’ on the eighteen statements of the SESS reflecting significant satisfaction with the educational modality. There are three sections of the SESS: debrief and reflection, clinical reasoning, and clinical learning. Nine questions assessed debrief and reflection, seventeen participants indicated strongly agree or agree to all nine questions. Two participants noted agree and unsure and one participant noted unsure on all questions of the debrief and reflection section (Appendix J).
Five questions evaluated the clinical reasoning of the simulation training. Eighteen participants noted strongly agree or agree to all five questions. Two participants indicated agree on all five questions (Appendix J). Four questions evaluated the clinical learning of the simulation training. All twenty participants noted strongly agree or agree to all four questions (Appendix J).
The goal of this scholarly project was to implement and evaluate the effectiveness of a TeamSTEPPS® 2.0 SBTT within a comprehensive multidisciplinary unstable pediatrics course provided at a local community hospital. The secondary aims of the TeamSTEPPS® 2.0 intervention were to improve teamwork perceptions, attitudes and team performance of participating individuals, and have participant self-reported satisfaction with the education modality of interactive SBTT. Of the eleven learning objectives identified in the outline of the unstable pediatrics course, this scholarly project directly evaluated three learning objectives: upon completion of the unstable pediatrics course, participants will be able to perform effective team teamwork through demonstration in simulation scenarios; participants will report satisfaction in team collaboration from the simulation team training scenarios; and participants will report improved perceptions and attitudes towards teamwork and collaboration (Appendix D).

The results of this scholarly project support the implementation of a TeamSTEPPS® 2.0 framework and SBTT in a multidisciplinary continuing education setting in a community hospital. The statistically significant scores of the T-TAQ indicate an improvement of the participant's attitudes towards teamwork following the TeamSTEPPS® 2.0 education (Table 5). This evidence is supportive of evidence found in previous studies by Colacchio, et al. (2012) and Rice, et al. (2016) that demonstrated improvement in individual attitudes towards teamwork following TeamSTEPPS® 2.0 and
SBTT education. The insignificant changes in the T-TPQ on the sub-constructs of leadership and team structure indicate the individual's views of the current state of teamwork in their organization did not change with the TeamSTEPPS 2.0 framework and SBTT intervention. Previous research on perceptions by participants using the TeamSTEPPS 2.0 framework is limited. Rice, et al. (2016) did identify improved scores in the T-TPQ following the TeamSTEPPS 2.0 and SBTT implementation on a small sample size of eight participants.

The overall improved score of the T-TPOT, post-TeamSTEPPS 2.0 framework, and SBTT intervention indicates improved team performance. Communication and mutual support demonstrated significant improvement in all three measurement instruments (T-TAQ, TTPQ, and T-TPOT) (Tables 4, 5, and 6). Increased communication is exponentially significant as the AHRQ (2008) has identified poor communication and one of the leading causes of medical errors in the United States. Of note, all five sub-constructs improved significantly in the teamwork attitudes evaluations post-intervention. Often individuals alter and evaluate their personal attitudes towards teamwork before a change in their view on the perceptions of the organizational approach to teamwork (TeamSTEPPS, n.d. b). This demonstrates a potential creation of teamwork change within the facility overall.

Relation to Other Evidence

There is an ample amount of literature available supporting the use of the TeamSTEPPS® 2.0 framework and SBTT (Boling et al., 2016; Fung et al., 2015). The
results of this scholarly project are consistent with the reviewed literature completed by the DNP student that support the use of TeamSTEPPS® 2.0 framework and a form of SBTT during continuing education with hospital staff. This scholarly project differs from some of the reviewed studies in clinical team focus, evaluation tools utilized, and outcomes measured.

Clinical team focus for this TeamSTEPPS® 2.0 and SBTT implementation was employees at a small community hospital that work with the pediatric population. In the studies reviewed, there was a wide range of clinical focus, neurological patients entering the ED (Capella et al., 2010), neonatal ICU (Colacchio et al., 2012), clinical teams in the combat setting of Iraq (Deering et al., 2011), critical care teams (Frengley et al., 2011; Rice et al., 2016), perinatal outcomes (Riley et al., 2011), and patients in a stroke rehabilitation center (Strasser et al., 2008). Though the clinical focused differed amongst these populations, all results were consistent with improved team performance supported by the outcomes of this scholarly project.

Many of studies reviewed by the DNP student utilized the TeamSTEPPS 2.0 evaluation tools and methods (Capella et al., 2010; Colacchio et al., 2012; Figueroa et al., 2013; Mayer et al., 2011; Reed et al., 2017; Rice et al., 2016). Others utilized self-developed evaluation tools (Gordon & Buckely, 2009; Lisbon et al., 2016; Reime et al., 2016). The majority of the available literature involved some variation of interdisciplinary teams (Capella et al., 2010; Colacchio et al., 2012; Figueroa et al., 2013) similar to this scholarly project. Others utilized one staffing group such as medical students (Ten Eyck, 2009) or nurses (Rice et al., 2016).
Team performance improved with the implementation of the TeamSTEPPS 2.0 and SBTT in the reviewed literature which is supported by the results of this scholarly project (Falcone et al., 2008; Figueroa et al., 2013; Fung et al., 2015; Maxson et al., 2011; Mayer et al., 2011; Reed et al., 2017; Rice et al., 2016).

The reviewed literature that evaluated team participants attitudes specific to teamwork guided by the TeamSTEPPS 2.0 framework is in line with the results of this scholarly project (Colacchio et al., 2012; Lisbon et al., 2016). Mayer et al. (2011) identified improved perceptions and Rice et al. (2016) improved both attitudes and perceptions following the TeamSTEPPS® 2.0 SBTT. This scholarly project evaluated both attitudes and perceptions. Both were improved following the TeamSTEPPS 2.0 framework implementation (Figure 4 and 5). Improved clinician attitudes were identified as a common outcome of various SBTT in the integrative review completed by Fung et al. (2015).

Literature reviewed supports the use of SBTT as an educational platform with a high level of participant satisfaction (Fung et al., 2015; Gillman et al., 2016; Murphy et al., 2016; Reime et al., 2016; Ten Eyck et al., 2009; Ziesmann et al., 2013). Rice et al. (2016) specifically identified satisfaction with TeamSTEPPS® 2.0 SBTT. Feedback on the SSES in this scholarly project also supports staff satisfaction of SBTT.

Overall the supporting literature and the scholarly project demonstrate positive outcomes of teamwork including team performance, attitudes, perceptions, and participant satisfaction regardless of clinical team focus, clinical group or evaluation tools.
utilized confirming the benefits of TeamSTEPPS 2.0 framework and SBTT regardless of the evaluation methods or involved team structure.

**Limitations**

There were multiple limitations to this scholarly project. Due to the time restrictions for the completion of the scholarly project, it was only feasible for the DNP student to implement one TeamSTEPPS® 2.0 training and SBTT. Data supporting the use of the TeamSTEPPS® 2.0 program and SBTT would have been strengthened if there was additional educational sessions and evaluation over an extended time frame. The DNP student was not able to evaluate participants within the actual clinical setting which would have given possible insight into the practical effects of the TeamSTEPPS® 2.0 and SBTT on clinical outcomes.

Having one lead investigator is a limitation in both time and bias. Bias is a limitation that must be considered in any scholarly project as the DNP student is the project lead and has a personal investment in the success or failure of the project intervention. The selection of articles and research for the literature review, the interpretation of the data, and the development of certain interventions had potential to be influenced by the DNP student’s personal bias. Active measures were taken to avoid bias throughout the project by working closely with the ED director and ED educator the DNP student was cognizant of the practical learning needs of the community hospital. The self-evaluations of teamwork attitudes and perceptions were assigned to a participant number to which the DNP student did not correlate until analysis was completed.
The DNP student is a novice in the quality improvement project process, and this could be considered a limitation. Finally, generalizability and external validity must be considered. The basis and goals of this project could possibly be generalized to any setting, although the interventions were tailored to the needs of this community hospital.

Conclusion

This project has highlighted the benefits of the addition of TeamSTEPPS® 2.0 framework and SBTT to interdisciplinary continuing education at a community hospital. Though there are limitations with the implementation of this scholarly project, both TeamSTEPPS® 2.0 framework and SBTT appear to be beneficial additions to any healthcare organization education program. The results of this scholarly project can be utilized to further strengthen the importance of teamwork for optimal patient outcomes. Also highlighted in this scholarly project is the favorability of SBTT as an educational modality.

Following the successful implementation of the TeamSTEPPS® 2.0 and SBTT in the unstable pediatrics course, the DNP student successfully presented the TeamSTEPPS® 2.0 program to the employer, REACH Air Medical as an enhancement to their hospital outreach education program. Since the initial implementation during the DNP student’s scholarly project, the DNP student has worked with REACH Air Medical to provide unstable pediatric sessions incorporating TeamSTEPPS® 2.0 and SBTT across southwest Montana. Over the past year and a half, four sessions have occurred, each at different small community hospitals that are tasked with the initial assessment, treatment,
and stabilization of all patients including critically ill or injured pediatrics. During these training, the formal The TeamSTEPPS® 2.0 and SBTT evaluations have not been completed, though in feedback questionnaires participants have favorable responses. Further educational opportunities are scheduled with the involvement of the TeamSTEPPS® 2.0 program with REACH Air Medical that can continue to strengthen team performance, teamwork attitudes, and perceptions in healthcare facilities across southwest Montana. In healthcare, processes are dictated by protocols while the care is driven by the people. Strengthening the collaboration and teamwork amongst these healthcare providers hopefully will reinforce overall patient care and improve patient outcomes.


APPENDIX A

EVIDENCE TABLE
<table>
<thead>
<tr>
<th>Author</th>
<th>Objectives</th>
<th>Level/Design</th>
<th>Intervention/Outcome Measured</th>
<th>Tool Used</th>
<th>Results</th>
<th>Limitations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Boling, et al. (2016)</td>
<td>Examine current research to answer the research question: &quot;What is the effect of high-fidelity simulation on the knowledge, confidence, self-efficacy of critical care providers?&quot;</td>
<td>Level I Integrative Review</td>
<td>What is the effect of HFS on knowledge and confidence of participants?</td>
<td>Systematic evaluation of evidence through electronic databases (CINAHL, Medline) in the past 10 years</td>
<td>Seventeen studies includes. All 17 demonstrated improved knowledge. 13 evaluated confidence with improvement post simulation in all</td>
<td>English language only. Many studies did not specify HFS in title potentially excluding appropriate articles.</td>
</tr>
<tr>
<td>Capella, et al. (2010)</td>
<td>Does formal team training improve team behaviors in the trauma resuscitation bay? If yes, then does improved teamwork lead to more efficiency in the trauma bay and/or improved clinical outcomes?</td>
<td>Level III Pre/post test</td>
<td>Leadership, situation monitoring, mutual support, communication, time to: ct scan, endotracheal intubation, OR</td>
<td>TIPOT</td>
<td>Time from arrival to CT scan, ETT, and OR were decreased. No change in LOS-ICU or hospital, complication rate or mortality rate. Improved TIPOT scores</td>
<td>TIPOT was developed by the authors, not utilized previously.</td>
</tr>
<tr>
<td>Colacchio, et al. (2012)</td>
<td>Implement and evaluate teamwork training using simulation in situ in neonatal ICU</td>
<td>Level III Pre/Post test</td>
<td>Teamwork attitudes regarding team structure, leadership, situation monitoring, mutual support, communication</td>
<td>Teamwork Attitudes Questionnaire (TAQ) TeamSTEPPS</td>
<td>Caregivers views group-level team skills and effective communication as being very important. Training was helpful and informative and would apply skills into daily practice</td>
<td>high patient census preventing sessions from being conducted in situ and scheduling conflicts preventing staff from participating</td>
</tr>
<tr>
<td>Deering et al. (2011)</td>
<td>Implementation and evaluation TeamSTEPPS in Iraq</td>
<td>Level III Mixed method</td>
<td>TeamSTEPPS training sessions and reinforcement on unit by leaders. Measurement of communication-related errors</td>
<td>Rates of communication-related errors, medication and transfusion errors, and needle stick incidents</td>
<td>Improved patient safety, improved communication</td>
<td>Clinical setting within combat zone with different variables than US hospital setting.</td>
</tr>
<tr>
<td>Falcone et al. (2008)</td>
<td>Evaluate the impact of SBTT on multidisciplinary group in pediatric trauma</td>
<td>Level III RCT</td>
<td>Monthly SBTT with video taping and debriefing</td>
<td>N/A</td>
<td>Improved team performance. Less errors</td>
<td>Comparison group makes up not defined</td>
</tr>
<tr>
<td>Study</td>
<td>Levels</td>
<td>Design</td>
<td>Methods</td>
<td>Results</td>
<td>Limitations</td>
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<tr>
<td>Figueroa, et al. (2013)</td>
<td>Level III</td>
<td>Pre/post test</td>
<td>Didactic TeamSTEPPS principles; Interdisciplinary simulation. Participant evaluation of confidence, skills, communication, and collaboration. Rate themselves and team as a whole during simulation on TeamSTEPPS principles.</td>
<td>TeamSTEPPS Course was useful, better prepared (p&lt;0.05) to participate and to lead, significant change in confidence (p&lt;0.05) and skill, significant increase (p&lt;0.05) in communication, use of debriefing, perception of mutual respect and sense of empowerment.</td>
<td>Instructors worked with participants possibly creating bias. Insufficient data to assess impact on pt. outcomes or adverse events.</td>
<td></td>
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<tr>
<td>Frengley, et al. (2011)</td>
<td>Level II RCT crossover study</td>
<td>The effects of SBTT on performance of CCU teams</td>
<td>Systematic evaluation of evidence through electronic databases (CINAHL, Medline, EMBASE, Cochrane, ERIC). Kirkpatrick Levels of effectiveness.</td>
<td>Significant improvement in overall teamwork, leadership and team coordination (p&lt;.002) and in verbalizing situational information (p&lt;.02), clinical management (p&lt;.003).</td>
<td>Results only from one CCU.</td>
<td></td>
</tr>
<tr>
<td>Gordon &amp; Bucely 2009</td>
<td>Level III Pre/post test</td>
<td>Confidence in ability to respond to emergencies with technical and nontechnical skills</td>
<td>Evaluator developed survey.</td>
<td>Increased confidence in all aspects measured.</td>
<td>Study tool never verified or utilized elsewhere.</td>
<td></td>
</tr>
<tr>
<td>Study</td>
<td>Methodology</td>
<td>Findings</td>
<td>Limitations</td>
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<tr>
<td>Laird-Fick et al. (2011)</td>
<td>To train medical residents and nurses to work together as a patient centered team and test its feasibility, nurses learning and patient outcomes</td>
<td>Patient satisfaction, learning by nurses of patient centered interview, team performance</td>
<td>Significant improvement for RN in knowledge for PCC and self-efficacy. No change for residents or RN on team performance. No significant change for patients. No direct observation of participants. Potential chance intervention not effectively implemented.</td>
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<tr>
<td>Lisbon, et al. (2016)</td>
<td>Describe the process and results from implementation of TeamSTEPPS in interprofessional team training in ED</td>
<td>Patient satisfaction, learning by nurses of patient centered interview, team performance</td>
<td>Knowledge and attitudes increased significantly (p&lt;.05) and were sustained by day 90. Survey data not segregated by profession or trainee. No control group.</td>
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<tr>
<td>Maxson et al. (2011)</td>
<td>To evaluate for enhanced nurse/md collaboration post SBTT using TeamSTEPPS</td>
<td>Collaboration and satisfaction about care decisions</td>
<td>Significant improvement in satisfaction scores for both physician and RN. Improved perceived collaboration. No findings on patient clinical outcomes.</td>
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<tr>
<td>Mayer et al. (2011)</td>
<td>Evaluate effectiveness/team performance improvement after implementation of TeamSTEPPS system</td>
<td>Staff interviews, teamwork observation, staff surveys, clinical outcome data</td>
<td>Improved experience of teamwork, improvement in staff perceptions of team work. Improved observed performance. Decrease infection rate. Participants only within 2 units of 1 hospital.</td>
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<tr>
<td>Merriel et al. (2016)</td>
<td>To evaluate if a short multidisciplinary training intervention and simulation can improve recognition of the deteriorating patient using EWS</td>
<td>Hour long training on EWS, simulation and debriefing discussion. The EWS score, changes in safety and teamwork</td>
<td>After training, staff were more likely to calculate EWS scores correctly. Observations were more likely to be performed at the correct frequency. No evidence if better EWS identification resulted in improved clinical outcomes.</td>
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<tr>
<td>Murphy, et al. (2016)</td>
<td>To evaluate the current knowledge about the key components and impacts of multidisciplinary SBTT on team performance and patient and healthcare outcomes specifically in emergency resuscitation</td>
<td>Does multidisciplinary SBTT lead to improved teamwork? Does teamwork lead to efficiency in resuscitation management? What simulation training models for resuscitation teams are evident in the literature? What do staff perceive are the necessary components of multidisciplinary SBTT?</td>
<td>Eleven studies included. SBTT improved team performance. SBTT was associated with timelier decisions and recognition of critical events earlier. All studies used some form of simulation or staged scenarios. Some included didactic. All chose SBTT over traditional methods. Participants</td>
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<td>All studies reviewed were of low level evidence. Lack of comparative data across studies.</td>
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<tr>
<td>Study</td>
<td>Objective</td>
<td>Methodology</td>
<td>Key Findings</td>
<td>Notes</td>
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<td>Reed et al. (2017)</td>
<td>Evaluate TeamSTEPPS effect on team performance, knowledge of TeamSTEPPS principles, self-efficacy.</td>
<td>Level IV pre/post test quantitative descriptive 1-group</td>
<td>Assess TeamSTEPPS through simulation to determine impact on self-efficacy and team performance</td>
<td>Significant improvement in all target measures</td>
<td>Internally developed evaluation tool</td>
<td></td>
</tr>
<tr>
<td>Reime, et al. (2016)</td>
<td>Experience of RN and medical students after SBTT course and impact on professional and patient safety practice.</td>
<td>Level III Mixed method</td>
<td>Team performance was observed and scored. Focused interviews conducted to evaluated participants experience</td>
<td>Significant improvement following video debriefing in sessions. Participants prefer this educational modality.</td>
<td>The researchers were actively involved both as facilitators in the simulations and as moderators in the focus groups. Possible sample bias.</td>
<td></td>
</tr>
<tr>
<td>Rice, et al. (2016)</td>
<td>Implementation and evaluation of TeamSTEPPS SBTT in a trauma ICU ‘boot camp’</td>
<td>Level III Pre/post test</td>
<td>Teamwork attitudes regarding team structure, leadership, situation monitoring, mutual support, communication. Participants satisfaction with teaching modality</td>
<td>T-TAQ, TTPOT, T-TPQ, NLN satisfaction Survey</td>
<td>Small sample size n=8</td>
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<tr>
<td>Riley et al. (2011)</td>
<td>Evaluate effectiveness of TeamSTEPPS training on perinatal outcomes</td>
<td>Level II RCT</td>
<td>Perinatal morbidity and mortality. One hospital was control group, one hospital used TeamSTEPPS and simulation training exercises</td>
<td>Weighted Adverse Outcomes Score (WAOS) and Safety Attitudes Questionnaire</td>
<td>37% improvement with full intervention (SBT and didactic) in reduction of perinatal harm. No improvement on team training on culture of safety. Staff turnover was not accounted for as a variable at the 3 hospitals.</td>
<td></td>
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<tr>
<td>Roh et al. 2013</td>
<td>Efficacy and RN satisfaction with computer or HFS training</td>
<td>Level III post comparison</td>
<td>Self-reported self-efficacy and satisfaction post</td>
<td>Self-reported on 10-point Likert Scale</td>
<td>Significant improvement in satisfaction for usefulness, prioritization and protocol implementation. Further research needed to verify results.</td>
<td></td>
</tr>
<tr>
<td>Siassako et al. (2010)</td>
<td>To determine whether team performance in a simulated emergency is related to generic teamwork skills and behaviors</td>
<td>Level II RCT Retrospective cohort observational study</td>
<td>Correlation of team performance and teamwork scores</td>
<td>Skills and behavior tool by Weller et al</td>
<td>Significant Positive correlation between clinical efficiency and teamwork scores. Further research needed to know what aspect of teamwork is critical for performance.</td>
<td></td>
</tr>
<tr>
<td>Study</td>
<td>Objective</td>
<td>Study Design</td>
<td>Intervention Details</td>
<td>Outcome Measures</td>
<td>Findings</td>
<td>Limitations</td>
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<tr>
<td>Strasser et al. (2008)</td>
<td>To test whether a team training intervention in stroke rehabilitation is</td>
<td>Level II cluster RCT</td>
<td>Intervention group: 6 mos team training and feedback. Outcome: FIM instrument, community is charge and LOS</td>
<td>FIM instrument patient chart data on LOC and discharge location</td>
<td>Statistically significant improvement in motor function (increase of 4.4% in intervention group, decrease of 9.2% in control group). No measurable effect on LOS or discharge destination</td>
<td>None</td>
</tr>
<tr>
<td>Ten Eyck, et al. (2009)</td>
<td>Determine the effects of SB curriculum on fourth-year medical students test performance and satisfaction during ER training</td>
<td>Level II RCT crossover design</td>
<td>Students randomized into 2 groups for simulation, discussion and evaluation. Student performance and satisfaction evaluated</td>
<td>Multiple choice test performance. Likert satisfaction survey</td>
<td>Student performance on material presented in simulation vs discussion improved. Students prefer simulation format</td>
<td>Results only from one medical school. Survey question designed were asked from the perspective that suggested simulation was better. Doesn’t assess for clinical performance or team skills.</td>
</tr>
<tr>
<td>Wallin, et al. (2007)</td>
<td>Effects of team training on behavior and attitude of medical emergency team training</td>
<td>Level III Pre/post test</td>
<td>Effects of SBT on behavior and attitude Video recordings Instrument developed by Gaba and colleagues at Stanford for CRM behaviors. OTRMS (operating team resource management survey)</td>
<td>Simulation perceived as very realistic, recommended the course to peers, behavioral components were rated significantly higher, inter-rater reliability for communication 0.7 and recognition of limitations 0.78</td>
<td>Single site cohort.</td>
<td></td>
</tr>
<tr>
<td>Ziesmann et al. (2013)</td>
<td>STARTT program. Evaluate impact of CRM on emergency trauma management</td>
<td>Level III Pre/post test</td>
<td>STARTT program. Outcome: Satisfaction Satisfaction survey tool</td>
<td>Improved attitudes towards simulation, teamwork and safety but not stress recognition</td>
<td>Lack of evidence on clinical outcomes.</td>
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</tbody>
</table>
APPENDIX B

ESSENTIALS POWERPOINT TEAMSTEPPS 2.0
TeamSTEPPS 2.0

Samar

Situation: What is going on with the patient?
- An elderly woman, Mrs. Ashton, called the clinic reporting a decrease in urine output and an increase in shortness of breath.

Background: Mrs. Ashton is a 78-year-old female with a history of congestive heart failure and diabetes.

Assessment: Mrs. Ashton appears anxious and diaphoretic. Her blood pressure is 100/60 mm Hg, heart rate is 110 bpm, and respiratory rate is 24 breaths per minute.

Recommendation and Request:
- Call for help immediately. Mrs. Ashton needs immediate medical attention.
- Ensure she is positioned upright and comfortable. Monitor her vital signs closely.

Communication:

Call-Out

Strategies used to communicate important or critical information:
- Use simple and clear language.
- Ensure all team members are focused and engaged.
- Use nonverbal cues to reinforce verbal communication.

Example:
- "Mrs. Ashton is experiencing shortness of breath and decreased urine output. We need to call for help immediately."

Leaders:
- "Call for help!"
- "Let's call for help immediately."

Nurse:
- "We need to call for help."
- "Mrs. Ashton needs immediate assistance."
TeamSTEPPS 2.0 Essentials

Check-back

- Make sure that the information was understood by the entire team.
- Check that all team members are on the same page.
- Review the steps to ensure that nothing was missed.

Example:
- Device: "Give 25 mg Benadryl IV push";
- Name: "Dr. Smith";
- Initial: "Initials";

Communication

Hand-off

The transfer of information among team members is essential for safe and effective care. Hand-off should be clear, concise, and thorough.

- Transfer of information includes:
  - Patient status
  - Medication changes
  - Significant medical history
  - Current treatment plans
  - Surgical procedures
  - Patient information

TeamSTEPPS 2.0 Essentials Course
TeamSTEPPS®

Handoff
A key strategy to prevent information exchange during transitions is to use "CHECK THE BAG".

1. Prepare
2. Takeover
3. Transition
4. Verify
5. Evaluate
6. Assess
7. Feedback

Communication

TeamSTEPPS®

Effective Team Leaders
The following are responsibilities of effective team leaders:
- Organize the team
- Identify and articulate clear goals (i.e., the "game")
- Define tasks and responsibilities
- Monitor and modify the pace
- Communicate changes
- Resolve the team's interpersonal conflicts; provide
- Manage and allocate resources
- Facilitate information sharing
- Encourage team members to ask questions and
- Resolve conflict as a team through
- Model effective teamwork

Leadership
TeamSTEPPS® Essentials

Leadership

Team Events
- Setting the Plan
  - Brief: Brief members prior to start to ensure all players change from familiar
  design roles to responsibilities, establish expectations and define anticipated
  outcomes and real contingencies
- Monitoring and Identifying the Plan
  - Monitor: All can monitor to reestablish
  accountability and adjust plan if needed.
- Reviewing the Team's Performance
  - Review: Internal/external exchange
  sessions designed to improve team
  performance and effectiveness through
  feedback shared and incorporation of
  positive behavior.

TeamSTEPPS® 2.0

Brief Checklist
During the event, the team should address:
- Who is the team?
- Do all team members understand the event goals?
- Are the roles and responsibilities understood?
- Where are we in the event?
- What is the team's ability to adapt?
- How is the team managing stress?
- What resources are available?
TeamSTEPPS® 2.0

Leadership

Dealer Checklist
- What is the goal of the meeting? (check)
- Who has the responsibility for the meeting? (check)
- What is the objective of the meeting? (check)
- Who is responsible for the meeting's success? (check)
- What are the potential risks? (check)
- What are the potential benefits? (check)
- What are the potential costs? (check)
- What are the potential outcomes? (check)
- What are the potential trade-offs? (check)
- What are the potential impacts? (check)
- What are the potential benefits? (check)

Situation Monitoring

Situation Monitoring Process

- Situation awareness is the process of continually monitoring and assessing a situation to gain a mental model of what is happening, how it's changing, and what is going to happen.
- Situation awareness involves being aware of what you can see, hear, and feel in your environment.
- Situation awareness requires you to be aware of your own and others' actions, intentions, and capabilities.
- Situation awareness helps you anticipate potential problems and make informed decisions.
- Situation awareness is essential for effective communication and team performance.

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TeamSTEPPS® Essentials

Case Monitoring
A team uses monitoring strategies that involve:
- Monitoring actions of other team members
- Providing a buddy role within the team
- Encouraging feedback from colleagues or supervisors on quality and safety
- “Watching each other’s back”

Situation Monitoring

Each team member is responsible for assessing his or her own safety status.

I’M SAFE Checklist

- Energetic
- Motivated
- Bright
- Alert and Focused
- Frustration
- Tired and Overwhelmed
TeamSTEPPS®

Task Assistance

- Monitor oneself and other team members for signs of stress.
- Maintain situational awareness.
- Provide clear and concise instructions.
- Communicate effectively to ensure mutual understanding.
- Foster a positive and supportive team environment.

Feedback

- Provide feedback to team members on their performance.
- Use specific, positive feedback to reinforce desired behaviors.
- Offer constructive criticism to help improve performance.
- Encourage open communication to foster a culture of respect and trust.
- Recognize and reward team members for their efforts and contributions.

Mutual Support

- Monitor one's own and others' behavior to prevent errors.
- Stay in contact with team members during critical moments.
- Support and encourage each other to maintain focus and confidence.
- Communicate effectively to ensure mutual understanding.
- Foster a positive and supportive team environment.
TeamSTEPPS® 2.0

Essentials

Team Strategies & Tools to Enhance Performance & Patient Safety

TeamSTEPPS® 2.0

Natural Support

Advocate for the Patient

-Straightforward and direct
-Use clear, direct, concise language
-Express opinions and concerns
-Ask questions

Essentials

TeamSTEPPS® 2.0

Team Strategies & Tools to Enhance Performance & Patient Safety

TeamSTEPPS® 2.0

Two-Challenge Role

Ensure all team members are ‘on board’

- Check the current situation
- Ask for feedback
- Provide insight

When an initial assertion statement is ignored:

- If your responsibility is to assert:
  - Ensure that you have been heard
  - Reiterate your concerns
  - Ask for feedback

TeamSTEPPS® 2.0

Team Strategies & Tools to Enhance Performance & Patient Safety
**TeamSTEPPS® 2.0**

**Mutual Support**

**CUES**

Concerned

I am CONCERNED

I am UNCOMFORTABLE

This is a SAFETY ISSUE

“Shut the Line”

---

**TeamSTEPPS® 2.0**

**DISC Script**

A conflict resolution approach for managing and resolving conflict.

A. **D**efinition for specific classroom behavior: provide concrete data

B. **I**mpact: how the situation makes you feel; what concerns are present

C. **S**olution: suggest alternative(s) and make implementation

D. **C**onsideration: should be tailored to format or impact on established team goals; strive for consensus

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**TeamSTEPPS 2.0 | Essentials Course**
### TeamSTEPPS 2.0 Essentials

#### Team Performance Observation Tool (TeamPOT)

<table>
<thead>
<tr>
<th>Performance Dimension</th>
<th>Rubric</th>
<th>Component</th>
<th>Task/Time</th>
</tr>
</thead>
<tbody>
<tr>
<td>Communication</td>
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<tr>
<td>Leadership</td>
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<td>Team Process</td>
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<td>Task Management</td>
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<tr>
<td>Crisis Management</td>
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**Rubrics**
- Role: Team Member
- Level: Intermediate
- Time: 5 minutes

**Components**
- Communication
  - Listen
  - Speak
  - Read
  - Write
- Leadership
  - Lead
  - Follow
- Team Process
  - Plan
  - Do
  - Review
  - Adapt
- Task Management
  - Prioritize
  - Sequence
  - Execute
- Crisis Management
  - Respond
  - React
  - Reinstate

**Task/Time**
- 15 minutes
Effective Use of TeamSTEPPS Tools and Strategies
APPENDIX C

UNSTABLE PEDIATRICS COURSE SCHEDULE
Two sessions each day

- Morning 7:00 -12:30
- Afternoon 1:00-6:30

Maximum 15 participants per each session.

7:00 – 7:30

- Introductions
- Registration
- Demographic data collection
- Pre TeamSTEPPS® Teamwork Attitudes Questionnaire (T-TAQ)
- Pre TeamSTEPPS® Teamwork Perceptions Questionnaire (T-TPQ)

7:30 – 8:30

- Didactic (Pediatric flight nurse)

8:30 – 9:30

- Skills (ED educator assisted by DNP student)
  - IO
  - Syringe pump
  - Infant warmer
  - OB Kit
  - Pediatric crash cart

9:30 – 9:45

- Break

9:45 – 10:15

- Pre TeamSTEPPS team simulation with Team Performance Observational Tool (TPOT) (DNP student assisted by ED educator)

10:15 – 11:15

- TeamSTEPPS lecture (DNP student)

11:15 – 11:45
• Post TeamSTEPPS team simulation with Team Performance Observational Tool (TPOT) (Team simulations (DNP student assisted by ED educator)

11:45 – 12:30

• Post TeamSTEPPS® Teamwork Attitudes Questionnaire (T-TAQ)
• Post TeamSTEPPS® Teamwork Perceptions Questionnaire (T-TPQ)
• Satisfaction with Simulation Education Survey (SESS)

________________________________________________________________________

1:00 – 1:30

• Introductions
• Registration
• Demographic data collection
• Pre TeamSTEPPS® Teamwork Attitudes Questionnaire (T-TAQ)
• Pre TeamSTEPPS® Teamwork Perceptions Questionnaire (T-TPQ)

1:30 – 2:30

• Didactic (Pediatric flight nurse)

2:30 – 3:30

• Skills (ED educator assisted by DNP student)
  o IO
  o Syringe pump
  o Infant warmer
  o OB Kit
  o Pediatric crash cart

3:30 – 3:45

• Break

3:45 – 4:15

• Pre TeamSTEPPS team simulation with Team Performance Observational Tool (TPOT) (DNP student assisted by the ED educator)

4:15 – 5:15
• TeamSTEPPS lecture (DNP student)

5:15 – 5:45

• Post TeamSTEPPS team simulation with Team Performance Observational Tool (TPOT)
  Team simulations (DNP student assisted by the ED educator)

5:45 – 6:30

• Post TeamSTEPPS® Teamwork Attitudes Questionnaire (T-TAQ)
• Post TeamSTEPPS® Teamwork Perceptions Questionnaire (T-TPQ)
• Satisfaction with Simulation Education Survey (SESS)
APPENDIX D

UNSTABLE PEDIATRICS COURSE LEARNING OBJECTIVES & EVALUATION
Objectives

1.) Upon completion of the Unstable Pediatrics course, participants will be able to recognize unstable pediatric patients and identify assessment and evaluation data that would indicate an unstable pediatric patient.

2.) Upon completion of the Unstable Pediatrics course, participants will be able to perform effective teamwork in the sub-constructs of communication, leadership, mutual support, situational monitoring and team structure through demonstration in simulation scenarios.

3.) Upon completion of the Unstable Pediatrics course, participants will verbalize the understanding and use of the Broslow tape and cart in emergent pediatric patient care.

4.) Upon completion of the Unstable Pediatrics course, participants will demonstrate appropriate medical math calculations for pediatric patients.

5.) Upon completion of the Unstable Pediatrics course, participants will identify common emergent medications used in the pediatric population.

6.) Upon completion of the Unstable Pediatrics course, participants will verbalize and demonstrate the appropriate process to obtain interosseous and intravenous access in the pediatric population.

7.) Upon completion of the Unstable Pediatrics course, participants verbalize an understanding of the emergent delivery kit contents and the indication for the infant warmer.

8.) Upon completion of the Unstable Pediatrics course, participants will report improved confidence in the recognition and care of unstable pediatric patients.

9.) Upon completion of the Unstable Pediatrics course, participants will report satisfaction in team collaboration from the simulation team training scenarios.

10.) Upon completion of the Unstable Pediatrics course, participants will report improved perceptions and attitudes towards teamwork and collaboration.

Evaluation of Objectives

- Objectives 1, 3, 5, 7 will be evaluated through discussion and self-reported learning throughout the course
- Objective 2 will be objective be evaluated using the TPOT
- Objectives 4, 5 will be evaluated through return demonstration
- Objective 8 will be evaluated through a self-report assessment at the completion of the course.
• Objective 9 will be evaluated using the Satisfaction with Simulation Experience Scale (SSES)
• Objective 10 will be evaluated using the T-TPQ and T-TAQ
APPENDIX E

PARTICIPANT CONSENT
SUBJECT CONSENT FORM FOR PARTICIPATION IN HUMAN RESEARCH AT MONTANA STATE UNIVERSITY

Implementation and Evaluation of a Simulation-Based Team Education Program

You are being asked to participate in a research project for the evaluation of simulation-based education modalities utilizing the TeamSTEPPS® 2.0 program. Through this project we may obtain better understanding of the effectiveness of this education modality. You have been asked to participate in this project as you are employees of Saint Peter’s Hospital and Lewis & Clark Emergency Physicians and care for trauma patients in the interdisciplinary emergency setting. Participation is voluntary. If you agree to participate you will be asked to attend and participate in a simulation-based team education program and complete a questionnaire on the effectiveness of this education technique. Participation is voluntary, and you can choose to not answer any questions you do not want to answer, and/or you can stop at any time. The team performance will also be video recorded, evaluated and debriefed with the participants.

Prior to the training participants initially will be asked to complete a short demographic survey, TeamSTEPPS® 2.0 Teamwork Attitudes Questionnaire (T-TAQ) and TeamSTEPPS® 2.0 Teamwork Perceptions Questionnaire (T-TPQ). Participants will partake in an interdisciplinary simulation team trauma activation while being observed and evaluated with the Team Performance Observation Tool (TPOT). Participants then will attend a one-hour TeamSTEPPSTM program presented by a the TeamSTEPPS®2.0 program trained DNP student. Follow the TeamSTEPPS® 2.0 program the teams will be asked to complete a post TeamSTEPPS® program T-TAQ and T-TPQ. Participants then will participate in another interdisciplinary simulation team trauma activation while being observed and evaluated with the TTPOT. The simulation trauma activations will be debriefed with feedback given to the group. Upon completion of the training day participants will be asked to complete an evaluation of their satisfaction with the simulation education modalities utilizing the student satisfaction and self-confidence in learning tool.

There are no foreseen risks of participation in this project. Participants will benefit in receiving evidenced-based education for effective teamwork in high acuity trauma patients. This project is not funded by an outside source and there are no costs to be incurred by the participant.

Participants are encouraged to ask questions and elicit clarification of the project purpose and reasoning from the investigator.

Your investigator will treat your identity with professional standards of confidentiality. Participants will be assigned a project ID when the demographic data is obtained. Participants will not be asked to provide personal information such as name or date of birth. All information regarding participants will be kept confidential by the primary investigator. All information with remain in the possession of the primary investigator and all evaluated data will be stored on a personal computer with password.
restrictions. All video data will be deleted upon completion of the group debriefing. The information obtained in this project may be published in academic journals, but your identity will not be revealed.

In the event your participation in this research directly results in injury to you, medical treatment consisting of calling 911, referral to Urgent Care or the Emergency Department. Further information about this treatment may be obtained by calling Kathryn Butterly at (207) 944-9935

If you have any questions about the research, you can contact Kathryn Butterly at (207)944-9935 [butterly.kathryn@gmail.com]. If you have additional questions about the rights of human subjects you can contact the Chair of the Institutional Review Board, Mark Quinn, (406) 994-4707 [mquinn@montana.edu].

For one's own participation:

AUTHORIZATION: I have read the above and understand the discomforts, inconvenience, and risk of this project. I, ____________________________ (name of subject), agree to participate in this research. I understand that I may later refuse to participate and that I may withdraw from the project at any time. I have received a copy of this consent form for my own records.

Signed: ____________________
Investigator: ____________________
Date: ____________________
APPENDIX F

DEMOGRAPHIC DATA SURVEY
Demographic Data Survey

Age: ______

Current Role at hospital

___ RN ___ EMT ___ Paramedic ___ RT

___ NP ___ PA ___ MD/DO

___ other: __________

How long have you held your license?

___ Years

How long have you been employed at hospital?

___ Years

What is your primary department of employment?

___________________

How long have you been working in your department at SPH?

___ Years
APPENDIX G

Teamwork Attitudes Questionnaire
**TeamSTEPPS® 2.0**

**TeamSTEPPS Teamwork Attitudes Questionnaire (T-TAQ)**

**Instructions:** Please respond to the questions below by placing a check mark (✓) in the box that corresponds to your level of agreement from *Strongly Disagree* to *Strongly Agree*. Please select only one response for each question.

<table>
<thead>
<tr>
<th><strong>Team Structure</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>1. It is important to ask patients and their families for feedback regarding patient care.</td>
</tr>
<tr>
<td>2. Patients are a critical component of the care team.</td>
</tr>
<tr>
<td>3. This facility's administration influences the success of direct care teams.</td>
</tr>
<tr>
<td>4. A team's mission is of greater value than the goals of individual team members.</td>
</tr>
<tr>
<td>5. Effective team members can anticipate the needs of other team members.</td>
</tr>
<tr>
<td>6. High performing teams in health care share common characteristics with high performing teams in other industries.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Leadership</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>7. It is important for leaders to share information with team</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>---</td>
</tr>
<tr>
<td>8.</td>
</tr>
<tr>
<td>9.</td>
</tr>
<tr>
<td>10.</td>
</tr>
<tr>
<td>11.</td>
</tr>
<tr>
<td>12.</td>
</tr>
</tbody>
</table>

**PLEASE CONTINUE TO THE NEXT PAGE**
### Situation Monitoring

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>13</td>
<td>Individuals can be taught how to scan the environment for:</td>
</tr>
<tr>
<td></td>
<td>* important situational cues.</td>
</tr>
<tr>
<td>14</td>
<td>Monitoring patients provides an important contribution to:</td>
</tr>
<tr>
<td></td>
<td>* effective team performance.</td>
</tr>
<tr>
<td>15</td>
<td>Even individuals who are not part of the direct care team should be encouraged to scan for and report changes in:</td>
</tr>
<tr>
<td></td>
<td>* patient status.</td>
</tr>
<tr>
<td>16</td>
<td>It is important to monitor the emotional and physical status of other team members.</td>
</tr>
<tr>
<td>17</td>
<td>It is appropriate for one team member to offer assistance to:</td>
</tr>
<tr>
<td></td>
<td>* another who may be too tired or stressed to perform a task.</td>
</tr>
<tr>
<td>18</td>
<td>Team members who monitor their emotional and physical status on the job are more effective.</td>
</tr>
</tbody>
</table>

### Mutual Support

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>19</td>
<td>To be effective, team members should understand the work of their fellow team members.</td>
</tr>
<tr>
<td>20</td>
<td>Asking for assistance from a team member is a sign that an individual does not know how to do his/her job effectively.</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td>21</td>
<td>Providing assistance to team members is a sign that an individual does not have enough work to do.</td>
</tr>
<tr>
<td>22</td>
<td>Offering to help a fellow team member with his/her individual work tasks is an effective tool for improving team performance.</td>
</tr>
<tr>
<td>23</td>
<td>It is appropriate to continue to assert a patient safety concern until you are certain that it has been heard.</td>
</tr>
<tr>
<td>24</td>
<td>Personal conflicts between team members do not affect patient safety.</td>
</tr>
</tbody>
</table>

**PLEASE CONTINUE TO THE NEXT PAGE**
Teams that do not communicate effectively significantly increase their risk of committing errors.

Poor communication is the most common cause of reported errors.

Adverse events may be reduced by maintaining an information exchange with patients and their families.

I prefer to work with team members who ask questions about information I provide.

It is important to have a standardized method for sharing information when handing off patients.

It is nearly impossible to train individuals how to be better communicators.
Please provide any additional comments in the space below.

Thank you for your participation!
APPENDIX H

TEAMWORK PERCEPTIONS QUESTIONNAIRE
### TeamSTEPPS Teamwork Perceptions Questionnaire (T-TPQ)

**Instructions:** Please respond to the questions below by placing a check mark (✓) in the box that corresponds to your level of agreement from *Strongly Agree* to *Strongly Disagree*. Please select only one response for each question.

<table>
<thead>
<tr>
<th>Team Structure</th>
<th>Strongly Disagree</th>
<th>Disagree</th>
<th>Neutral</th>
<th>Agree</th>
<th>Strongly Agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. The skills of staff overlap sufficiently so that work can be shared when necessary.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. Staff are held accountable for their actions.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. Staff within my unit share information that enables timely decision making by the direct patient care team.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. My unit makes efficient use of resources (e.g., staff supplies, equipment, information).</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5. Staff understand their roles and responsibilities.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6. My unit has clearly articulated goals.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7. My unit operates at a high level of efficiency.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Leadership</th>
<th>Strongly Disagree</th>
<th>Disagree</th>
<th>Neutral</th>
<th>Agree</th>
<th>Strongly Agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>8. My supervisor/manager considers staff input when making decisions about patient care.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>9. My supervisor/manager provides opportunities to discuss the unit’s performance after an event.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10. My supervisor/manager takes time to meet with staff to</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
1. My supervisor/manager ensures that adequate resources (e.g., staff, supplies, equipment, information) are available.
2. My supervisor/manager resolves conflicts successfully.
3. My supervisor/manager models appropriate team behavior.
4. My supervisor/manager ensures that staff are aware of any situations or changes that may affect patient care.
### Situation Monitoring

15. Staff effectively anticipate each other’s needs.
16. Staff monitor each other’s performance.
17. Staff exchange relevant information as it becomes available.
18. Staff continuously scan the environment for important information.
19. Staff share information regarding potential complications (e.g., patient changes, bed availability).
20. Staff meets to reevaluate patient care goals when aspects of the situation have changed.
21. Staff correct each other’s mistakes to ensure that procedures are followed properly.

### Mutual Support

22. Staff assist fellow staff during high workload.
23. Staff request assistance from fellow staff when they feel overwhelmed.
24. Staff caution each other about potentially dangerous situations.
25. Feedback between staff is delivered in a way that promotes positive interactions and future change.
26. Staff advocate for patients even when their opinion conflicts.
<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>with that of a senior member of the unit.</td>
<td></td>
</tr>
<tr>
<td><strong>27.</strong> When staff have a concern about patient safety, they challenge others until they are sure the concern has been heard.</td>
<td></td>
</tr>
<tr>
<td><strong>28.</strong> Staff resolve their conflicts, even when the conflicts have become personal.</td>
<td></td>
</tr>
</tbody>
</table>

**PLEASE CONTINUE TO THE NEXT PAGE**
<table>
<thead>
<tr>
<th></th>
<th>Communication</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>29.</td>
<td>Information regarding patient care is explained to patients and their families in lay terms.</td>
<td></td>
</tr>
<tr>
<td>30.</td>
<td>Staff relay relevant information in a timely manner.</td>
<td></td>
</tr>
<tr>
<td>31.</td>
<td>When communicating with patients, staff allow enough time for questions.</td>
<td></td>
</tr>
<tr>
<td>32.</td>
<td>Staff use common terminology when communicating with each other.</td>
<td></td>
</tr>
<tr>
<td>33.</td>
<td>Staff verbally verify information that they receive from one another.</td>
<td></td>
</tr>
<tr>
<td>34.</td>
<td>Staff follow a standardized method of sharing information when handing off patients.</td>
<td></td>
</tr>
<tr>
<td>35.</td>
<td>Staff seek information from all available sources.</td>
<td></td>
</tr>
</tbody>
</table>
APPENDIX I

TEAM PERFORMANCE OBSERVATION TOOL
<table>
<thead>
<tr>
<th>Section</th>
<th>Rating</th>
<th>Item</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Team Structure</td>
<td></td>
<td>a. Assembles a team</td>
</tr>
<tr>
<td></td>
<td></td>
<td>b. Assigns or identifies team members’ roles and responsibilities</td>
</tr>
<tr>
<td></td>
<td></td>
<td>c. Holds team members accountable</td>
</tr>
<tr>
<td></td>
<td></td>
<td>d. Includes patients and families as part of the team</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Comments:</td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>Overall Rating – Team Structure</strong></td>
</tr>
<tr>
<td>2. Communication</td>
<td></td>
<td>a. Provides brief, clear, specific, and timely information to team members</td>
</tr>
<tr>
<td></td>
<td></td>
<td>b. Seeks information from all available sources</td>
</tr>
<tr>
<td></td>
<td></td>
<td>c. Uses check-backs to verify information that is communicated</td>
</tr>
<tr>
<td></td>
<td></td>
<td>d. Uses SBAR, call-outs, and handoff techniques to communicate effectively with team members</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Comments:</td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>Overall Rating – Communication</strong></td>
</tr>
<tr>
<td>3. Leadership</td>
<td></td>
<td>a. Identifies team goals and vision</td>
</tr>
<tr>
<td></td>
<td></td>
<td>b. Uses resources efficiently to maximize team performance</td>
</tr>
<tr>
<td></td>
<td></td>
<td>c. Balances workload within the team</td>
</tr>
<tr>
<td></td>
<td></td>
<td>d. Delegates tasks or assignments, as appropriate</td>
</tr>
<tr>
<td></td>
<td></td>
<td>e. Conducts briefs, huddles, and debriefs</td>
</tr>
<tr>
<td></td>
<td></td>
<td>f. Role models teamwork behaviors</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Comments:</td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>Overall Rating – Leadership</strong></td>
</tr>
<tr>
<td>4. Situation Monitoring</td>
<td></td>
<td>a. Monitors the status of the patient</td>
</tr>
<tr>
<td></td>
<td></td>
<td>b. Monitors fellow team members to ensure safety and prevent errors</td>
</tr>
<tr>
<td></td>
<td></td>
<td>c. Monitors the environment for safety and availability of resources (e.g., equipment)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>d. Monitors progress towards the goal and identifies changes that could alter the plan of care</td>
</tr>
<tr>
<td></td>
<td></td>
<td>e. Fosters communication to ensure that team members have a shared mental model</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Comments:</td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>Overall Rating – Situation Monitoring</strong></td>
</tr>
<tr>
<td>5. Mutual Support</td>
<td></td>
<td>a. Provides task-related support and assistance</td>
</tr>
<tr>
<td></td>
<td></td>
<td>b. Provides timely and constructive feedback to team members</td>
</tr>
<tr>
<td></td>
<td></td>
<td>c. Effectively advocates for patient safety using the Assertive Statement, Two-Challenge Rule, or CUS</td>
</tr>
<tr>
<td></td>
<td></td>
<td>d. Uses the Two-Challenge Rule or DESC Script to resolve conflict</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Comments:</td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>Overall Rating – Mutual Support</strong></td>
</tr>
<tr>
<td>TEAM PERFORMANCE RATING</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
APPENDIX J

SATISFACTION WITH SIMULATION EXPERIENCE SCALE
### SATISFACTION WITH SIMULATION EXPERIENCE SCALE (SSES)

Below you will find a list of statements. Read each statement and then select the response that best indicates your level of agreement.

- **Please answer every item**, even if one seems similar to another one.
- **Answer each item quickly**, without spending too much time on any one item.

<table>
<thead>
<tr>
<th>Debrief and reflection</th>
</tr>
</thead>
<tbody>
<tr>
<td>01 The facilitator provided constructive criticism during the debriefing</td>
</tr>
<tr>
<td>02 The facilitator summarized important issues during the debriefing</td>
</tr>
<tr>
<td>03 I had the opportunity to reflect on and discuss my performance during the debriefing</td>
</tr>
<tr>
<td>04 The debriefing provided an opportunity to ask questions</td>
</tr>
<tr>
<td>05 The facilitator provided feedback that helped me to develop my clinical reasoning skills</td>
</tr>
<tr>
<td>06 Reflecting on and discussing the simulation enhanced my learning</td>
</tr>
<tr>
<td>07 The facilitator’s questions helped me to learn</td>
</tr>
<tr>
<td>08 I received feedback during the debriefing that helped me to learn</td>
</tr>
<tr>
<td>09 The facilitator made me feel comfortable and at ease during the debriefing</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Clinical reasoning</th>
</tr>
</thead>
<tbody>
<tr>
<td>10 The simulation developed my clinical reasoning skills</td>
</tr>
<tr>
<td>11 The simulation developed my clinical decision making ability</td>
</tr>
<tr>
<td>12 The simulation enabled me to demonstrate my clinical reasoning skills</td>
</tr>
<tr>
<td>13 The simulation helped me to recognize patient deterioration early</td>
</tr>
<tr>
<td>14 This was a valuable learning experience</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Clinical learning</th>
</tr>
</thead>
<tbody>
<tr>
<td>15 The simulation caused me to reflect on my clinical ability</td>
</tr>
<tr>
<td>16 The simulation tested my clinical ability</td>
</tr>
<tr>
<td>17 The simulation helped me to apply what I learned from the case study</td>
</tr>
<tr>
<td>18 The simulation helped me to recognize my clinical strengths and weaknesses</td>
</tr>
</tbody>
</table>

This resource was created as part of an ATLC Project titled Examining the impact of simulated patients and information and communication technology on nursing students’ clinical reasoning. Please acknowledge as: Levet-Jones, T., McCoy, M., Lapkin, S., Noble, D., Hoffman, K., Dempsey, J., Arthur, C. & Roche, J. (2011). The development and psychometric testing of the Satisfaction with Simulation Experience Scale. *Nurse Education Today*, 31(7), 705-710.
APPENDIX J

SIMULATION SCENARIOS
Simulation Scenarios

**Acute poisoning**

- Presentation: Toddler lethargic, bradypena with ashened skin color.
- HPI: Three-year-old male brought in POV by babysitter after finding him lethargic and breathing shallow. She states she left him alone playing for approximately 20 mins while she was caring for his infant sibling. When she returned to the boy he was lying on the floor and minimally responsive without any obvious injury or causative substance nearby. She states he does not have any medical conditions or allergies she is aware of. She rushed to get to the ED with the children and did not look around the house for anything out of place.
- Assessment:
  - VS: BP | 86/48 HR | 39 Resp | 9 Temp | 97.3 Pulse Ox | 88%
  - Generalized: Lethargic child, minimally responsive to verbal or physical stimuli. Appears well develop, nourished and groomed.
  - Neuro: Pupils 2mm and minimally responsive
  - Resp: lungs clear to auscultation bilaterally. Shallow slow respirations.
  - CVS: 1+ radial bilaterally bradycardic
  - GI: Abdomen soft, non-tender. No evidence of vomit or diarrhea.
  - GU: No evidence of incontinence
  - Musculoskeletal: No bruising or deformities noted
- Critical interventions:
  - ABC assessment and interventions PRN
  - IV and fluid bolus
  - Labs Urine toxicology
  - Narcan
  - Contact Poison control

**Respiratory distress leading into cardiac arrest**

- Presentation: 10-year-old female arriving by EMS for asthma attack while at the fair
- HPI: 10-year-old female with history of asthma. Began with wheezing at the fair. Attempted to use her inhaler without improvement. EMS states her only medical condition is asthma. No medication allergies
- Assessment:
  - VS: BP | 112/86 HR | 131 Resp | 45 Temp | 99.3 Pulse Ox | 78%
  - Generalized: Lethargic child, minimally responsive to verbal or physical stimuli. Appears well develop, nourished and groomed.
  - Neuro: Pupils 4mm responsive
  - Resp: Absent lung sounds bilaterally.
  - CVS: 2+ radial bilaterally tachycardic
Critical interventions

- ABC
- Albuterol/Atrovent neb
- Respiratory therapy at bedside
- IV labs and fluid bolus
- CXR
- Epinephrine
- When patient decompensates continue with PALS algorithm and intubation

Acute significant trauma

- Presentation: 2-year-old brought in by mother when he wouldn’t wake from his nap.
- HPI: 2-year-old brought in by mother when he wouldn’t wake from his nap. She then noticed new bruising to his abdomen and back that was not there when she left in the morning. She states he does not have any medical conditions or allergies. The child was being watched by the mother’s boyfriend.
- Assessment:
  VS: BP | 74/38 HR | 136 Resp | 22 Temp | 97.3 Pulse Ox | 94%
  - Generalized: Lethargic child, minimally responsive to verbal or physical stimuli. Bruising at different stages of healing to abdomen and back.
  - Neuro: Pupils R: 2mm and minimally responsive L: 6mm unresponsive
  - Resp: lungs clear to auscultation bilaterally.
  - CVS: 1+ radial bilaterally tachycardic
  - GI: Abdomen firm and distended. No evidence of vomit or diarrhea.
  - GU: No evidence of incontinence.
  - Musculoskeletal: Bruising at different stages of healing to abdomen and back No deformities noted

- Critical interventions
  - Trauma alert
  - ABC
  - IV labs and fluid bolus
  - CXR
  - Pan CT
  - Contact police